



IAS 2019

10TH IAS CONFERENCE ON HIV SCIENCE
Mexico City, Mexico 21-24 July 2019

**ABSTRACT
BOOK**

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Abstract Mentor Programme

The Abstract Mentor Programme (AMP) was introduced at the 15th International AIDS Conference (AIDS 2004), with the objective to help young or less experienced researchers improve their abstracts before submitting them, in order to increase the chance of their work being presented at conferences.

Over the years, the AMP has proven to increase the motivation of early career researchers, as well as the number of abstract submissions received from resource-limited countries. This year, 53 mentors reviewed 168 draft abstracts submitted by 118 authors. 69% of the reviewed abstracts were submitted to IAS 2019 and the following were selected:

- 1 Poster Discussion Session
- 29 Poster Exhibition

We would like to thank all volunteer abstract mentors, listed below, who supported early-career HIV researchers improve the quality of their abstracts:

Abiola Clementina Ajibola, Nigeria
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Abstract Submission

Over 3,600 abstracts were submitted to the 10th IAS Conference on HIV Science (IAS 2019). The Scientific Programme Committee (SPC) is very thankful for all the abstract submissions received. While the SPC found many very high-quality abstracts among the IAS 2019 submissions, due to limitations in the conference programme, more abstracts were rejected than accepted – with an overall acceptance rate of 35%.

All abstracts went through a blind peer-review process done by over 800 abstract reviewers. These reviewers are international experts in the field of HIV, including members of SPC and track members. Each abstract was reviewed by three to four reviewers.

The abstracts were reviewed for the quality and originality of the work. Late-breaking abstract reviews included an additional assessment of the late-breaking nature of the research. All reviewers were instructed to abstain from scoring any abstract on which they were an author or co-author, had a financial or personal conflict of interest, or did not have the appropriate expertise to evaluate. Each abstract was scored numerically against five pre-determined criteria, which were equally weighted to get a final score. The final score ranged from one (the lowest) to six (the highest). Any abstracts that received less than three reviews or where there was a scoring discrepancy between reviewers were additionally reviewed by the SPC.

Statistics for Abstracts

Regular abstracts submitted	3606
Regular abstracts accepted	1252
Oral abstracts	117
Poster discussion abstracts	67
Poster exhibition abstracts	1068
Late-breaking abstracts submitted	328
Late-breaking abstracts accepted	80
Late-breaking oral abstracts	25
Late-breaking poster discussion abstracts	6
Late-breaking poster abstracts	49
Total abstracts submitted	3934
Total abstract accepted	1332

Region and gender breakdown of presenting authors of all accepted abstracts

Gender (% and no.)

Female:	52% (694)
Male:	47.5% (632)
Transgender:	0.05% (6)

Region (% and no.)

Africa:	29% (390)
Asia & the Pacific Islands:	15.5% (206)
Europe:	12% (160)
Latin America & Caribbean:	8% (104)
USA & Canada	35.5% (472)

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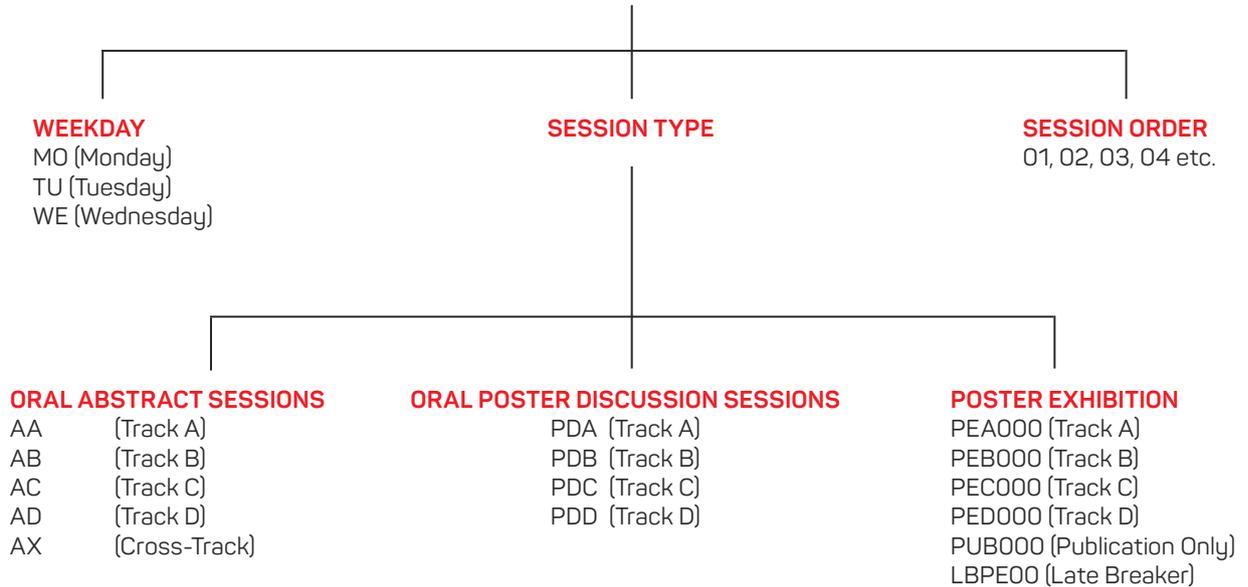
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IAS 2019 Abstract Coding

Example 1: **TUAA01** = **TU** (Weekday) – **AA** (Session type) – **01** (Session order)

Example 2: **TUAA0105LB** = **TU** (Weekday) – **AA** (Session type) – **01** (Session order) – **05** (abstract order) – **LB** (late breaker abstract)

Example 3: **TUPEA001** = **TU** (poster presentation day) – **PE** (presentation type) – **A** (track) – **001** (abstract order)



Monday 22 July

Oral Abstract Sessions

MOAB01 ART: Trials and tribulations

MOAB0101

Virologic efficacy of raltegravir vs. efavirenz-based antiretroviral treatment in HIV1-infected adults with tuberculosis: W48 results of the ANRS 12300 Reflate TB2 trial

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BACKGROUND: Double-dose raltegravir is recommended in HIV1-infected patients with tuberculosis. A previous phase 2 study showed similar efficacy of standard raltegravir 400mg BID, raltegravir 800mg BID, or efavirenz-based regimens. We aimed to assess non-inferiority of raltegravir 400mg BID to efavirenz in HIV1-infected patients with tuberculosis.

METHODS: ANRS 12300 Reflate TB2 is an open-label, phase 3, randomized trial conducted in Brazil, Côte d'Ivoire, France, Mozambique, and Vietnam. ART-naïve HIV1-infected patients aged ≥18 years on standard tuberculosis treatment for 2-8 weeks were randomized (1:1) to receive raltegravir 400mg BID or efavirenz 600mg QD both with TDF/3TC 300mg/300mg QD. The primary endpoint was the proportion of patients with virologic success at week 48 defined as HIV-RNA ≤50 cp/ml on allocated therapy using the FDA snapshot algorithm. The pre-specified non-inferiority margin was 12%.

RESULTS: From September 2015 to January 2018, 230 patients were randomized in each trial arm: 201 (87%) and 203 (88%) completed follow-up in the EFV and RAL arms, respectively. Median age was 35 (IQR: 29-43) years, 40% were female, median BMI 19.1 (IQR: 17.5-21.0) kg/m², median CD4 102 (IQR: 38-239) cells/μL, median HIV-RNA was 5.5 log (IQR: 5.0-5.8), 311 (68%) patients had pulmonary tuberculosis only, and 308 (68%) had bacteriologically-confirmed tuberculosis. In the mITT population, virologic success was achieved: in 134/228 (59%) pts in the raltegravir arm and 135/227 (59%) pts in the efavirenz arm at W24 (end of TB treatment); in 139/228 (61%) patients in the raltegravir arm and 150/227 (66%) patients in the efavirenz arm at W48. At W48, the difference between the raltegravir and efavirenz arm was -5.1% [95% CI: -13.9- +3.7], thus not meeting criteria for non-inferiority. Sixty-two (27%) and 77 (33%) patients experienced grade 3-4 adverse events in the raltegravir and efavirenz arms, respectively (p-value=0.1), including 11 (5%) and 13 (6%) IRIS (p-value=0.7). Twelve (5%) patients in the raltegravir arm and 14 (6%) in the efavirenz arm died (Logrank p-value=0.7).

CONCLUSIONS: The non-inferiority of raltegravir 400mg compared to efavirenz at week 48 was not demonstrated. Raltegravir remains a safe option in combination with tuberculosis treatment. Complementary analyses are necessary to identify determinants of virologic failures in both arms.

MOAB0102

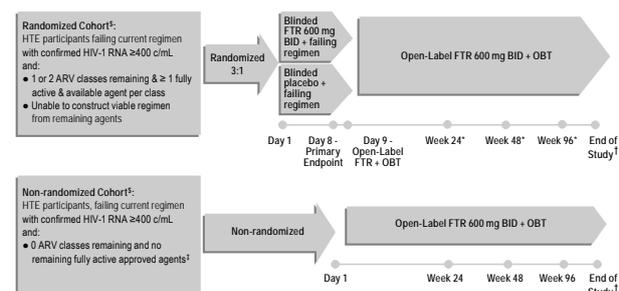
Week 96 safety and efficacy of the novel HIV-1 attachment inhibitor prodrug fostemsavir in heavily treatment-experienced participants infected with multi-drug resistant HIV-1 (BRIGHT study)

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BACKGROUND: BRIGHT is an ongoing Phase 3 study evaluating fostemsavir (FTR) in heavily treatment-experienced (HTE) patients with multidrug resistant HIV-1 who are unable to form a viable antiretroviral (ARV) regimen. FTR is a prodrug metabolized to temsavir (TMR), a first-in-class, investigational attachment inhibitor, which binds directly to HIV-1 gp120 preventing initial attachment to CD4 receptors on T-cells, and other host immune cells, thereby blocking infection.

METHODS: Participants were assigned to the Randomized (RC) or Non-randomized Cohort (Non-RC) (Figure-1). Results through Week 48 were presented previously. Week 96 results are presented here.



*Measured from the start of open-label FTR 600 mg BID + OBT; †The study is expected to be conducted until an additional option, rollover study or marketing approval, is in place; ‡Use of investigational agents as part of OBT was permitted; §There was no screening FTR IC₅₀ criteria.

[Figure 1 - Study Design]

RESULTS: Participants had a median baseline CD4 count of 80 cells/μL (100 RC;41 Non-RC); 86% had AIDS. At Week 96, 60% of RC achieved virologic suppression (an increase of 6% from Week 48 despite continued attrition, Table-1); mean increase in CD4 was 205 cells/μL. Of RC with baseline CD4 <200, 67% increased to CD4 ≥200; 56% from <50 to ≥200 cells/μL.

	Randomized Cohort N=272		Non-Randomized Cohort N=99	
	Snapshot n (%)	Observed n (%)	Snapshot n (%)	Observed n (%)
Week 24	144 (53)	141/246 (57)	37 (37)	37/89 (42)
Week 48	146 (54)	145/233 (62)	38 (38)	40/83 (48)
Week 96	163 (60)	170/214 (79)	37 (37)	39/66 (59)

[Table 1 - Summary of Virologic Response (HIV-1 RNA <40 c/mL) Over Time by Snapshot Analysis (Intent-to-Treat Exposed Population) and Observed Analysis]

Through Week 96, there were higher rates of severe AEs in the Non-RC vs. RC: SAE (48%/34%), Grade 3-4 AEs (49%/29%), and deaths (16%/4%). Overall, 38% had an SAE; 3% were drug related. 7% discontinued due to AE. Most deaths were attributed to complications of advanced AIDS and acute infection.

CONCLUSIONS: Fostemsavir-containing regimens remained generally well-tolerated through Week 96 with no new safety signal and few AE-related discontinuations. Virologic and immunologic response continued to improve in this difficult-to-treat population. BRIGHT results support continued development of FTR as a potentially important treatment option for HTE patients with multi-drug resistant HIV.

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MOAB0103

**Patient views on long acting HIV treatment:
Cabotegravir + rilpivirine as maintenance therapy
(ATLAS 48 week results)**

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BACKGROUND: New modes of HIV treatment are needed to improve adherence and patient choice. ATLAS a phase 3, open-label study enrolling virally suppressed participants demonstrated switching to monthly long-acting (LA) formulations of Cabotegravir (CAB) + Rilpivirine (RPV) is non-inferior to current ART (CAR) at Week 48. A planned secondary analysis of tolerability, health status, and acceptability of switching to a monthly LA regimen has been performed.

METHODS: Participants who were virologically suppressed for >6 months on an oral regimen of 2 NRTIs + 1 INSTI, NNRTI, or PI were randomly assigned (1:1) to continue CAR or switch to the LA arm. The LA arm received oral CAB + RPV once daily for 4 weeks to assess tolerability prior to monthly CAB LA + RPV LA IM injections. Secondary objectives included treatment satisfaction (HIV-Treatment Satisfaction Questionnaire), acceptability of treatment (general acceptance domain of ACCEPT), and health status (SF-12). Tolerability and acceptability of injections (Perception of Injections (PIN)) was assessed in the LA arm only.

RESULTS: 616 participants were randomized and received treatment. The median age was 42 years with 5.4 years of previous treatment; 203 were women (33%). Participants in the LA group showed greater improvement from baseline in treatment satisfaction at Week 44 compared to CAR (mean +6.12 vs +0.44; $p < 0.001$), along with greater acceptance of treatment at Week 48 (mean +13.7 vs +3.0; $p < 0.001$). Overall, 94% and 66% of participants "were satisfied to continue their treatment" in the LA and CAR arms, respectively. There were no differences between LA and CAR arms in health status through Week 48. While 231 (75%) participants in the LA arm had injection site pain, 86% reported their pain as "totally" or "very" acceptable on the "Acceptability of ISRs" in the PIN at Week 48.

CONCLUSIONS: In addition to demonstrating CAB + RPV LA was non-inferior to CAR, the LA arm reported higher levels of treatment satisfaction, greater willingness to continue therapy, and increased acceptance of treatment. These results indicate monthly CAB + RPV LA may be an important treatment option for virologically suppressed PLHIV who want an alternative to daily oral therapy.

MOAB0104

Virologic failure in ART-naïve HIV patients with high pre-therapy viral load burden initiating on common core agents

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BACKGROUND: Patients initiating antiretroviral therapy (ART) with viral loads (VL) $\geq 100,000$ copies/mL are less likely to achieve virologic success. We assessed the efficacy of dolutegravir (DTG), elvitegravir (EVG), raltegravir (RAL) and darunavir (DRV) on rates of virologic failure (VF).

METHODS: ART-naïve patients with VLs $\geq 100,000$ copies/mL initiating DTG, EVG, RAL, or DRV between 12Aug2013 and 31July2017 were identified. VF was defined as (i) 2 consecutive VLs ≥ 200 copies/mL after 36 weeks of ART, or (ii) 1 VL ≥ 200 copies/mL with core agent discontinuation after 36 weeks, or (iii) 2 consecutive VL ≥ 200 copies/mL after suppression (VL ≤ 50 copies/

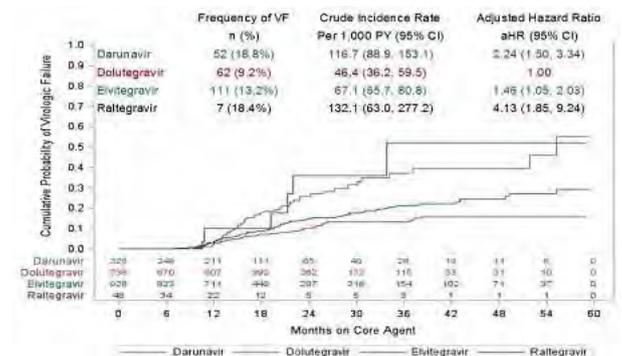
mL) before 36 weeks, or (iv) 1 VL ≥ 200 copies/mL with discontinuation after suppression before 36 weeks. Analyses were conducted with Kaplan Meier methods and multivariate Cox modeling.

RESULTS: There were 2,038 ART-naïve patients with high VL who initiated DTG (36%), EVG (46%), DRV (16%) or RAL (2%). Median follow-up was 18.1 months (IQR: 12.4-28.9). EVG patients didn't differ from DTG at baseline. RAL patients were older and more likely to be female with low CD4 counts. DRV patients differed notably, especially on baseline characteristics associated with risk for treatment failure. (Table 1) VF was experienced by 9.2% DTG, 13.2% EVG, 18.4% RAL and 18.8% DRV initiators. Compared to DTG, the adjusted hazard ratio for VF was 1.46 [95% CI: 1.05, 2.03] for EVG, 2.24 [1.50, 3.34] for DRV, and 4.13 [1.85, 9.24] for RAL. (Figure 1)

CONCLUSIONS: ART-naïve patients with high viral loads initiating on DTG were significantly less likely to experience VF compared to EVG, RAL and DRV initiators.

	DTG n=736	EVG n=928	DTG vs. EVG p-value	RAL n=48	DTG vs. RAL p-value	DRV n=326	DTG vs. DRV p-value
Median (IQR) Age (Yrs)	32.8 (25.7-43.2)	32.0 (25.9-43.7)	0.8093	40.3 (28.7-47.8)	0.0206	36.9 (28.7-45.4)	0.0014
Female (n,%)	90 (12.2%)	99 (10.7%)	0.6035	15 (31.3%)	0.0015	46 (14.1%)	0.6023
African American (n,%)	311 (42.3%)	418 (45.0%)	0.2550	21 (43.8%)	0.8391	164 (50.3%)	0.0149
Medicaid/ Medicare/Ryan White (n,%)	441 (59.9%)	487 (52.5%)	0.0105	29 (60.4%)	0.4013	206 (63.2%)	0.2177
AIDS (n,%)	196 (26.6%)	239 (25.8%)	0.6862	15 (31.3%)	0.4844	131 (40.2%)	<.0001
VL $\geq 500K$ copies/mL (n,%)	147 (20.0%)	208 (22.4%)	0.2274	13 (27.1%)	0.2363	96 (29.4%)	0.0007
CD4 Count ≤ 200 (n,%)	294 (39.9%)	399 (43.0%)	0.2100	30 (62.5%)	0.0021	205 (62.9%)	<.0001
Median (IQR) VACS	30 (20-53)	30 (20-53)	0.9143	46 (30-65)	0.0018	49 (30-65)	<.0001
Hx of Syphilis (n,%)	208 (28.3%)	267 (28.8%)	0.8188	11 (22.9%)	0.4240	112 (34.4%)	0.0459

[Table 1. Baseline Patient Characteristics by Core Agent]



[Fig 1. VF Following Core Agent Initiation: Unadj. Cumulative Probability and Adjusted Hazard Ratio]

MOAB0105

Switching to a single-tablet regimen bicitegravir, emtricitabine, and tenofovir alafenamide (B/F/TAF) from dolutegravir (DTG) plus emtricitabine and either tenofovir alafenamide or tenofovir disoproxil fumarate (F/TAF or F/TDF)

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BACKGROUND: The single-tablet regimen B/F/TAF is a guideline-recommended treatment for HIV-1. We evaluated whether people receiving dolutegravir (DTG) plus F/TAF or F/TDF can safely and effectively switch to B/F/TAF. **METHODS:** In this phase 3, double-blinded study, virologically suppressed adults taking DTG plus either F/TAF or F/TDF were randomized (1:1) to switch to B/F/TAF or DTG+F/TAF, once daily with matching placebo. Documented or suspected prior resistance to NRTIs (i.e., M184V, K65R and thymidine analogue mutations [TAMs]), NNRTIs and/or PIs was permitted; INSTI-resistance was exclusionary. Primary endpoint was the proportion with HIV-1 RNA ≥ 50 c/mL at Week (W) 48 (FDA snapshot). Noninferiority was assessed through 95% confidence intervals (CI) using a margin of 4%. Secondary endpoints were the proportion with HIV-1 RNA < 50 c/mL and change from baseline in CD4 counts at W48. Safety was assessed by adverse events [AEs] and laboratory results.

RESULTS: 565 participants were randomized/treated (B/F/TAF n=284, DTG+F/TAF n=281): 14% women, 23% Black, median age 51 years (range 20-79), 24% had resistance to NRTIs including 5% with K65R or ≥ 3 TAMs, and 14% with M184V/I with or without other mutations. At W48, 0.4% on B/F/TAF and 1.1% on DTG+F/TAF had HIV-1 RNA ≥ 50 c/mL demonstrating non-inferiority. There was no treatment emergent resistance. No participant with NRTI-resistance had HIV-1 RNA ≥ 50 c/mL at W48. Overall, 93% on B/F/TAF and 91% on DTG+F/TAF had HIV-1 RNA ≤ 50 c/mL. Change in CD4 was similar between groups (p=0.23). The most common AEs were nasopharyngitis, diarrhea, and upper respiratory tract infection. Six (2%) in each group discontinued study drug due to AEs.

	B/F/TAF	DTG + F/TAF	B/F/TAF vs DTG + F/TAF	
			P-Value	Difference in Percentages (CI)
HIV-1 RNA < 50 copies per mL	265 (93.3%)	256 (91.1%)	0.35	2.2% (-2.3 to 6.8%)
HIV-1 RNA ≥ 50 copies per mL	1 (0.4%)	3 (1.1%)	0.37	-0.7% (-2.8 to 1.0%)
HIV-1 RNA ≥ 50 copies per mL	1 (0.4%)	1 (0.4%)		
Discontinued due to lack of efficacy	0	0		
Discontinued due to other reasons* and last available HIV-1 RNA ≥ 50 copies per mL	0	2 (0.7%)		
No virologic data	18 (6.3%)	22 (7.8%)		
Discontinued due to AE/death	6 (2.1%)	6 (2.1%)		
Discontinued due to other reasons* and last available HIV-1 RNA < 50 copies per mL	12 (4.2%)	15 (5.3%)		
Missing data but on study drug	0	1 (0.4%)		
HIV-1 RNA < 50 copies per mL by per-protocol analysis	259 (100.0%)	259 (100.0%)		
Participants with NRTI-resistance				
HIV-1 RNA < 50 copies per mL	65/70 (92.9%)	62/63 (98.4%)		
HIV-1 RNA ≥ 50 copies per mL	0	0		
No virologic data and last available HIV-1 RNA < 50 copies per mL	5/70 (7.1%)	1/63 (1.6%)		

The week 48 window is between days 295 and 378 (inclusive).

*Other reasons include subjects who discontinued study drug due to investigator's discretion, subject decision, lost to follow-up, non-compliance with study drug, protocol violation and pregnancy.

P-values for the superiority tests comparing the percentages of subjects between treatment groups were from the Fisher exact test.

The differences in percentages of subjects between treatment groups and their 95.001% CIs were calculated based on an unconditional exact method using 2 inverted 1-sided tests.

[Table.]

CONCLUSIONS: At W48, switching to B/F/TAF was noninferior to DTG+F/TAF, with high rates of virologic suppression in both groups. The single-tablet regimen B/F/TAF is an effective option for people virologically suppressed on DTG+F/TDF or F/TAF, with or without NRTI resistance mutations including M184V, K65R and TAMs.

MOAB0106

Longer-term (96-week) efficacy and safety of switching to bicitegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) in women

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BACKGROUND: Fixed-dose combination B/F/TAF is recommended regimen for HIV-1 treatment. We report week (W) 96 results from a phase 3 study evaluating switching to B/F/TAF in a globally distributed cohort of women. Primary outcome at W48 demonstrated noninferior virologic response, good tolerability, and no emergent resistance.

METHODS: In the randomized phase of this multicenter, open-label trial, women living with HIV who were virologically suppressed (HIV-1 RNA < 50 copies/mL) on a baseline regimen (elvitegravir/cobicistat/F/TAF, E/C/F/tenofovir disoproxil fumarate [TDF], or atazanavir+ritonavir+F/TDF) were assigned (1:1) to switch to B/F/TAF (50/200/25 mg) or stay on baseline regimen (SBR) for 48W. At W48, women in the SBR arm switched to B/F/TAF; all participants received B/F/TAF through W96. Secondary efficacy endpoints included proportion with plasma HIV-1 RNA ≥ 50 copies/mL (missing=excluded [M=E]) at W96 (for those on B/F/TAF throughout the study) and W48 (for those switched to B/F/TAF after W48). Adverse events (AEs) and laboratory test results were assessed through W96.

RESULTS: 470 women from the Dominican Republic, Russian Federation, Thailand, Uganda, and the US were treated in the randomized phase (234 B/F/TAF, 236 SBR); 231 continued on B/F/TAF and 228 in the SBR arm switched to B/F/TAF. At W96, virologic suppression (M=E) was maintained in 99.5% (95% CI 97.4%, 100.0%) of the women who received B/F/TAF throughout the study and in 98.5% (95% CI: 95.5%, 99.7%) of women who switched to B/F/TAF at W48. No individual who received B/F/TAF developed treatment-emergent resistance. Over a median exposure of 76.6W, B/F/TAF was well tolerated, with low frequencies of grade 3 or 4 AEs (6.7%), treatment-related AEs (5.8%), or serious AEs (5.2%). One participant who received B/F/TAF in the extension phase discontinued treatment due to drug-related AEs (grade 2 elevated ALT, AST, and GGT). Grade 3 or 4 laboratory abnormalities occurred in 22.1%; most were menses-associated urine RBCs.

CONCLUSIONS: B/F/TAF was safe and well tolerated through 96 weeks. Women who switched to B/F/TAF maintained high levels of virologic suppression without emergence of resistance. This analysis supports the efficacy and safety of B/F/TAF observed in other B/F/TAF studies and contributes important long-term data on safety, tolerability, and efficacy in women living with HIV.

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Monday
22 July
Oral Abstract
Sessions**MOAB02 Co-morbidities: No organ left behind****MOAB0201****Impact of rosuvastatin on atherosclerotic progression in people with HIV at moderate cardiovascular risk; A multinational, randomized, double blind, placebo-controlled trial**J. Trevillyan^{1,2}, A. Dart², M. Cavassini³, J. Fehr⁴, C. Staehelin⁵, L. Dewar⁶, A. Calmy⁷, J. Hoy⁶¹University of California, Los Angeles, Los Angeles, United States, ²Monash University, Melbourne, Australia, ³Lausanne University Hospital, Lausanne, Switzerland, ⁴University Hospital Zurich, Zurich, Switzerland, ⁵University of Zurich, Zurich, Switzerland, ⁶Alfred Health and Monash University, Melbourne, Australia, ⁷Hospital University Geneva, Geneva, Switzerland**BACKGROUND:** People with HIV are at increased risk for coronary artery disease. This study aimed to determine the effect of rosuvastatin on atherosclerotic progression in people with HIV at moderate cardiovascular risk.**METHODS:** Participants with well controlled HIV (suppressed viral load, ART for >6 months) who were at moderate cardiovascular risk (10 year Framingham risk score 10-15%) with no indication for statin therapy were recruited from a single centre in Australia and four centres in Switzerland. They were randomised 1:1 (stratified by site) to 20mg of rosuvastatin or matched placebo. Participants on a protease inhibitor received dose reduced (10mg) rosuvastatin.

All participants had assessment of carotid intima media thickness (cIMT) and fasting bloods at baseline, week 48 and 96. cIMT was measured at three sites, carotid bulb, common carotid artery (CCA) and internal carotid artery (ICA) bilaterally (the average of the combined sides presented here).

The primary endpoint was the change from baseline to week 96 in CCA cIMT. **RESULTS:** 87 individuals were randomised (55: Australia - 32: Switzerland). Predominantly male [85 (97%)] with a median age 54 years (range 42-67), 29 (33%) were current smokers.There was no difference in baseline IMT between groups; carotid bulb 0.790mm versus 0.81mm, $p=0.43$; CCA 0.690mm versus 0.722mm, $p=0.447$; ICA 0.650mm versus 0.647mm, $p=0.9252$ (rosuvastatin, placebo arms respectively). Despite significantly decreases in LDL cholesterol with rosuvastatin (mean change -1.06mmol/L versus -0.06mmol/L, $p<0.0001$) there was no difference in progression of IMT from baseline to 96 weeks at any site [carotid bulb ($p=0.211$), CCA ($p=0.876$) or ICA ($p=0.950$)] in those on rosuvastatin. At week 96 there was no difference in cIMT at any site between treatment arms ($p=0.993$, $p=0.791$, $p=0.462$ respectively).

One participant developed type 2 diabetes and one cerebrovascular disease (both on rosuvastatin). Three participants had acute myocardial infarctions while on study (two on rosuvastatin, one on placebo). Two participants (one from each arm) had significant increases in creatinine kinase.

CONCLUSIONS: In this study of people with well controlled HIV at moderate cardiovascular risk who did not otherwise warrant statin therapy addition of rosuvastatin did not alter the progression of cIMT over 96weeks.**MOAB0202****History of pulmonary opportunistic infection makes no attributable difference to long-term pulmonary function of people living with HIV who smoke**K.H. Tram¹, J.A. O'Halloran², R. Presti², J. Atkinson³¹Washington University School of Medicine, St. Louis, United States,²Washington University School of Medicine, Division of Infectious Diseases, St. Louis, United States, ³Washington University School of Medicine, Division of Pulmonary and Critical Care Medicine, St. Louis, United States**BACKGROUND:** Evidence suggests an accelerated rate of COPD and other lung diseases in people living with HIV (PLWH). We aimed to examine the long-term sequelae of pulmonary opportunistic infections (OIs) in smokers living with HIV.**METHODS:** We recruited PLWH 30 years or older who had a 15 pack-year history of smoking or were current smokers. Participants completed:

(1) health questionnaire addressing demographics, smoking habits, and HIV status;

(2) the St. George's Respiratory Questionnaire (SGRQ), scored from 0-100 (100 being maximum health impairment); and (3) pulmonary function tests (PFTs). COPD was diagnosed using GOLD criterion ($FEV1/FVC < 0.7$).

We used chi-square, two-sample t-test, and logistic regression to compare PLWH with and without a history of pulmonary OIs. Data are presented as "mean [SD]".

RESULTS: Of the 153 PLWH, 37 (24%) had a history of pulmonary OIs, (25 (16%) pneumocystis pneumonia, 12 (7.8%) recurrent bacterial pneumonia, and 7 (4.6%) pulmonary tuberculosis). Compared to those without, those with previous OIs were older age [54.3 [7.5] vs. 49.2 [8.2], $p=0.001$], had lower current CD4+ T cell counts [499 [290] vs. 658 [322], $p=0.009$], and lower nadir CD4+ T cell counts [103 [131] vs. 213 [166], $p < 0.001$]. HAART receipt, viral suppression rates, and smoking history were similar in both groups. There was no significant differences in total or component SGRQ scores. Of the 134 for whom PFTs were available, there was no difference in post-bronchodilator FVC1 (3.7L vs. 4.0L, $p=0.155$) or FEV1/FVC ratio (74.5% vs. 77.4%, $p=0.163$) between the groups. Lower FEV1 (2.7L vs. 3.1L, $p=0.024$) was observed in the previous OIs group, and COPD rates were over double (9, 29% vs 14, 14%, $p=0.046$). A borderline association with COPD was observed with a prior history of pulmonary OIs (unadjusted OR 2.6 [95% CI 0.997 - 6.783] $p=0.051$), however adjusted for age, the association attenuates (adjusted OR 1.9 [95% CI 0.680 - 5.157] $p=0.225$).**CONCLUSIONS:** Our data suggests that a history of pulmonary OIs makes no attributable difference to long-term pulmonary function in PLWH who smoke, and that other factors such as age and continued smoking may play a more important role in developing COPD.**MOAB0203****Validation of serological biomarkers for detection of non-alcoholic fatty liver disease (NAFLD) and/or advanced liver fibrosis in people living with HIV**C. Yanavich¹, A. Pacheco³, S. Cardoso¹, E. Nunes¹, U. Chaves¹, R. Santos¹, M. Morata¹, V. Veloso¹, B. Grinsztejn¹, H. Perazzo¹, GPC-HepatoL¹Fundação Oswaldo Cruz, Instituto Nacional de Infectologia Evandro Chagas, Rio de Janeiro, Brazil, ²University of California, Los Angeles, United States, ³Fundação Oswaldo Cruz, PROCC, Rio de Janeiro, Brazil**BACKGROUND:** Patients with HIV infection and non-alcoholic fatty liver disease (NAFLD) are at increased risk for progression to advanced fibrosis. We aimed to validate the accuracy of serological biomarkers to detect NAFLD and advanced fibrosis in HIV mono-infected patients.**METHODS:** From Jun-2015 to Jan-2018, HIV-infected patients ($n=547$) were prospectively enrolled in the PROSPEC-HIV study [NCT02542020]. At entry, a clinical evaluation, laboratory testing, and liver stiffness measurement (LSM) / Controlled Attenuation Parameter (CAP) using transient elastography (Fibroscan) were performed. Patients with viral hepatitis co-infection ($n=17$), abusive alcohol intake [AUDIT>8 ($n=54$)] or unreliable Fibroscan ($n=39$) results were excluded. NAFLD was defined by $CAP \geq 248$ dB/m and advanced fibrosis by $LSM \geq 8.7$ kPa with M or ≥ 7.2 kPa with XL probes, respectively. Serological biomarkers for steatosis [Steato-ELSA, Fatty Liver Index (FLI), Hepatic Steatosis Index (HSI), NAFLD Liver Fat Score (NAFLD-LFS)] and fibrosis [FIB-4, APRI and NAFLD Fibrosis Score (NFS)] were calculated. The area under the ROC curves (AUROC), sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and likelihood-ratio (LR) were assessed.**RESULTS:** 437 patients [57% female, median age=44 (IQR 35-52) years, BMI=26.1 (23.4-29.3) Kg/m², ALT=30 (23-43)U/L, CD4=660 (427-901) cells/mm³] were included. The prevalence [95%CI] of NAFLD and advanced fibrosis were 38% [34-43] and 11% [8-14], respectively. The AUROCs [95%CI] for diagnosis of NAFLD were 0.854 [0.818-0.889], 0.840 [0.804-0.877], 0.805 [0.762-0.847] and 0.793 [0.750-0.836] for Steato-ELSA; FLI; HSI and NAFLD-LFS [$p < 0.001$], respectively. The AUROCs [95%CI] for diagnosis of advanced fibrosis were 0.736 [0.659-0.814], 0.700 [0.614-0.785] and 0.795 [0.726-0.864] for FIB-4, APRI and NFS [$p=0.077$], respectively. The table shows sensitivities, specificities, PPV, NPV and LR.**CONCLUSIONS:** Serological biomarkers accurately predicts steatosis; use in patients with fibrosis demonstrated high specificity and NPV. Integration of these tests should be encouraged as part of routine HIV management for the detection of NAFLD and to exclude advanced liver fibrosis.Tuesday
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	Sensitivity [95%CI]	Specificity [95%CI]	PPV	NPV	LR+	LR-
Biomarkers for diagnosis of NAFLD						
ELSA \geq 0.386	81% [76-87]	74% [69-80]	66%	87%	3.19	0.25
FLI \geq 60	75% [69-82]	76% [70-81]	65%	83%	3.09	0.32
HSI \geq 36	89% [84-93]	52% [46-58]	53%	88%	1.84	0.22
NAFLD-LFS \geq -0.640	80% [74-86]	63% [57-69]	57%	84%	2.17	0.31
Biomarkers for diagnosis of advanced fibrosis						
FIB-4 \geq 3.25	4% [0-10]	99% [98-100]	50%	90%	8.50	0.96
APRI \geq 1.5	2% [0-6]	99% [98-100]	25%	90%	2.93	0.99
NFS \geq 0.676	11% [2-20]	98% [97-99]	38%	90%	5.31	0.91

[Accuracy of serological biomarkers for NAFLD and advanced liver fibrosis in patients with HIV mono-infection]

MOAB0204

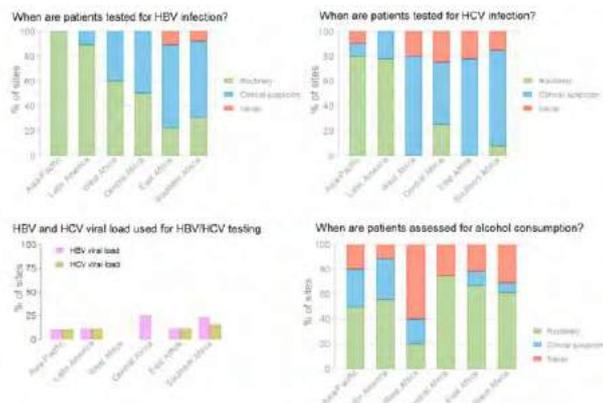
Assessment of risk factors for hepatocellular carcinoma in HIV care and treatment programs across 31 countries: A cross-sectional survey

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BACKGROUND: Liver cancer is the fourth leading cause of cancer death worldwide. According to the 2015 Global Burden of Disease Study, alcohol, hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are the three main causes of hepatocellular carcinoma (HCC). We assessed diagnostic practices for these risk factors in >50 HIV clinics across the world.

METHODS: Cross-sectional web-based survey among HIV care and treatment sites participating in the International epidemiology Databases to Evaluate AIDS (IeDEA); 55 HIV clinics from 31 countries in 6 different regions participated. Data were collected from December 2014 to September 2015.

RESULTS: The majority of sites were from low-income countries (36%) or lower-middle-income countries (31%), with 3 (5%) from high-income countries. Thirty-eight (69%) sites were tertiary-care facilities and 44 (80%) were located in urban settings. Sites followed over 550,000 HIV-positive individuals. Routine HBV testing ranged from 22-100% of sites across regions, and routine HCV testing from 0-80% (Figure).



[Screening practices and diagnostic tools for HBV, HCV and alcohol consumption in 55 sites across 6 IeDEA regions]

When any HBV testing was performed, 32 (58%) sites used a rapid HBV surface antigen test and 17 (31%) a laboratory-based serological test. HBV viral load was performed in less than 25% of sites across regions. Of the 47 (85%) sites reporting any HCV antibody testing, none used rapid tests and HCV viral load was available in 5 (9%) clinics. Alcohol consumption was routinely assessed in 29 (53%) sites, with 12 (39%) using a structured assessment tool (e.g., AUDIT-C). Five (9%) sites reported having an ongoing screening program for HCC.

CONCLUSIONS: Although HBV and HCV testing were conducted in the majority of surveyed HIV clinics, only a minority performed it routinely, with large variation across regions, including across high burden countries. Confirmation of HBV and HCV replication and assessment of hazardous alcohol consumption, the most important modifiable HCC risk factors, were poorly implemented globally.

MOAB0205

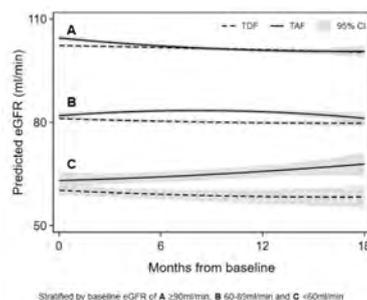
Renal function trajectories after switching from TDF to TAF: A nationwide cohort study

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BACKGROUND: Tenofovir alafenamide (TAF), characterized by its better renal safety profile than tenofovir disoproxil fumarate (TDF), became available in Switzerland in October 2016. We compared the impact of switching from TDF to TAF on estimated glomerular filtration rate (eGFR).

METHODS: We included all participants of the Swiss HIV Cohort Study on TDF-containing antiretroviral therapy with follow-up after January 2016 who remained on TDF until the end of the observation period (October 2018), or switched to TAF. Baseline was defined as (1) switching date for patients on TAF, (2) October 1st 2016 for patients remaining on TDF, or (3) registration date for patients remaining on TDF and registered after October 1st 2016. We calculated eGFR with the CKD-EPI formula, and used multivariable linear mixed-effect models to explore the association between receiving TAF and eGFR over time.

RESULTS: Of 3,430 individuals included, 2,499 (72.9%) were male and the median age was 49 years (IQR 42-56). At baseline, 1,823 individuals (53.1%) had an eGFR \geq 90 ml/min, 1,433 (41.8%) a value of 60-89 ml/min, and 174 (5.1%) had an eGFR < 60 ml/min. The median follow-up time was 15.3 months (IQR 13.4-16.6) for 1,575 individuals who remained on TDF and 11.4 months (8.8-13.6) for 1,855 who switched to TAF. Adjusted eGFR trajectories were similar in both groups if baseline eGFR was \geq 90 ml/min (predicted difference in eGFR after 18 months: 0.3 ml/min, 95% confidence interval [CI] -1.5-2.0 ml/min) or 60-89 ml/min (predicted difference: 1.4 ml/min, 95% CI -0.4-3.2 ml/min). In contrast, difference in eGFR at 18 months was 9.6 ml/min (95% CI 5.1-14.0 ml/min) between individuals on TAF compared to those remaining on TDF if baseline eGFR was < 60 ml/min. (Figure).



[Comparisons of predicted eGFR trajectories over time between TDF (dashed) and TAF (solid).]

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CONCLUSIONS: TAF was associated with an increase in eGFR over time compared to TDF in patients with moderate to severe impairment of renal function.

MOAB0206

Gastrocnemius muscle thickness as a predictor of sarcopenia in people living with HIV

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BACKGROUND: Sarcopenia is common in ageing people living with HIV (PLWH). Various difficult-to-perform methods can be utilized to determine sarcopenia. There is a demand for point-of-care sarcopenia diagnostics for ageing HIV population. This study aims to evaluate the role of muscle ultrasound imaging as a screening tool for sarcopenia in PLWH over 40.

METHODS: PLWH registered in Hacettepe Cohort were invited to this cross sectional study. Local IRB reviewed and approved the study protocol. Patients were enrolled after providing informed consent. Inclusion criteria were ART over 6 months, age>40, viral load< 100copies/ml, no co-infection. Demographic data collected from cohort database. Bioelectrical impedance analysis (fat mass index (FMI), fat free mass index (FFMI), and phase angle), hand grip, gait speed and muscle ultrasound imaging (gastrocnemius muscle thickness) were performed. Sarcopenia was defined as the presence of both low muscle mass (FFMI) and low muscle function (hand grip strength).

RESULTS: A total of 95 PLWHA (77.9% male) were included. Mean age was 52.28±8.39 years. Median duration of ART was 60 (6-312) months. Median CD4 was 574 (39-1389) cells/ml. Mean BMI was 27.15±4.2 kg/m². Median waist circumference and hip circumference were 96±10.6 cm and 103±7.8 cm, respectively. Median FFMI was 21 (16.4-27.6) kg/m² and median BFMI was 5.20 (0.60-20.6) kg/m². Median hand grip strength was 33.9 (14-52.8) kg, median gastrocnemius muscle thickness was 14.2 (8.9-20.7) mm, median phase angle was 7.4° (4.10-22.8). Sarcopenia was present in 12.6% of patients. FFMI score correlated with gastrocnemius thickness (r=0.560, p< 0.001) but not with phase angle (r=0.19, p=0.059). Gastrocnemius muscle thickness also correlated with hand grip strength (r=0.52, p< 0.001). Receiver operating characteristic (ROC) curve analysis was performed. Gastrocnemius muscle thickness suggestive of sarcopenia was defined as 13.05 mm (sensitivity 84%, specificity 83%). Positive and negative predictive values were calculated as 42% and 97%, respectively.

CONCLUSIONS: Sarcopenia, which is suggestive of frail phenotype, is frequently present in PLWH. Muscle ultrasound imaging fulfills the criteria for point-of-care diagnostics. Our results suggest that gastrocnemius muscle thickness has a high negative predictive value in diagnosing sarcopenia, thus can be implemented as a screening tool for the detection of sarcopenia in PLWH over 40.

MOAC01 Substance use, mental health and key populations

MOAC0101

Consumption of recreational drugs and their sexualized use in gay men, bisexual and other men-who-have-sex-with-men from Latin America: Preliminary results of the Latin America MSM Internet Survey (LAMIS)

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BACKGROUND: The increasing prevalence of sexualized drug use among gay, bisexual and other men-who-have-sex-with-men (GBMSM) is causing concern globally, as it poses multiple risks for their psycho-social-sexual health. This study aimed to describe the sexualized use of recreational drugs, and to characterize users among Latin American GBMSM.

METHODS: The Latin American MSM Internet Survey was an online questionnaire, available in three languages across 18 Latin American countries. From January-May 2018, it collected information on sexual behavior, drug use, psychosocial health, HIV/STI testing, self-reported HIV/STI diagnosis, and preventive strategies. Participants were mainly recruited through gay apps/web-pages. The Chi-square test was used to compare proportions.

RESULTS: Of the 64,655 participants, 45.8% had used drugs (excluding alcohol, tobacco, and sedatives) in the last 12 months (Brazil and Southern Cone countries had the highest proportions). Cannabis (29%), poppers (18%), erection-enhancing medications (15%), cocaine (9.5%) and ecstasy (7.3%) were the most commonly used substances. Injection drug use was reported by 0.3%. Among those who had sex with a man in the last 12 months (n=60,985), 49% had sex under the influence of alcohol or other drugs, 9.9% never had sober sex, and 24% used some recreational drug before/during sex with their last non-steady partner(s). Overall, 8,690 men (13.6%) reported using drugs to enhance or prolong sex during the last 12 months and 6.6% used drugs in a group sex setting. The using drugs to enhance their sexual experience was significantly more likely among men who reported the following characteristics: living in a Southern Cone country, residence in a city of more than one million inhabitants, aged 25-40, born abroad, higher education, employment, gay identity, engaging in transactional sex, and diagnosed with HIV. Also among these men, 72% reported condomless anal sex with non-steady partners in the last 12 months, 53% had been diagnosed with a previous STI; and, among those with no prior HIV-diagnosis, 2.6% were taking PrEP.

CONCLUSIONS: The sexualized use of drugs among Latin-American GBMSM is noticeable, particularly in big cities and Southern Cone countries. This pattern should be taken into account in public health programs and harm-reduction interventions included as part of the combined prevention approach.

MOAC0102

Polydrug use and HIV sexual risks in a sample of men who inject drugs on the U.S.-Mexico border

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BACKGROUND: Polydrug use among Latino men who inject drugs on the U.S.-Mexico border has been increasing over the last years yielding to negative health outcomes, (overdose), HIV high-risk behaviors (e.g. condomless sex), and other STIs. We explored HIV risk behaviors and the patterns of drug use by sexual behavior (i.e. MSM vs non-MSM) among Latino men who inject drugs.

METHODS: The sample for this study included 160 men who inject drugs recruited through respondent driven sampling methodology. Data analysis was conducted using SPSS v.25. Independent sample t-test was used to identify mean differences and chi-squared to explore proportional differences on binomial substance use, STIs, and sexual risk behaviors.

RESULTS: MSM reported higher odds of employment (OR=1.96, p=0.007), but also higher use of inhalants (OR=1.96, p=0.044), methamphetamine (OR=2.42, p=0.005), and history STIs (OR=1.76, p=0.015). Participants were asked to report the number of times that different risk behaviors occur in the past 30 days; significant differences were found on the number of new sex partners reported by MSM vs non-MSM (Mean: 1.88 vs 0.54, p< 0.001), sex under the influence of a drug (Mean: 14.38 vs 6.83, p=0.43), engage in anal sex (Mean: 4.47 vs 1.21, p< 0.001), and exchange sex for money (Mean: 3.32 vs 0.92, p< 0.001). However, the number of times MSM engaged in condomless sex was lower than non-MSM (Mean: 4.53 vs 8.99, p=0.005). Finally, more MSM reported experienced sexual abuse before they were 18 years old (OR=1.81, p=0.016), and being gang raped (OR=7.04, p=0.007).

CONCLUSIONS: Although MSM who inject drugs reported lower cases of condomless sex compared to their non-MSM counterpart, their sexual risk behaviors are higher, including sex under the influence of drugs which can decrease their willingness of use condom and be more susceptible to sexual violence. Risk reduction strategies including Pre-Exposure Prophylaxis (PrEP) could be a method to effectively reduce their HIV risks.

MOAC0103

Still left behind: Using programmatic data to assess harm reduction service coverage and HIV treatment cascades for people who inject drugs in five South African cities

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BACKGROUND: A third (14% - 58%) of people who inject drugs (PWID) in South Africa are living with HIV. For HIV epidemic control among PWID UNAIDS recommends 300 needles per PWID per year, 40% opioid substitution therapy (OST) coverage and reaching the 90-90-90 treatment targets. By 2018, PWID programming in the country included needle/syringe services (NSS), HIV testing and linkage to care, and opioid substitution therapy (OST). To estimate service coverage, we assessed needle distribution, OST coverage and HIV treatment cascades among PWID accessing harm reduction services in Cape Town, Durban, Johannesburg, Port Elizabeth and Pretoria.

METHODS: We combined programmatic data from city services between January and June 2018. For this period, we:

- (1) consolidated counts of PWID accessing NSS;
- (2) calculated the average number of needles distributed per PWID accessing NSS;
- (3) divided the number of PWID on OST by the number of PWID accessing NSS as a proxy for OST coverage and
- (4) counted the numbers tested and treated to develop cascades.

RESULTS: During this period, 7 316 unique PWID accessed services (700 in Cape Town, 541 in Durban, 1 365 in Johannesburg, 361 in Port Elizabeth and 4 349 in Pretoria). Overall, 558 983 needles and syringes were distributed (ranging from 60 634 in Port Elizabeth to 225 709 in Pretoria); an average of 76 needles per PWID (ranging from 52 in Pretoria to 174 in Cape Town). 260 PWID were on OST at the end of the period, representing 4% coverage across cities (from 0% in Port Elizabeth to 8% in Cape Town). In total, 1 773 (24%) PWID tested for HIV (ranging from 15% in Pretoria to 57% in Cape Town). HIV positivity was 23% (from 3% in Cape Town to 45% in Johannesburg), 20% of whom were initiated onto antiretroviral therapy (ranging from 6% in Durban to 65% in Port Elizabeth). Viral suppression data was unavailable.

CONCLUSIONS: To reach HIV epidemic control among PWID in these cities, needle distribution needs to double, OST coverage expand ten-fold and access to HIV testing and treatment increase five-fold. The viral suppression data gaps need to be filled.

MOAC0104

High levels of depression among Peruvian men who have sex with men: Implications for HIV prevention and treatment care

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BACKGROUND: Annual depression rates among men who have sex with men (MSM) from high income countries are 3- to 9-fold higher than the general population (12%-36% vs. 4%, respectively); however, little is known about depression rates in MSM in low- and middle-income countries (LMIC). Among HIV-negative MSM, depression is associated with increased alcohol/drug use and decreased condom use during sexual intercourse while for HIV-positive MSM, depression reduces accessing or adhering to medical care and is associated with worse long-term survival. The present study assessed the prevalence of depression among MSM seeking HIV/STI services in Peru, a LMIC.

METHODS: Between August 2017 and December 2018, MSM presenting for HIV/STI services at the community-based organization Epicentro were offered depression screening using the Peruvian-validated version of the Patient Health Questionnaire (PHQ-9). The PHQ-9, used globally, consists of 9 questions that measure the frequency of core depression symptoms on a scale ranging from "0" (not at all) to "3" (nearly every day). PHQ-9 scores ≥ 5 are suggestive of depression with the highest score (27) corresponding to severe levels.

RESULTS: A total of 185 MSM consented to depression screening, of whom 13% tested positive for HIV and 87% tested negative; 4 participants sought other STI services and declined HIV testing. Mean participant age was 28.77 years (range, 17-58). Alcohol and/or drug use during last sexual encounter was reported by 20% of men. Depression prevalence was: 58% none/no depression (PHQ-9 = 0-4); 23% mild (PHQ-9 = 5-9); 12% moderate (PHQ-9 = 10-14); 5% moderately severe (PHQ-9 = 15-19); and 2% severe (PHQ-9 = 20-27). There was an association with depression (PHQ-9 score ≥ 5) for both having a positive HIV test result and alcohol use though not statistically significant ($p=0.39$ and 0.09 , respectively).

CONCLUSIONS: Depression was common among Peruvian MSM, with >40% scoring positive for the disorder. Most depression severity was mild- to moderate, which could be treated by brief, non-pharmacological depression interventions. Though no significant association between depression and HIV or alcohol use was observed, both are known depression risk factors meriting future research in LMIC. Finally, future research must include more diverse populations, especially transgender women.

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MOAC0105

Gender differences in syringe-related policing behaviors and attitudes following a police education program in Tijuana, Mexico: A longitudinal mixed methods analysisM.L. Mitta^{1,2}, T. Rocha Jiménez², I. Artamonova², S.A. Strathdee², M. Morales³, J. Cepeda², P. Baker², E. Clairgüe Caizero³, A. Bañuelos Pérez⁴, J. Arredondo², T. Patterson², L. Beletsky^{2,5}¹Universidad Xochicalco, Escuela de Medicina, Tijuana, Mexico, ²University of California, San Diego, Division of Infectious Diseases and Global Public Health, La Jolla, United States, ³Comisión de Salud Fronteriza México-Estados Unidos, Tijuana, Mexico, ⁴Dirección de Planeación y Proyectos Estratégicos, Secretaría de Seguridad Pública Municipal, Tijuana, Mexico, ⁵Northeastern University, School of Law & Bouvé College of Health Sciences, Boston, United States**BACKGROUND:** Certain policing practices (i.e., syringe confiscation, syringe-related arrests) continue to fuel HIV transmission among persons who inject drugs (PWID) and are barriers to HIV prevention worldwide. We aimed to explore gender differences in syringe-related policing behaviors and attitudes towards PWID among law enforcement officers (LEOs) following a police education program (PEP) in Tijuana, Mexico.**METHODS:** *Proyecto Escudo* was a PEP delivered by peer instructors and multimedia covering occupational health (i.e., needle-stick injuries [NSIs]) and harm reduction topics. This mixed methods analysis drew from a random subsample of follow-up assessments with LEOs reporting contact with syringes (2015-2016): pre-PEP and 3-month post-PEP self-administered surveys, and linked qualitative interviews. Longitudinal logistic regression with gender as a main predictor and robust variance estimation via GEE was used to assess associations between gender and syringe-related policing behaviors and attitudes, which were further explored with qualitative narrative analysis.**RESULTS:** In our baseline subsample (n=766), 29.5% female LEOs (n=33) arrested someone for syringe possession versus 42.2% male LEOs (n=275; p=0.01), which significantly decreased 3-months post-PEP [subsample n=565; 18.7% female (n=14) versus 31.2% males (n=153); p=0.03]. Pre-PEP, females were less likely than males to confiscate syringes (OR: 0.62; 95%CI: 0.41-0.93; p=0.02) and arrest someone for syringe possession (OR: 0.57; 95%CI: 0.37-0.88; p=0.01). Female LEOs were less likely to arrest someone for syringe possession 3-months post-PEP (OR: 0.51; 95%CI: 0.27-0.93; p=0.03), more likely to disagree with "laws that reduce penalties on drug users make my job more difficult" (OR: 1.76; 95%CI: 1.08-2.87; p=0.02), and more likely to refer PWID to social/health programs (OR: 1.89; 95%CI: 1.13-3.15; p=0.01). Qualitative analysis (n=20) revealed post-NSI behavior change and attitude changes towards PWID ("People do change...Many people do better their lives"). Female LEOs also reflected on how their own NSI experiences would have been different with tools learned during the PEP, "I didn't know, that's why I didn't do it [test for HIV]."**CONCLUSIONS:** LEOs improved policing practices and attitudes following a PEP; however, these data suggest greater improvement among female LEOs, which persisted 3-months post-PEP. Female LEOs may serve as potential peer models to prevent NSIs and reduce HIV-related harms among PWID.Tuesday
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MOAD0101

Policing as a structural determinant of HIV risk among people who inject drugs: A systematic literature reviewP. Baker^{1,2}, L. Beletsky^{1,3}, L. Avalos¹, C. Venegas¹, S.A. Strathdee¹, J. Cepeda¹
¹University of California San Diego, Division of Infectious Disease and Global Public Health, San Diego, United States, ²San Diego State University, Graduate School of Public Health, San Diego, United States, ³Northeastern University, School of Law and Bouvé College of Health Sciences, Boston, United States**BACKGROUND:** The law and its enforcement are structural determinants of the HIV risk environment among people who inject drugs (PWID). Certain policing practices, such as syringe confiscation are consistently associated with increased HIV risk, but these relationships have not been systematically assessed. Our objective was to conduct a systematic literature review to provide a quantitative synthesis of policing practices acting as structural risk factors for HIV and its risk behaviors among PWID.**METHODS:** From September 2017 to November 2018, we conducted a systematic literature review (PROSPERO #CRD42018105967) screening MEDLINE, sociological databases and grey literature for quantitative studies conducted from 1981-2018 that included estimates of HIV infection or risky IDU behaviors and associations with policing practices that are adversely related to PWID health (syringe confiscation, beatings, arrest, etc). Abstracts were screened and those identified to contain elements of HIV risk and policing behaviors among PWID were selected for further review. We abstracted data on drug related harms and policing practices from eligible studies.**RESULTS:** Of 8,201 abstracts screened, 175 full text articles were reviewed; 26 eligible articles presenting associations between policing and HIV risk behaviors among PWID were included. Eligible studies originated from nine countries (Russia, Mexico, USA, Canada, Ukraine, Thailand, Malaysia, China and India) across various per-capita GDP income levels. HIV infection was significantly associated with syringe confiscation (Odds Ratio [OR]=2.04;95% Confidence Interval [CI]=1.00-4.21 and OR=2.38;CI=1.17-4.81) new syringe confiscation (OR=5.50;CI=1.80-16.6), not buying syringes for fear of police (OR=3.30;CI=1.40-7.60), not carrying syringes for fear of police (OR=2.20;CI=1.10-4.40), rushed injection due to police presence (OR=20.6;CI=10.00-42.70), pre-loaded syringe confiscation (OR=3.50;CI=1.906.40), fear of arrest (OR=0.62;CI=0.42-0.93), forced to buy back syringe from police (OR=2.90;CI=1.50-5.40), arrested for planted drugs (OR=3.00;CI=1.30-6.80), beaten or tortured (OR=3.10;CI=1.50-6.50 and OR=1.35;CI=1.08-1.67).**CONCLUSIONS:** Policing practices influencing HIV and drug-related risk were pervasive among PWID populations with high HIV burden across diverse global settings. There is an urgent need for interventions to transform police encounters with PWID from a source of harm to a source of harm reduction.

MOAD0102

Witch-hunt in Brazil: Bill 198/2015, criminalization of HIV transmission and pathologization of dissident sexualities

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BACKGROUND: Mass media and the National Congress has been working together on the construction of an imaginary of "risk", especially from the „Clube do Carimbo“, a supposed practice of purposely transmitting the virus by seropositive homosexuals. That notion has been used to ground a law that would make the intentional transmission of HIV a heinous crime - bill 198/2015. The objective of this research is to present a cartography of controversies involving parliamentarians, academics, activists, social movements, NGOs, international organizations and Ministry of Health.**METHODS:** The methodology is qualitative and is based on the analysis of public documents produced by social actors in the process related to bill 198/2015. A database was created with materials published in the media and in the media of the movement against AIDS, government programs and in-

ternational agencies; booklets and notes produced by the social movement; scientific articles. And the entire process of that bill in the National Congress, as well as its debate through public hearings or demonstrations of parliamentarians involved were monitored.

RESULTS: The outcomes are:

- 1) the construction of the notion of risk promotes the persecution of LGBTI, sex workers, the black population and immigrants;
- 2) the construction of the "Clube do Carimbo" as a panic reifies the old project of pathologizing dissident sexualities and promotes an increase in stigma and discrimination against people living with HIV/Aids - PLWHA;
- 3) there is an individualization of the epidemic, focused on the responsibility of the PLWHA;
- 4) There is a national and international increase in punitive policies that criminalize PLWHA based on sexual behavior.

CONCLUSIONS: The social construction of sexual behaviors seen as a threat, as well as the logic of individuality, drive the criminalization of HIV transmission and stigmatize and discriminate PLWHA and certain social groups. And the handling of the scientific evidence „undetectable equals untransmittable“ has proved to be very useful and needs to be studied more closely, especially in countries with advances in prison devices.

MOADO103

Utilizing individual level data to characterize the relationship between HIV infection and the legal context of sex work across 10 countries in sub Saharan Africa

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BACKGROUND: The legal and policy environment has been established as a key structural determinant of HIV risk for female sex workers and has become a focus for HIV response. Ecological studies of country level data have observed a relationship between HIV and legal status of sex work. The majority of studies have examined legal status of sex work and health outcomes through ecological studies and systematic reviews, highlighting the need for empiric data. In response, the aims of this study are to use pooled individual-level data examine the relationship between HIV and legal environments.

METHODS: Respondent driven sampling was used to recruit sex workers over the period of 2011-2018 across 10 countries: Burkina Faso, Cameroon, Côte d'Ivoire, Gambia, Guinea-Bissau, Lesotho, Senegal, eSwatini, South Africa, and Togo. Interviewer-administered socio-behavioral questionnaires and biological testing for HIV were conducted. Legal status of sex work for countries was defined and categorized based on the legal approach: Not specified; partially legalized; criminalized. Individual-level data were pooled across countries. Multivariable logistic regression was used to measure the association between legal status and HIV.

RESULTS: HIV prevalence among sex workers in contexts with partial legalization was 11.6% (219/1908), 19.6% (248/1266) within contexts where selling sex is not legally specified, and 40.4% (1605/3985) within criminalized settings. Legal status of sex work was associated with HIV (p-value <0.001). When compared to settings with partial legalization, criminalized status (aOR:7.6;95%CI:2.2,26.6), and not legally specified (aOR:2.5;95%CI:1.1,5.4) were associated with increased odds of HIV.

CONCLUSIONS: Consistently, the legal context of sex work was associated with prevalent individual HIV infection among sex workers. The magnitude of this relationship was highest among individuals in criminalized setting, followed by individuals in setting where the legal status of selling sex was not specified. These results highlight that laws contribute to individual level outcomes and decriminalization alongside supportive services should be established to effectively address the HIV epidemic.

	n/N	%	χ ² p value	Living with HIV					
				OR	P value	95% CI	aOR*	P value	95% CI
Legal status of sex work			<0.001						
Partial legalization	219/1908	11.56		Ref	Ref	Ref	Ref	Ref	Ref
Selling not specified	248/1266	19.59		1.86	0.103	0.88, 3.94	2.49	0.022	1.14, 5.44
Criminalized	1605/3985	40.44		4.97	0.009	1.52, 17.76	7.59	0.001	2.16, 26.60

[Figure 1- HIV infection and country level legal status]

MOADO104

A pathway to policy commitment for sustainability of a key population-led health services model in Thailand

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BACKGROUND: The key population-led health services (KPLHS) model has been proven to be efficient, safe, and feasible in enhancing uptake of and retention in HIV testing, antiretroviral treatment, and pre-exposure prophylaxis (PrEP) services among men who have sex with men, transgender women, and male and transgender sex workers in Thailand. Lay providers who are members of these key populations (KPs) delivered 42 percent of HIV testing, 35 percent of HIV diagnosis, and more than 50 percent of PrEP services among men who have sex with men and transgender women in the country in 2016. For KPLHS scale-up and sustainability, policy commitment must be achieved to ensure legalization and domestic financing mechanisms.

METHODS: A series of high-level policy and advocacy dialogues were held with Ministry of Public Health stakeholders during 2017 and 2018. The Thai Red Cross AIDS Research Centre and community-based organizations (CBOs), supported by LINKAGES Thailand, provided feasibility, impact, and health economic data on KPLHS to assist policy decisions. The USAID Community Partnership established a training and certification platform and facilitated regulatory reform to allow KP lay providers to deliver high-quality HIV and sexually transmitted infection services.

RESULTS: A Ministry of Public Health decree was revised to allow trained KP lay providers to perform HIV counseling, specimen collections for HIV and sexually transmitted infections, and rapid/point-of-care tests, as well as antiretroviral treatment and PrEP dispensing. KPLHS standards, training modules, and certification steps are in the process of being endorsed by the National AIDS Committee and the Ministry of Public Health. Domestic financing mechanisms are being piloted for the National Health Security Office to directly fund CBOs for KPLHS.

CONCLUSIONS: Concerted effort among key policy stakeholders, academia, and CBOs, together with strong leadership by the Ministry of Public Health, did efficiently advance regulatory reform to legalize KP lay providers and facilitate piloting to transition from international aid to domestic funding for sustainability of KPLHS.

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MOAD0105

Barriers and facilitators to the successful transition of adolescents living with HIV from pediatric to adult care in low and middle-income countries: A policy reviewT. Ritchwood¹, C. Jones², T. Taggart³¹Duke University, Durham, United States, ²Medical University of South Carolina, Charleston, United States, ³George Washington University, D.C., United States

BACKGROUND: Adolescents living with HIV face the unique challenge undergoing healthcare transition, which occurs when they age out of pediatric HIV care and engage in a planned transfer to an adult care setting. This process often coincides with a developmental period during which many adolescents struggle with disease management and experience the onset of HIV-related complications and interruptions in care, leading to high rates of HIV-related morbidity and mortality. While there have been a number of published literature reviews focused on healthcare transition in North America and Europe, we lack reviews evaluating healthcare transition in low-middle-income countries. Therefore, this study systematically reviews the literature on transition-related barriers and facilitators in low-middle-income countries. Additionally, we review relevant, country-specific policies to determine whether they are responsive to the barriers and facilitators of successful transition.

METHODS: We conducted a systematic literature review using the online databases to identify articles in peer-reviewed journals that included text associated with HIV, adolescents, and healthcare transition. We identified country-specific guidelines by searching the websites of each country's health ministry, international publications, and relevant online databases.

RESULTS: Our review yielded 10 studies assessing barriers and facilitators of transition for adolescents residing in low-middle-income countries. Our review of country-specific guidelines revealed that few countries have guidelines specific to transition for adolescents. We identified three factors critical to advancing the healthcare transition literature in low-middle-income countries: (1) more rigorous studies examining the effectiveness of transition programs, (2) the development and implementation of targeted guidelines or policies that address barriers and facilitators of transition among adolescents, and (3) the development of transition-oriented programs that address the socio-structural factors that affect transition, such as HIV-related stigma and socioeconomic factors.

CONCLUSIONS: Our review has led to several recommendations to facilitate successful transition, including:

- 1) training for the adult treatment team prior to transition;
- 2) dedicated time to treat adolescent patients or employment of adherence clubs; and
- 3) comprehensive programs that consider the developmental and cognitive needs of adolescents transitioning to adult care settings and children transitioning to adolescent care settings are also needed.

MOAD02 HIV testing: Pushing the envelope

MOAD0201

Private sector HIV self-testing in Kenya: Insights from a Mystery shopper studyK. Little¹, C. Odour², H. Awsumb¹, H. Essendi²¹Population Services International, HIV/TB, Washington, United States,²Population Services Kenya, Nairobi, Kenya

BACKGROUND: To understand the private sector's ability to reach adolescents and young people with high quality HIV self-testing (HIVST) services, we conducted a mystery shopper study at pharmacies and private health facilities participating in an HIVST demonstration project in Nairobi and Mombasa.

METHODS: Outlets were randomly selected for the study. Facility owners provided verbal consent, but were not informed about the date or time of visits. Mystery shoppers ages 18-30 visited facilities and attempted to purchase a quality-assured HIVST kit using one of 14 pre-defined mystery shopper scenarios. Scenarios included instructions for the shopper's age (range:

16-24 years), reason for testing, and type of kit to be purchased, and questions to ask the provider. After the visit, shoppers were interviewed about their experiences using a structured guide administered by a trained surveyor.

RESULTS: In Sep. 2018, 28 mystery shoppers visited 14 private health facilities and 41 pharmacies. While the project set the consumer price for both HIVST kits at 500Ksh, 6 (11%) facilities sold them at higher prices. Observed prices ranged from 150Ksh-900Ksh. Most facilities (25, 45%) stored kits in a storage room accessible only to employees, or under/behind the counter (10, 18%). Complete stock-outs weren't uncommon (7/55 facilities), and a further 5 facilities had just a single brand of quality-assured HIVST in stock at the time of the visit. While 42/55 providers gave clients information to help them use the test kit, and 36 provided a step-by-step explanation on using the kit, slightly fewer (27, 49%) could answer specific test-use questions satisfactorily. Misinformation, unfriendliness, lack of privacy, and provider preferences for one test kit over the other were also reported.

CONCLUSIONS: Despite a one-time training and monthly medical detailing visits, HIVST service delivery quality was uneven. Kit prices ranged substantially, as did the ability/willingness of providers to answer questions or demonstrate the use of the kits. Because kits were not stocked on shelves, providers acted as an important mediator for consumers deciding on which test kit to purchase. Further supportive supervision efforts may be needed to ensure providers are able to support consumers in safely using and interpreting the results of HIVST kits.

MOAD0202

False negative HIV rapid test results among people living with HIV on antiretroviral therapy in Johannesburg, South Africa: Implications for HIV self-testing roll outM. Majam^{1,2}, J.M. Francis^{1,2,3}, N. Rhagnath¹, V. Msolomba¹, F. Venter^{1,2}¹University of the Witwatersrand, Wits Reproductive Health and HIV Institute(Wits RHII), Johannesburg, South Africa, ²University of the Witwatersrand,

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South Africa, ³Muhimbili University of Health and Allied Science,

Epidemiology and Biostatistics, Dar es Salaam, Tanzania, United Republic of

BACKGROUND: The World Health Organization (WHO) self-testing guidelines recommends that people living with HIV (PLHIV) on antiretroviral therapy (ART) refrain from performing self-tests due to the risk of obtaining false negative results. We conducted a pilot study to assess the accuracy of one oral fluid and five blood based rapid diagnostic test (RDT) kits among PLHIV, of which four are designed for self-testing.

METHODS: This was a cross sectional study among PLHIV on ART participating in two randomized clinical trials within the Wits Reproductive Health and HIV Institute treatment optimization program, in Johannesburg, South Africa. Participants were recruited using convenience sampling. All participants had been on ART for a minimum of 2 years. The research nurses performed the RDT serially, starting with the oral followed by the blood based. Two nurses blinded to the test kits read and interpreted the results. We assessed the agreement between the readers using the kappa statistic, computed the proportion of positive and negative test results by age, sex and duration on ART, and assessed the association using the Fisher's exact test.

RESULTS: 100 participants were recruited into the study; 67% of whom were females. Majority of the participants were ≤40 years (53%) and 41% had been on ART for ≥7 years. Overall, the two nurses had high agreement on the results reading with kappa ranging from 90 - 100% (p< 0.001). Nine (9%) of the patients had false negative results on at least one of the RDTs with a total of 16 false results in the 600 tests performed. Four participants had multiple tests with false results. False negative results was not associated by duration on treatment.

CONCLUSIONS: False negative results have serious implications for HIV Self-Testing Programmes. Retesting on ART could result in participants believing that they are 'cured', especially in instances where multiple tests appear negative. False negativity may not be associated with length on time on ART, however further investigation on time to ART initiation from infection may play a role in antibody production.

MOADO203

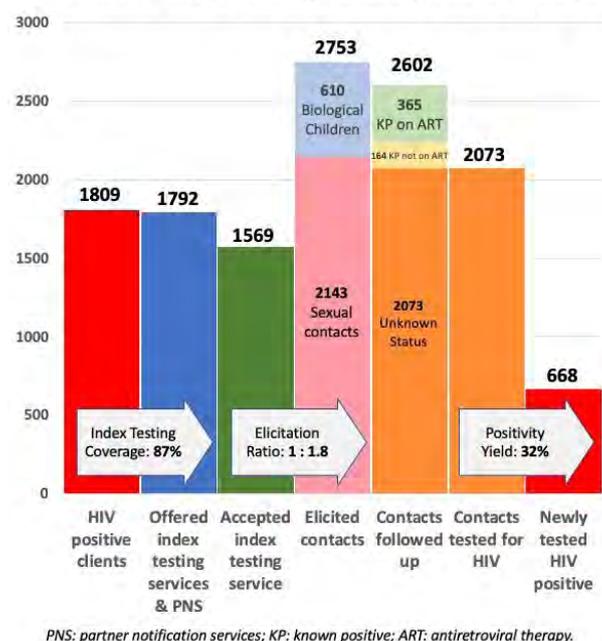
Reaching the unreachable: Early results from index testing in Zambia in the CIRKUIITS projectL.K. Mwangi¹, M. Mujansi¹, J. Chipukuma¹, B. Phiri¹, H. Sakala¹, N. Nyirongo¹, S. Sivile¹, M. Sinjani¹, M.-C. Lavoie², C.W. Claassen²¹Maryland Global Initiatives Corporation, Lusaka, Zambia, ²University of Maryland School of Medicine, Center for International Health, Education, and Biosecurity (CIHEB), Lusaka, Zambia

BACKGROUND: In Zambia, men, adolescent girls and young women (AGYW), and adolescent boys and young men (ABYM) are hard-to-reach priority populations (PPs) yet contribute significantly to gaps in achieving HIV epidemic control. Novel testing strategies are needed to identify HIV-infected PP individuals in the community while maximizing positivity yield. We present data from the Community Impact to Reach Key and Underserved Individuals for Treatment and Support (CIRKUIITS) project on index and social network testing. CIRKUIITS is a PEPFAR-funded project employing community approaches to accelerate HIV epidemic control among key and priority populations.

METHODS: We analyzed age and sex-disaggregated program data from Zambian Ministry of Health HIV testing services and index testing registers. We included data from October to December 2018 across 41 CIRKUIITS-supported facilities in Eastern, Western and Lusaka provinces. Since October 2018, CIRKUIITS has trained, mentored, and deployed 124 community health workers (CHWs) and 21 community liaison officers to conduct index and social network testing, partner notification services, and PP hotspot mapping in all supported facilities.

RESULTS: CIRKUIITS CHWs tested 12,250 clients in the community, of whom 1,809 (15%) were HIV-positive. Among HIV-positive clients, 1,569 (87%) clients were indexed, with 2,753 contacts elicited which included sexual partners and biological children (elicitation ratio: 1:1.8). Of the 2,602 contacts followed up, 2,073 contacts presented with unknown status and were tested for HIV; of these, 668 were newly diagnosed as HIV-positive, representing 32% positivity yield. Of these, 230 (34%) were women older than 25 years, 211 (32%) were men older than 25 years, 89 (13%) were AGYW ages 10-24, 85 (13%) were ABYM ages 10-24, and 53 (8%) were children under the age of 10 years.

CONCLUSIONS: Index and social network testing are effective strategies to identify HIV-infected persons in Zambia, especially priority populations that are hard to reach such as men, AGYW, and ABYM.

CIRKUIITS Index Testing Cascade, Oct.-Dec. 2018

[Figure 1. Index Testing Cascade in CIRKUIITS Project]

MOADO204

"Once their wives are OK ... they have no disease:" men infer HIV status from partner's results: Qualitative insights into male HIV testing in rural MalawiA. Radunsky¹, J. Weinstein², E. Geoffroy³, R. Atun¹, M.C.S. Fawsi⁴, M. McConnell¹, T. Barnighausen^{1,5}¹Harvard T.H. Chan School of Public Health, Global Health and Population, Boston, United States, ²Boston University, Boston, United States, ³Global AIDS Interfaith Alliance, San Francisco, United States, ⁴Harvard Medical School, Global Health and Social Medicine, Boston, United States, ⁵University of Heidelberg, Institute of Global Health, Heidelberg, Germany

BACKGROUND: Even with available HIV testing and effective treatment, HIV testing rates for men in rural Malawi and across sub-Saharan Africa remain low. We aim to add to the theoretical understanding for how and why men avoid HIV testing and how they make sense of this choice in HIV endemic settings. We use an ecological framework that considers institutional structures, social pressures and internal assessments of risk that strongly shape men's testing behaviors.

METHODS: We conducted 30 semi-structured in-depth qualitative interviews with adult men ages 20-39, in Mulanje District of rural Malawi in 2014. Audio-recordings were coded and analyzed using a Modified Grounded Theory framework.

RESULTS: Findings indicate that men rationalize their non-testing, especially when they can use their spouses' HIV negative test result as a proxy for their own status. Men identify testing as a source of anticipated stigma, social risk and potential family instability. Men resist testing even while encouraging their spouses to do so. Women are further encouraged to test in community and health service settings. Because of gendered social power dynamics, when women are encouraged to test they more often comply. If her test is negative, he can use that test result as a proxy for his own status. Her negative result reassures him that testing is unnecessary, and he can successfully rationalize going untested. Although unmotivated by their own health, men are more likely to test in response to an acute medical need.

CONCLUSIONS: Societal gender norms empower and motivate men to avoid testing, and institutional structures enable men to shift the social risk of an HIV positive result to women. Men highly value their social status, family structure and sexual access and HIV testing threatens to destabilize all of these. Men are sensitive to appeals to test that relate to helping their family, but if their wife is known to be HIV negative, this argument is less compelling. PMTCT related partner testing is an opportunity to draw men in, especially if men appreciate sex with their wife as a potential HIV risk to their unborn child.

MOADO205

Community mobilization is associated with HIV testing, particularly among men and rural dwellers, in ZambiaJ.G. Rosen¹, M.A. Carrasco², B. Olapeju³, E.K. Kumjip³¹Population Council, Lusaka, Zambia, ²United States Agency for International Development, Office of HIV/AIDS, Washington, United States, ³Johns Hopkins Center for Communications Programs, Baltimore, United States

BACKGROUND: Engaging men in HIV testing is a priority to reaching UNAIDS 90-90-90 goals in sub-Saharan Africa, where men continue to access testing less than women. Using data from a population-based assessment, this study aimed to measure the association between community mobilization and HIV testing in Zambia to determine if community mobilization could be a viable strategy to engage men in testing.

METHODS: Data come from a nationally representative survey of individuals aged 15-59 in 14 districts across Zambia's 10 provinces. Two-stage sampling proportional to population size was used to select households across residence types (urban/rural) in enumeration areas. The primary independent variable was operationalized using an 18-item, 5-point scale assessing four dimensions of community mobilization: community participation, social cohesion, collective efficacy, and leadership. Other independent covariates of interest included socio-demographic factors and other HIV-related factors, including sexual risk-taking and HIV stigma. Bivariate and multivariable logistic regression was used to measure the association between HIV testing and community mobilization. Multivariable models were subsequently stratified

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by sex and residence. Analytic weights derived from 2010 Zambian census data and 2016 population projections adjusted for clustering and stratification.

RESULTS: Among 3,533 respondents, 83% (n=2,921) reported previous HIV testing, with female (87% vs. 82%, $p < 0.001$) and married (93% vs. 68%, $p < 0.001$) respondents reporting HIV testing at significantly higher proportions than male and never-married respondents, respectively. Adolescents (aged 15-24 years) reporting HIV testing at significantly lower proportions than respondents aged 25-34 years (73% vs. 94%, $p < 0.001$) and 35-44 years (73% vs. 95%, $p < 0.001$). In multivariable analysis, community mobilization (mean: 62.48, range: 30-90) was significantly associated with HIV testing (AOR=1.02, CI: 1.00-1.03). In sex- and residence-stratified models, the odds of HIV testing were higher and significant among males (AOR=1.02, CI: 1.01-1.04) and rural residents (AOR=1.03, CI: 1.01-1.06), but not among females or urban residents, for each additional unit increase in community mobilization.

CONCLUSIONS: Community mobilization emerged as a significant factor associated with HIV testing among survey respondents, particularly among males and rural dwellers. These findings contribute to a growing toolkit of layered interventions for promoting HIV testing, particularly for hard-to-reach, vulnerable men and rural dwellers.

MOAD03 It's complicated: PrEP in practice

MOAD0301

PrEP knowledge, intention and uptake among MSM geosocial networking app users in Mexico

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BACKGROUND: Pre-exposure prophylaxis (PrEP) is a biomedical prevention strategy with significant potential to reduce HIV incidence among MSM worldwide. In 2018, the ImPrEP Project began in Mexico, a preliminary step for the launch of comprehensive PrEP services in that country. However, little data exists about PrEP engagement among MSM in Mexico. We sought to understand correlates of PrEP knowledge, intention, and uptake among an online sample of MSM in Mexico in order to guide future PrEP intervention efforts.

METHODS: Between November 2018 and January 2019 we recruited MSM from the social networking application, Hornet, using targeted advertising (N=2,957). Participants completed a brief online survey, which assessed PrEP knowledge, intention to use PrEP in the next 6 months, and current PrEP use. Bivariate tests of association, followed by multivariable logistic regression analyses, were used to determine correlates of these three PrEP-related outcomes, sociodemographic characteristics and behavioral health variables.

RESULTS: HIV-positive MSM (N=490; 16.6%) were excluded, leaving a total analytic sample of 2,467. Over two-thirds (70.0%) had previous knowledge about PrEP; 35.7% intended to use PrEP in the next 6 months; and 3.48% were current PrEP users. Of those currently using PrEP, the majority obtained the medication from their doctors (51.1%); a smaller percentage obtained the medication from a research study (25.0%), friends (7.9%), the internet (11.3%) or another source (4.5%). Multivariable analyses demonstrated that PrEP use was associated with prior sexually transmitted infection testing (aOR: 6.67, CI: 4.12-10.77), and satisfaction with sex life (aOR: 1.37, CI: 1.16-1.60). PrEP intention was associated with using the "know your status" function on Hornet (aOR: 2.17, CI: 1.76-2.68), and sex life satisfaction (aOR: 1.19, CI: 1.05-1.33).

CONCLUSIONS: PrEP use among Mexican MSM in our sample was low; however, knowledge of and intention to use PrEP were high, representing an important opportunity for HIV prevention. Geosocial networking apps and STI testing centers may be leveraged for PrEP information dissemination and PrEP access among MSM in Mexico. PrEP users in our sample were more satisfied with their sex lives than non-PrEP users; highlighting this may be helpful to increasing PrEP uptake among Mexican MSM.

MOAD0302

Manifestations of stigma in the context of a national oral pre-exposure prophylaxis (PrEP) scale-up program in Kenya

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BACKGROUND: Since Kenya began scaling up oral PrEP in May 2017, uptake has been slower than expected among adolescent girls and young women (AGYW), and overall continuation rates consistently low. Stigma was documented as a substantial barrier during clinical trials, hence understanding how PrEP-related stigma is experienced in routine service delivery is critical to improve PrEP outcomes. The Jilinde project, funded by the Bill & Melinda Gates Foundation, provides PrEP to female sex workers (FSW), men who have sex with men (MSM) and AGYW. This abstract describes how stigma is manifested and its impact on PrEP uptake and continuation.

METHODS: Between October 2017 and November 2018, qualitative data were collected from 222 respondents via 22 focus group discussions (FGD) and 30 in-depth interviews: 86 AGYW, 12 parents of AGYW, 10 male partners of AGYW, 36 MSM, 28 FSW, 29 health care providers, and 20 peer educators. All interviews and FGDs were audio-recorded, transcribed and translated, then thematically analyzed.

RESULTS: Stigma negatively influenced PrEP uptake and continuation among AGYW, FSW and MSM, who self-stigmatized and were stigmatized by others. Stigma was manifested through stereotypes, prejudice, and discrimination by peers, sexual partners, family, health care providers, and the community. For MSM and FSW, PrEP-related stigma was intertwined with identity stigma, while for AGYW it was manifested through stigma toward sexual behavior. Some health providers equated giving PrEP to these populations to promoting immorality. All individuals disguised their PrEP use since it was associated with 'recklessness': PrEP users were labelled as promiscuous and subjected to similar stigma associated with being HIV-positive. Consequently, PrEP use was hampered by: fear of violence and rejection by an intimate partner, family or community members; discrimination by providers; loss of 'business'; reputational damage; and shame.

CONCLUSIONS: Stigma remains a critical barrier to PrEP use among priority communities in Kenya and was directed towards the product, clients' behavior and identity. While stigma was manifested differently for diverse populations, results were similar in terms of PrEP uptake and continuation. Health care providers and communities should be prioritized in stigma interventions to improve uptake and optimize the outcomes of PrEP.

MOAD0303

Results from a large Australian PrEP demonstration study: Discontinuation and subsequent HIV and other sexually transmitted infection risk

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BACKGROUND: The PrEPX demonstration study used existing health services to emulate the 'real world' provision of HIV PrEP prior to government subsidisation in Australia in April 2018. We describe PrEPX participants who discontinued receiving study drug prior to the study ending, examine factors associated with discontinuation and describe these participants' ongoing HIV and sexually transmitted infection (STI) risk.

METHODS: Study drug dispensing data from pharmacy logs, HIV/STI testing and behavioural survey data from four study clinics participating in the

Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) system were extracted for the duration of PrEPX (26Jul 2016-30Apr2018). PrEPX participants were provided 90 pills per study drug dispensing event, and study discontinuation was classified as participants who were dispensed their last study drug before October 2017, seven months prior to study completion and missing at least two scheduled study prescriptions. Cox proportional hazards estimated covariates associated with discontinued study participation. HIV/STI diagnosis rates >100 days after last study drug dispensed are described and differences in HIV/STI positivity between study and post-study periods were assessed using Chi squared analyses.

RESULTS: This analysis included 2451 participants; 515 (21.0%) discontinued study participation with a median time from last study drug dispensed to study end of 367days (IQR:272-499). PrEP naiveté (aHR1.67 95%CI: 1.11-2.48), age < 30 years (aHR1.65, 95%CI: 1.09-2.50), and reporting consistent condom use with casual partners (aHR1.52 95%CI: 1.01-2.30) at enrolment were associated with discontinuing study participation. Of these 515 participants, 130 (25.2%) accessed post-study testing at ACCESS sites; four participants (3.3%) were diagnosed with HIV during the observation period. Mean time between last study drug dispensed and HIV diagnosis was 338 days (range 140-466 days). STI positivity was similar between pre and post-study periods for chlamydia (8.5%, 8.3%, $p=0.9$), gonorrhoea (10.4%, 9.9%, $p=0.9$), and syphilis (0.5%, 1.3%, $p=0.5$).

CONCLUSIONS: Approximately 20% of participants in this analysis discontinued study participation. Four HIV diagnoses and similar STI positivity between study and post-study periods suggest ongoing HIV and STI acquisition risk and unmet HIV prevention need. Greater understanding of barriers to PrEP retention and factors affecting accurate risk perception are needed to maximise the HIV prevention benefits of PrEP.

MOAD0304

Predictors of discontinuation in Brazil's free-of-charge PrEP program

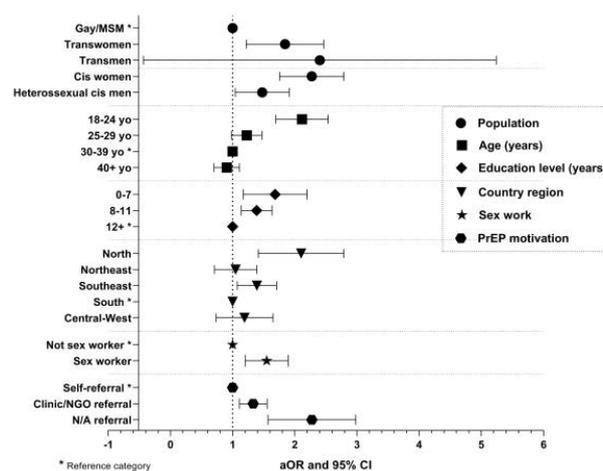
I. Ornelas Pereira, A.R. Pascom, F. de Barros Perini, C. Habckost Dutra de Barros, G. Mosimann Júnior, A. Schwartz Benzaken, G.F. Mendes Pereira
Ministry of Health of Brazil, Department of Surveillance, Prevention and Control of STIs, HIV/AIDS and Viral Hepatitis, Brasília, Brazil

BACKGROUND: Retention in care is a major challenge in HIV pre-exposure prophylaxis (PrEP) implementation programs. PrEP has been offered free of charge in the Brazilian public health system since December 2017. We aimed to describe the profile of discontinued PrEP users as well as the rates and predictors of discontinuation before the first follow-up visit in the Brazilian PrEP program.

METHODS: We used secondary data from the Ministry of Health of Brazil (MoH-B), including individuals admitted in the national daily dosing PrEP program, between January and December 2018. Discontinuity was defined as failing to attend the follow-up visit, with a delay (in days) of more than 40% of the expected time difference between the first consultation and the scheduled follow-up visit. Multivariable logistic regression model was used to assess the likelihood of PrEP discontinuation considering demographic and behavioral predictors.

RESULTS: Among the 8,097 enrolled PrEP users, 821 (10%) did not attend their first follow-up visit. Median age of discontinued users was 29 years old (IQR 24-36). Young users (18 to 24 years old) were 109% more likely to discontinue PrEP (aOR 2.087, 95%CI: 1.710-2.548) and sex workers were 52% more likely to do so (aOR 1.522, 95%CI: 1.215-1.905). Compared to MSM, the odds of discontinuing PrEP was 2.233 (95%CI: 1.776-2.807) among cis women, and 1.772 (95%CI: 1.258-2.497) among transwomen. Other factors positively associated with PrEP discontinuation were living in Brazil's North or Southeast region, compared to the South; lower education level; and clinic or NGO referral, rather than self-referral.

CONCLUSIONS: Understanding characteristics of users who are most-likely to discontinue PrEP is crucial to help health services to deliver strategies that are tailored to specific barriers to care. Enhancing education, motivation and social/psychological support during early PrEP visits may increase continuation in care and strengthen PrEP as public health policy.



[Results of multivariable logistic regression model results for interrupting PrEP before first follow-up visit, Brazil, 2018]

MOAD0305

A competing risks model for the use of condom in the open-label extension of the ANRS Ipergay study

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BACKGROUND: During the open-label extension (OLE) phase of the ANRS Ipergay trial, the overall use of condoms decreased when participants knew about the PrEP efficacy with TFDF/FTC vs. placebo. Still some participants resumed condom use during OLE. We aimed investigating the factors associated with using condoms back again combined or not with PrEP.

METHODS: ANRS Ipergay OLE started in November 2014. Follow-up between M0-M18 included bimonthly HIV/STI testing and online questionnaires collecting sexual behavior, PrEP (correct/sub-optimal) and condom use at the most recent anal intercourse (MRAI). This analysis focused on participants using only PrEP at OLE enrolment. The outcome: time elapsed until condom resumption alone or combined with PrEP. Competing risks survival model estimated hazard-ratios (HR). Individual characteristics, sexual behavior and STI onset before condom resumption during OLE were specified as time-dependent variables.

RESULTS: Among 361 OLE participants, 146 (40.4%) used only PrEP for their MRAI at enrolment. Compared to other participants, those using only PrEP were less educated (63.3% vs 36.7%, $p=0.03$), and had higher HIV-risk perception [scale 0-10; median[IQR]:4[2-7] versus 2[1-4], $p<0.001$]. No difference was found for age, number of sexual partners and number of sexual intercourses. 70% of these 146 participants were low-level condom users during the double-blind phase with: on average, 2/10 MRAI with condom (6/10 for the remaining 30%). Among these 146 participants, 8.2% resumed condoms instead of PrEP on average after 5.5 months (sd.±3.4); and 59.6% PrEP+condoms on average after 6 months (sd.±4.4). On average, condoms resumption lasted 7.6 months (sd.±6.1). Condom use probability increased with the number of sexual partners (previous 2 months) (HR:1.01, $p=0.035$); and the number of sexual intercourses (previous 4 weeks) (HR:1.05, $p<0.001$). Sensations seeking increased condom resumption probability in combination with PrEP (HR:1.04, $p=0.038$). However, chemsex reduced condom resump-

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tion alone (HR:0.157, p=0.014) or combined with PrEP (HR:0.712, p=0.003). Finally, the onset of STIs during OLE increased condom resumption probability alone (HR:3.69, p< 0.001) and combined with PrEP (HR:1.42, p=0.013);

CONCLUSIONS: Condom resumption during the OLE phase of the ANRS Ipergay study was strongly associated to the onset of STIs. In contrast, chemsexers were less likely to resume condom while using PrEP.

MOAD04 Big, bold and effective: Multi-level strategies that work

MOAD0401

Are community-led organizations the drivers for enhancing financial security among female sex workers? Lessons from a large-scale HIV intervention in India

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BACKGROUND: Community-led organizations have been essential part of HIV prevention programs to address the socio-economic and structural vulnerabilities among female sex workers (FSWs). The current study aims to examine whether strengthening of community organizations (COs) have been instrumental in reducing the financial vulnerability among FSWs in India.

METHODS: This study used a panel data of 2085 FSWs selected from 30 COs across five states of India. Two rounds of data (baseline in 2015 and end line in 2017) were collected among FSWs. Data were collected both at CO and individual level. CO level data was used to assess the CO strength. Individual level data was used to measure financial security. The financial security measure was measured based on the composite score of having a savings account, investment in schemes, insurance products, had an alternative source of income, and had not taken any loan from informal sources. Descriptive statistics, frequency, bivariate and multilevel logistic regression techniques were used for the analysis.

RESULTS: There was a significant improvement in CO strength from baseline to end-line. High CO strength has led to improved financial security among FSWs (EL: 85% vs. BL: 51%, AOR: 2.5; 95% CI: 1.5-4.1) in end line from baseline. FSWs those associated with COs whom were formed more than 5 years ago, have higher financial security compared to others (EL: 86% vs. BL: 49%, AOR: 2.82). In addition, FSWs those belonged to larger outreach COs (covering >=1200 FSWs) have 2 times higher financial security compared to FSWs belonged to smaller outreach COs (covering < 1200 FSWs). Further, the improvement in financial security in the inter-survey period led to increased or sustained individual empowerment (in terms of self-confidence, self-efficacy and individual agency) among FSWs.

CONCLUSIONS: The study concluded that organizational strengthening under the community mobilization interventions are key to address the structural issues and the decrease of financial vulnerability among FSWs. Further attention is needed to sustain the existing community advocacy and engagement systems to address the vulnerabilities faced by marginalized populations and build their empowerment.

MOAD0402

Organizational and individual-level strategies associated with viral suppression in a sample of transgender women receiving care for HIV infection in the U.S

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BACKGROUND: With increasing evidence of high HIV infection rates among transgender women (TW) worldwide, it is critical to improve their engagement in HIV primary care to achieve viral suppression. However, TW encounter numerous difficulties accessing healthcare, including stigma, provider bias, and a higher priority of seeking transgender-related care, where available.

METHODS: The U.S. Department of Health and Human Services, through HRSA's Special Projects of National Significance, funded nine demonstration sites to implement innovative interventions to engage TW living with HIV into care. The University of California, San Francisco Evaluation Center conducted key informant interviews to characterize organization-level strategies associated with successful interventions. Demonstration sites submitted information on individual-level intervention activities (screening, referrals, and services) provided to intervention participants and medical chart data on linkage, treatment, retention, and viral suppression (< 200 copies/mL) before and after intervention participation. We employed generalized estimating equations to identify intervention activities significantly associated with change in viral suppression at 24 months.

RESULTS: Sites enrolled 858 TW into nine interventions, with 79% participating in intervention activities. TW participated in a median of 280 minutes (IQR=45-630 minutes) of activities. Viral suppression increased from 23% at baseline to 35% at 24 months. Common organization-level strategies included: transgender empowering environments and activities; TW in visible staff/mentoring roles; support for self-care of staff; and incentives to attend intervention activities and/or health services. Individual-level intervention activities associated with change in viral suppression at 24 months include: (1) screenings for: mental health diagnosis (aOR=4.15; 95% CI=1.23-13.95), substance abuse (aOR=0.41; 95% CI=0.26-0.65) or food insecurity (aOR=2.87; 95% CI=1.82-4.53); (2) referrals to: HIV primary care (aOR=2.22; 95% CI=1.17-4.20), mental health care (aOR=2.52; 95% CI=1.06-5.99) or food assistance (aOR=2.43; 95% CI=1.42-4.16); and (3) services: retention counseling (3.50; 95% CI=2.11-5.81) and employment (aOR=6.18; 95% CI=2.93-13.05).

CONCLUSIONS: Transgender-affirming care settings with TW staff and integration of HIV primary care with mental health screening and referrals; food insecurity screenings and services; HIV care referrals; and retention counseling and employment services were associated with increased viral suppression. The continued development, adaptation and scale up of integrated care interventions for this key population will be necessary to meet 90-90-90 goals.

MOAD0403

Dreams of an AIDS-free generation: Which supportive factors delay onset of adolescent sexual HIV-risk behaviors in South Africa

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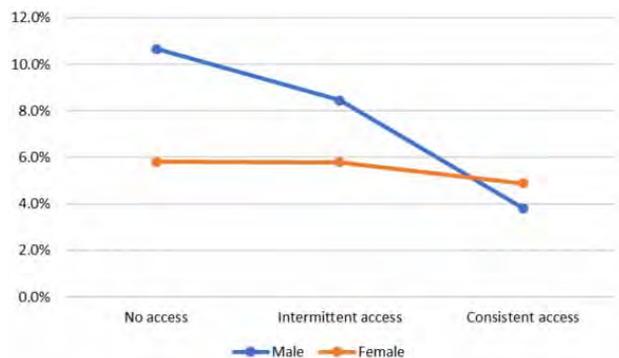
BACKGROUND: Early initiation of sexual risk-taking during adolescence is strongly associated with HIV infection. However, little is known about which supportive factors may delay and prevent high-risk sexual practices, especially in younger adolescents.

METHODS: We pooled data from two longitudinal surveys in three South African provinces to identify adolescents who had not initiated high HIV-risk behaviors (n=3,662). Interviews were conducted by trained researchers following informed, voluntary consent from adolescents and their caregivers. Questionnaires were designed as teen-friendly magazines to maximize participation. Initiation of HIV-risk behaviors was defined as initiating one of four high-risk sexual practices between baseline and 12-month follow-up (incident high-risk sex). These practices included inconsistent condom use, transactional sex, age-disparate relationship, or early sexual debut. Analyses used multivariate logistic regression to test whether consistent access to eight structural provisions was associated with incident high-risk sex.

RESULTS: Adolescents were young (baseline mean age 12.8 years), 57% female, and 42% lived in rural areas. Between baseline and follow-up, 8.7% of adolescents reported incident HIV-risk behaviors, which was strongly associated with incident pregnancy. Consistent access to four structural provisions was strongly associated with delayed incident high-risk sex: parenting/caregiving support (OR=0.53 95%CI0.35-0.80 p=0.002), violence prevention (OR=0.54 95%CI0.37-0.79 p=0.002), school subsidies (OR=0.57 95%CI0.35-0.93 p=0.002), and HIV knowledge (OR=0.43, 95%CI0.21-0.89 p=0.023), alone and in combination. One-year incident high-risk sex was 1.1% with ac-

cess to all four structural provisions compared to 12.4% without access to any provisions. Gender moderated the effect of school meals on incident high-risk sex: boys who accessed school meals consistently reported the greatest reduction in incident high-risk sex compared to boys who did not (Fig 1).

CONCLUSIONS: Consistent access to structural provisions in early adolescence is critical to delaying debut of HIV-risk sexual practices for young adolescent boys and girls, whether they live in urban or rural areas.



[Fig 1. Effects of school meals on incident high-risk sex by gender]

MOADO404

The *Sawa Sawa* Intervention: A quasi-experimental trial to reduce community level stigma and improve HIV testing service uptake among men in Sofala Province, Mozambique

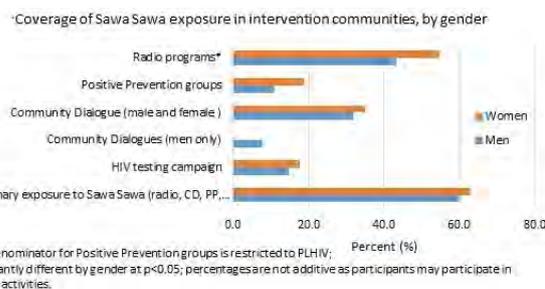
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BACKGROUND: In sub-Saharan Africa, stigma may partially explain low uptake of HIV testing services (HTS) and delayed engagement in care among men compared to women. The *Sawa Sawa* intervention aimed to reduce community-level stigma and improve uptake of HTS among men in Mozambique.

METHODS: *Sawa Sawa* (*Sawa*=equality in Sena language) included Positive Prevention (7sessions for PLHIV), Community Dialogues (6sessions for all community members), district-wide radio spots and call-in programs, and SMS-based linkage system that connected people with health facility focal points. Sessions included HIV prevention/care information with anti-stigma messaging. A quasi-experimental design was created to estimate the effect of the intervention on 1) community-level stigma and 2) HTS among adult men. All intervention activities ran continuously between March-December 2017 in Dondo district; Nhamatanda served as the control district. A longitudinal population-based survey (N=3,000) was implemented pre- (November-December 2016) and post-intervention (February-March 2018) in both districts (N=1,500/district). Survey included validated stigma measures (Genberg 2008; $\alpha=0.79$) and self-reported HIV testing (last 12mo). Statistical analyses compared intervention to control sites and included: residualized change regression models to compare changes in the summed stigma score among all participants and multi-level random effects model of men's survey data to compare changes in HTS. N=40 male Positive Prevention participants completed qualitative interviews.

RESULTS: N=3,017 and N=2,447 completed the baseline and endline surveys (81% retention); by design, two-thirds were men. Over 60% of intervention population participated in at least one intervention activity (Figure). Reductions in stigma were associated with the intervention (Beta:-2.38; 95%CI:-3.07,-1.69; $p < 0.001$) and HTS among men increased with the intervention ($aOR:1.32$; 95%CI:1.01,1.74; $p=0.049$). Qualitative interviews highlighted past experiences of stigma, observed changes in stigma during the intervention, and the mechanisms by which *Sawa Sawa* supported HIV care.

CONCLUSIONS: *Sawa Sawa* effectively reduced community-level stigma and improved HIV testing among men and may support achievement of HIV care continuum targets.



Note: Denominator for Positive Prevention groups is restricted to PLHIV; *significantly different by gender at $p < 0.05$; percentages are not additive as participants may participate in multiple activities.

[Coverage of Sawa Sawa intervention exposure in intervention communities]

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MOPDA01 HIV transcription: The sound of silence

MOPDA0101

Hormonal control of HIV-1 latency by estrogen imparts gender-specific restrictions on the latent reservoir

J. Karn¹, C. Dobrowolski², S. Valadkhan², P. Wille², R. Hoh³, M. Ghandi³, S. Deeks³, E. Scully⁴¹Case Western Reserve University, Molecular Biology and Microbiology, Cleveland, United States, ²Case Western Reserve University, Cleveland, United States, ³University of California San Francisco, San Francisco, United States, ⁴Johns Hopkins University of Medicine, Baltimore, United States**BACKGROUND:** Unbiased shRNA library screens revealed that the estrogen receptor- α (ESR-1) is a key factor regulating HIV-1 latency. HIV emergence from the latent reservoir can be manipulated with native ligands, agonists, and antagonists to ESR-1.**METHODS:** Hormone receptor manipulation by shRNA, CRISPR-mediated gene editing and inhibitory compounds was studied in primary cell models (QUECEL, Th17) infected *ex vivo*. Leukapheresis samples from a cohort of 12 well-matched reproductive age women and men on fully suppressive ART were evaluated by a novel assay measuring production of spliced envelope (env) mRNA (the EDITS assay). Additionally, longitudinal samples from women progressing through menopause have been evaluated.**RESULTS:** Although both sexes responded to β -estradiol and selective estrogen receptor modulators (SERMs), females showed much higher levels of inhibition in response to the hormone and higher reactivity in response to SERMs than males. Importantly, the total inducible RNA reservoir, as measured by EDITS, was significantly smaller in the women than in the men. Remarkably, estrogen nearly completely blocked viral spread in females before and after menopause, but not in males. Agonists and antagonists to other hormone receptors, including thyroid receptors (TR), androgen receptor (AR), and the glucocorticoid receptor (GR), can modulate HIV expression but are much less potent than drugs targeting ESR-1. **CONCLUSIONS:** We conclude that concurrent exposure to estrogen is likely to limit the efficacy of viral emergence from latency and that ESR-1 is a pharmacologically attractive target that can be exploited in the design of therapeutic strategies for latency reversal. A preliminary trial of the effects of Tamoxifen and vorinostat on the HIV reservoir among postmenopausal HIV-infected women has completed enrollment (ACTG A5366, ClinicalTrials.gov Identifier: NCT03382834). Our studies also suggest that high dose estrogen contraception might have an impact on HIV acquisition and suppression of the viral reservoir and that estrogen treatment in transgender people might reduce viral reservoirs.

MOPDA0102

Cell-associated HIV RNA and the ratio of HIV RNA to DNA have circadian cycles in HIV-positive individuals on antiretroviral therapy

J. Stern¹, M. Roche², A. Solomon¹, A. Dantanarayana¹, A. Reynaldi³, M. Davenport³, S.G. Deeks⁴, W. Hartogenesis⁵, F.M. Hecht⁵, L. Cockerham⁶, S.R. Lewin^{1,7}¹The Peter Doherty Institute for Infection and Immunity, The University of Melbourne and Royal Melbourne Hospital, Melbourne, Australia, ²RMIT University, School of Health and Biomedical Science, Melbourne, Australia, ³The Kirby Institute, University of New South Wales, Sydney, Australia, ⁴University of California San Francisco, Department of Medicine, San Francisco, United States, ⁵Osher Center for Integrative Medicine, University of California San Francisco, San Francisco, United States, ⁶Division of Infectious Diseases, Medical College of Wisconsin, Milwaukee, United States, ⁷Alfred Hospital and Monash University, Department of Infectious Diseases, Melbourne, Australia**BACKGROUND:** HIV-positive individuals on antiretroviral therapy (ART) have detectable cell-associated unspliced (CA-US) HIV RNA in CD4+ T-cells from blood which varies with time. Additionally, we recently showed that circadian transcription factors, Circadian Locomotor Output Cycles Kaput (CLOCK) and Brain and Muscle Arnt-like protein-1 (BMAL1), bind to the HIV LTR and increase HIV transcription. We hypothesised that circadian rhythms exert transcriptional control on latent HIV.**METHODS:** Chronically infected, virally suppressed HIV-positive individuals (n=17) were admitted to the Medical College of Wisconsin and supervised for 24 hours as inpatients with regulated meal times, ART ingestion, and light exposure. Blood and saliva were sampled four-hourly, and levels of stress and sex hormones known to vary diurnally were measured. Cell-associated HIV DNA, CA-US HIV RNA, and mRNA of several circadian genes (Clock, Bmal1, Period1-3, Cryptochrome1-2) were measured by qPCR. To identify which parameters changed over time, two non-linear mixed-effects models were used to plot these parameters respective to time - either as a categorical variable, or a cosinor wave. Circadian variation was defined as having a 24-hour period. Six different models accounting for time, circadian gene expression, and hormone levels were used to assess these factors' impact on HIV parameters.**RESULTS:** Using the relative standard curve method, all circadian genes were quantifiable in these participants. Salivary and plasma cortisol showed circadian cycling ($p < 0.0001$) over the 24-hour observation period, as did all circadian genes ($p < 0.05$). CA-US HIV RNA and the RNA:DNA ratio also had circadian cycles ($p=0.0485$ and $p=0.007$, respectively) but HIV DNA did not. CA-US HIV RNA peaked at midnight and had a nadir at midday. Using a model incorporating time and *Bmal1* expression levels, the time-dependent variations in *Bmal1* were predictive of CA-US HIV RNA changes ($p=0.015$).**CONCLUSIONS:** CA-US HIV RNA and the RNA:DNA ratio in CD4+ T-cells in HIV-positive individuals on ART have circadian cycles. This is not explained by cell trafficking considering that HIV DNA lacked circadian changes. *Bmal1* expression predicted changes in CA-US HIV RNA, suggesting that circadian proteins impact HIV transcription in CD4+ T-cells *in vivo*. Circadian variation represents a novel pathway to potentially target to modify HIV transcription and eliminate latency.

MOPDA0103

Different HIV transcriptional profiles in memory CD4+ T cells subsets during ART

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CD4⁺ T cell subsets is unknown. We assessed the HIV transcriptional profiling in Naïve, Central Memory (T_{CM}), Transitional Memory (T_{TM}) and Effector Memory (T_{EM}) CD4⁺ T cells from HIV⁺ subjects undergoing ART.

METHODS: Naïve, T_{CM}, T_{TM} and T_{EM} from 9 HIV⁺ virally ART-suppressed participants were sorted by flow cytometry based on their expression of CD45RA, CD27 and CCR7. Sorted cells were used for the quantification of total HIV DNA by qPCR and 4 HIV RNA transcripts by RT-qPCR: LTR-R (initiation), Pol (elongation), Poly-A (completion) and Tat-Rev (splicing).

RESULTS: LTR-R was detected in all subsets from all participants and showed a trend towards higher values in T_{EM} compared to all other subsets (2, 8, 7 and 17 LTR-R RNA copies/viral genome in Naïve, T_{CM}, T_{TM}, and T_{EM}, respectively). The opposite trend was noted for Poly-A transcripts (0.35, 0.33, 0.13 and 0.05 LTR-R RNA copies/viral genome in Naïve, T_{CM}, T_{TM} and T_{EM}, respectively). No marked difference was seen in Pol transcripts. Tat/rev RNA were rarely detected in all subsets. In spite of the low levels of LTR-R transcripts in naïve cells, this subset had a greater capacity to elongate viral transcripts, as shown by the Pol/LTR-R ratios (0.1 in naïve cells compared to 0.03 in T_{CM}, T_{TM}, and T_{EM}). Accordingly, the less differentiated subsets displayed the highest Poly-A/LTR-R ratio compared to more differentiated cells (0.07; 0.01; 0.007 and 0.004 in naïve, T_{CM}, T_{TM}, and T_{EM}, respectively).

CONCLUSIONS: HIV transcripts were detected in CD4⁺ T cell subsets from HIV⁺ subjects undergoing ART in the absence of stimulation. Although T_{EM} cells displayed an increased capacity to initiate HIV transcription compared to other subsets, elongation and completion of HIV transcription were more efficient in the less differentiated subsets. Our results reveal differences in the blocks contributing to HIV latency between different CD4⁺ T cells subsets.

MOPDB01 Sex, drugs and alcohol

MOPDB0101

Increased levels of current alcohol use are associated with worse HIV care cascade outcomes among HIV-positive adults in rural Kenya and Uganda in the SEARCH trial

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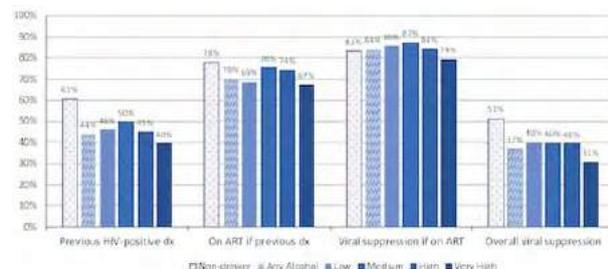
BACKGROUND: Alcohol use is common and associated with poor clinical outcomes among PLHIV. However, there are limited data on the impact of alcohol use across the HIV care cascade in sub-Saharan Africa.

METHODS: SEARCH is a cluster-randomized HIV "test-and-treat" trial in 32 rural Kenyan and Ugandan communities. We evaluated baseline (2013-14) HIV care cascade outcomes and alcohol use by AUDIT-C. "Alcohol use" included any current use (AUDIT-C>0) and was stratified by level: never (0), low (1-3 men/1-2 women), medium (4-5 men/3-5 women), high (6-7), very high (8-12). Baseline population-wide HIV testing identified 13,991 HIV-positive adults (≥ 15 years): 11,396 (82%) completed alcohol screening. Logistic regression evaluated associations between alcohol use and cascade metrics (HIV diagnosis, ART uptake, viral suppression), adjusting for sex, age, mobility, marriage, education, occupation, wealth, and community clustering.

RESULTS: Among 11,396 HIV+ adults, 1828 (16%) reported alcohol use: 7% of women (514/7,302); 32% of men (1314/4,094). Levels of drinking were low (30%), medium (15%), high (19%), and very high (36%). Drinkers were significantly less likely to know their HIV-positive status (44% [95%CI: 39-49%]) than non-drinkers (61% [95%CI: 55-66%]) and to be virally suppressed (37% [95%CI: 32-41%]) than non-drinkers (51% [95%CI: 48-54%]), findings noted at every level of drinking (Figure). In multivari-

ate analyses comparing to non-drinkers, alcohol users were significantly less likely to know their HIV status (aOR 0.63, 95%CI: 0.55-0.72). If diagnosed, drinkers were less likely to be on ART (aOR 0.53, 95%CI: 0.44-0.63). Among those on ART, there was no significant association between alcohol and viral suppression. Overall, alcohol use was associated with significantly lower odds of viral suppression (aOR 0.56, 95%CI: 0.47-0.67).

CONCLUSIONS: Current alcohol use was associated with lower viral suppression: results suggest this may be due to decreased HIV diagnosis and ART use. Tailored interventions for individuals who use alcohol may be needed to optimize cascade outcomes.



[Figure. Percent of HIV-positive adults achieving HIV care cascade targets at baseline by level of current alcohol use]

MOPDB0102

National bio-behavioral surveys suggest improvement in HIV cascade among PWID in Ukraine

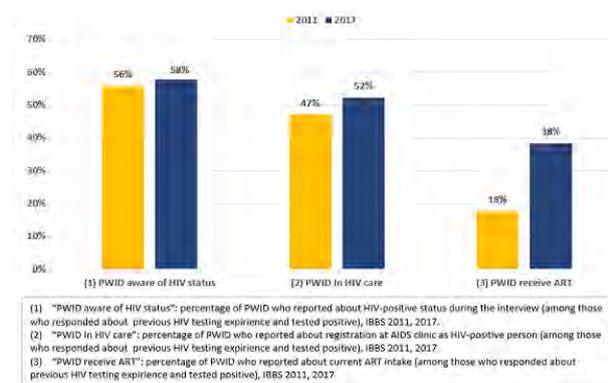
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BACKGROUND: Monitoring and evaluation of HIV cascade has become a standard approach to measuring the progress achieved in detecting and treating HIV. Aim of this study was to identify trends in HIV cascade among PWID, a key population that constitutes almost half of estimated number of people living with HIV (PLHIV) and accounts for 75% of new HIV cases in Ukraine. During the period taken for the analysis (2011 - 2017) significant scale-up of community-based services for PWID (e.g. harm reduction and case management) occurred. These services are important interventions that were shown to improve access to ART in other settings.

METHODS: We conducted secondary analysis of 2011 and 2017 IBBS data collected in all 27 regions of Ukraine using respondent-driven sampling. Results of rapid HIV testing and self-reported data on HIV status awareness and enrollment into HIV care and treatment were used to construct HIV services cascades. Chi-square test was used to determine significance of differences between the two years.

RESULTS: In 2017, 10,076 PWID were recruited (18% females) and 21.1% tested positive for HIV. In 2011, 9,069 PWID were recruited (28% females) and 21.9% tested HIV-positive. Among those who tested positive for HIV, improvements in access to care and ART coverage were significant ($p<0.001$), while awareness of HIV status remained stable. Linkage to HIV care increased from 47% to 52%, and treatment uptake from 18% to 38%.



[HIV Cascade among PWID in Ukraine, IBBS 2011 - 2017]

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CONCLUSIONS: Enrollment into HIV care and ART coverage among HIV-positive PWID in Ukraine significantly improved from 2011 to 2017. Nevertheless, considerable gaps exist in the cascade, mainly in HIV status awareness and access to ART among those in care. Services such as case management are important interventions that may further improve access to treatment for PWID. IBBS may serve as a valuable source of data to analyze HIV service cascade outcomes for key populations.

MOPDB0103

Crystal methamphetamine and group sex fuel an explosive epidemic of hepatitis C among Thai MSM with HIV

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BACKGROUND: Increased rates of hepatitis C virus (HCV) infection among HIV-infected men who have sex with men (MSM) who deny injecting drug use have been reported in resource-rich settings. We measured HCV prevalence and incidence in a predominantly MSM cohort with acute HIV infection (AHI) in Bangkok, Thailand.

METHODS: In 2009-2018, participants with AHI were enrolled into the SEARCH010/RV254 cohort. HCV antibody was measured at enrollment and annually, or if clinically indicated. Infection was confirmed with HCV RNA. HCV genotype was conducted by linear array. Risk factors for HCV were analyzed by proportional hazards regression, with hazard ratios (HR) calculated in a multivariable model.

RESULTS: Of 573 participants, 97.4% were men and 94% were MSM. Median age at HIV diagnosis was 26 years (range 18-70). Prevalence of HCV antibody at HIV diagnosis was 9/513, or 1.8% (95% CI 0.7-3.0%). In 1883 person-years (PY) of follow up, 39 incident cases were identified (incidence of 2.1/100 PY [95% CI 1.5-2.8]). All incident cases were identified from 2014 onwards, and incidence rose from 0.88/100PY in 2014 to 3.35/100PY in 2018 (p=0.0004). Of the 35 incident HCV cases with genotype (GT) data available, 91.4% were GT1 and 8.6% were GT3. Most incident cases (97.4%) were MSM, and the majority (37/39, 94.5%) denied injecting drugs. Of 7 (1.2%) MSM in the cohort who reported injecting crystal methamphetamine, 2 (28.6%) contracted HCV during follow-up. No cohort participants reported injecting heroin. In multivariate analysis, participating in group sex (HR 2.61, 95% CI 1.29-4.26, p=0.008) and methamphetamine use (HR 2.73, 95% CI 1.32-5.63, p=0.006) were the only factors significantly associated with HCV incidence.

CONCLUSIONS: Drastically increasing HCV incidence in this cohort signals an emerging epidemic among HIV-positive MSM in Bangkok that is associated with group sex and crystal methamphetamine use. Over 90% of the incident cases were GT1, departing from prior surveys of HCV genotypic distribution in Thailand which report a mixture of GT3 (40%) and GT1a/b (33%).

Access to diagnosis and effective treatment for HCV will be critical in resource-limited countries such as Thailand to prevent morbidity and mortality in HIV-infected individuals, as well as to decrease onward transmission of HCV.

MOPDB0104

Targeting effective analgesia in clinics for HIV (TEACH): A randomized controlled trial (RCT) to improve satisfaction, confidence, and trust around chronic opioid therapy in HIV care

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BACKGROUND: Many people living with HIV (PLWH) suffering from chronic pain are treated with chronic opioid therapy (COT). It is unknown if system improvements to increase guideline concordant care impact satisfaction, confidence, or trust among patients and providers.

METHODS: The Targeting Effective Analgesia in Clinics for HIV (TEACH) study was a two arm cluster RCT to assess whether a collaborative care intervention improved COT prescribing practices and satisfaction with care compared to standard practice. From 2015-2016 we recruited COT care providers and their patients from two hospital-based HIV clinics. We randomized 41 providers, in a 1:1 ratio, to receive either the TEACH intervention (i.e., an IT-enabled nurse care manager; opioid education and academic detailing, access to addiction specialists) or a brochure on safe opioid prescribing (control). The primary outcome of this analysis was provider satisfaction at 12 months and three secondary outcomes were:

1) provider confidence prescribing COT; 2) patient satisfaction with COT; and 3) patient trust in provider (latter two outcomes dichotomized based on top vs. lower three quartiles). Intention-to-treat analyses were conducted using linear and logistic regression models.

RESULTS: Providers (n=41) were 34% male; mean age 46 years; 63% white; 78% MDs; and 12% buprenorphine-waivered. Patients (n=187) were 72% male; mean age 54 years; 28% white; 91% undetectable HIV viral load; and 15% history of injection drug use. Twenty-one providers with 87 patients were randomized to the intervention. At 12 months, the adjusted mean satisfaction with COT was 1.11 points higher among intervention providers (Scale 1-10; 95% confidence interval [CI]: -0.04-2.26, p=0.06). The adjusted mean confidence with prescribing COT was 1.01 points higher among intervention providers (Scale 1-10; 95% CI: 0.05-1.96, p=0.04). No significant differences were detected in patient satisfaction with COT (adjusted odds ratio [AOR] 1.17, 95% CI: 0.50-2.76, p=0.72) or trust in provider (AOR 1.63, 95% CI: 0.65-4.09, p=0.30).

CONCLUSIONS: In the TEACH RCT, intervention providers had higher satisfaction and confidence than controls in prescribing COT, with the confidence outcome reaching statistical significance. TEACH did not decrease patient satisfaction or trust in providers. TEACH is a promising strategy to improve prescribing COT for PLWH.

MOPDB0105

Prevalence of recent alcohol and substance use in persons with HIV and associations with HIV care cascade outcomes in South Africa

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BACKGROUND: Alcohol and drug use are associated with worse outcomes for persons with HIV in high-income settings, but effects of drug and alcohol use on the HIV care cascade in sub-Saharan Africa are not known.

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METHODS: We evaluated the association between drug and alcohol use and ART initiation, retention in care, and virologic suppression (HIV RNA < 200 copies/mm³) in a longitudinal cohort of 2375 HIV-infected adults attending an urban clinic outside Durban, South Africa (2013-2017). At the time of HIV testing/enrollment, participants self-reported alcohol use (any or none within the past 30 days) and drug use (any or none within the past 30 days, by type of drug). ART initiation was captured from chart abstraction and viral load (VL) tested at 6 and 12 months after initiation. Persons without a recorded VL measurement were presumed non-suppressed. We used multivariate logistic regression to evaluate the odds ratios for each outcome, controlling for age, sex, anxiety, depression, and socioeconomic status.

RESULTS: 502 (50%) men and 281 (33%) women reported any alcohol use in the previous 30 days at baseline. 127 (5%) reported marijuana and 31 (1%) any other drug use in the previous 30 days. Overall, 1925 (81%) participants initiated ART, 1851 (78%) were retained in HIV care at 12 months, and 1272 (55%) achieved VL suppression. Alcohol use was associated with lower odds of initiating ART (aOR 0.81, 95%CI 0.65-1.03, p=0.08), significantly lower odds of being retained in care at 12 months (aOR 0.64, 95%CI 0.51- 0.79, p< 0.001), and lower odds of VL suppression (aOR 0.94, 0.78-1.13, p=0.53) (not statistically significant). Baseline drug use was not associated with any HIV outcome. No further intensity-of-use data were available among persons endorsing any drug or alcohol use in 30 days prior to enrollment.

CONCLUSIONS: Self-reported alcohol use was common and drug use rare in this cohort of HIV-infected South Africans. Alcohol use was associated with increased risk of poor HIV outcomes. Research quantifying alcohol and drug use to determine the relationship between heavy/frequent alcohol use, drug use, VL suppression, and death is needed to best target interventions to reduce harms from alcohol and drug use.

MOPDB0106

Hepatitis C and HIV co-infection and related risk determinants among women who inject drugs in the capital city of Nepal

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BACKGROUND: Globally, 60% to 80% of people who inject drugs (PWIDs) are infected with the hepatitis C virus (HCV), a figure that is comparatively higher in Nepal with mid-point prevalence of 87.3% among all PWIDs. Information related to the burden of HCV infection among women who inject drugs is limited by prejudice and stigma related to both drug use and gender. This study aimed to assess the prevalence of HCV infection, co-morbidities, and related risk determinants among women who inject drugs in Nepal.

METHODS: In this cross-sectional survey, 160 women at least 16 years of age who inject drugs were recruited between April 2016-August 2016 in Kathmandu, the capital city of Nepal, using modified network sampling. Serum samples were taken and tested for antibodies against hepatitis C virus (anti-HCV), hepatitis B surface antigen (HBsAg) and HIV. Rapid Plasma Reagin tests conducted for syphilis. Interviews were undertaken to collect behavioral information. A logistic regression model was used to understand factors associated with HCV.

RESULTS: The prevalence of anti-HCV, HBsAg, HIV and syphilis were 22%, 2%, 9% and 8% respectively. The prevalence of HCV-HIV co-infection was 6%. The prevalence of anti-HCV antibodies was associated with being older than 24 years of age [odds ratio (OR), 6.3; 95% confidence interval (CI), 2.7-14.9], HIV sero-positive status [OR 8.3, 95% CI 2.6-26.8], cross-border movement (across the open border between India and Nepal) for the purpose of injecting drug use [OR 3.6, 95% CI 1.5-8.9], visiting an outreach centre to get new syringes [OR 3.6, 95% CI 1.2-11], visiting an HIV testing and counselling centre (HTC) [OR 3.1, 95% CI 1.7-8.6] and enrolling in opioid substitution therapy (OST) [OR 3.9, 95% CI 1.7-8.6].

CONCLUSIONS: The study found a high prevalence of HCV infection and other co-morbidities among women who inject drugs in Kathmandu, but these women seem to be accessible for secondary prevention and treatment interventions since they also visit harm reduction centers to a higher degree than those women are uninfected. Thus, integrating diagnosis and treatment services for HCV within existing HIV (HTC) and OST services could help test, treat and retain high-risk women who inject drugs.

MOPDD01 More than HIV care: Integrating services for positive health outcomes

MOPDD0101

Integrating gender-affirming hormone treatment into HIV services facilitates access to HIV testing, syphilis testing, PrEP, and other sexual health services among transgender women in Thailand

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BACKGROUND: HIV funds typically focus on HIV services alone. However, gender-affirming hormone treatment (GAHT) is an essential part of comprehensive healthcare for transgender people. As transgender-specific healthcare services are limited in public facilities, transgender people seek such services from non-health professionals and often prioritize GAHT over HIV services. We explored the effects of integrating GAHT into HIV services for transgender women (TGW) in Thailand.

METHODS: The Tangerine Community Health Center, funded by USAID LINKAGES Project, integrates GAHT into HIV services to provide a comprehensive healthcare package for transgender people. We recorded characteristics of TGW clients, their access to GAHT, HIV, and other sexual health services, and compared the uptake of HIV and other sexual health services between TGW who did and did not access GAHT services.

RESULTS: Of 1,886 TGW who attended the clinic November 2015-October 2018, median (IQR) age was 25.4 (22.2-29.8) years, 56.4% had education below bachelor's degree, 28.7% were unemployed, 17.4% engaged in sex work, 54.7% used alcohol, and 9.2% used amphetamine-type stimulants. At baseline, 90.8% received HIV testing, 11.6% were HIV positive, of whom 93.3% successfully initiated antiretroviral treatment. GAHT services were used by 49.8%. Compared to GAHT service clients, TGW not accessing GAHT services were more likely to have lower income (20.1% vs. 15.7% earned < \$305/month, p< 0.001), had higher HIV prevalence (19.5% vs. 3.1%, p< 0.001), were less likely to be first-time HIV testers (27% vs. 32.8%, p=0.009), were less likely to re-visit the clinic (34% vs. 38.9%, p=0.027), had lower rates of repeat HIV testing (25.2% vs. 30.1%, p=0.021) and syphilis testing (16.9% vs. 27.6%, p< 0.001), and had lower PrEP uptake (7.6% vs. 10.6%, p=0.042).

CONCLUSIONS: Integration of GAHT into HIV and sexual health services resulted in high access to HIV testing and linkage to treatment among TGW. TGW not accessing GAHT services were highly susceptible to HIV acquisition. HIV and sexual health programs should integrate specific health service interventions to respond to unmet health needs of key populations. For TGW, GAHT should be offered as part of comprehensive health services in order to facilitate access to HIV prevention, care, and treatment services.

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MOPDD0102

Universal test and treat: Reaching underserved farm workers and their families in four sub-districts of uMgungundlovu District, South AfricaE. Mungai¹, L. Maina², T. Ngwenya¹, F. Ndlovu³¹KZN Department of Treasury, Pietermaritzburg, South Africa, ²UNAIDS, Pretoria, South Africa, ³KZN Office of the Premier, Pietermaritzburg, South Africa

BACKGROUND: In South Africa, both male and female farm workers are pervasively affected by the HIV epidemic. In September 2016, the country adopted Universal test and treat (UTT) approach for HIV and TB. Studies indicate that farm workers have limited access to health services due to distance and the amount of time it takes to access health services which is often treated as unpaid leave. In response, a project was conceptualised whose aim was to increase access to UTT by farm workers age 15 - 49 years through door-to-door and community outreach services.

METHODS: The Farm workers and families mobile HIV/TB outreach programme provided services listed in table 1 below. A two-pronged approach of door-to-door and community outreach was implemented between June - December 2018 in farms across four sub-districts in uMgungundlovu district, South Africa. Mobile teams consisted of professional nurse, lay counsellors, community mobilisers and data captureurs. Data was captured onsite using laptops and later imported into the district health information system for the nearest clinic.

Intervention	Services Provided
HIV Counselling and Testing	HIV education, counselling to all occupants of the home and provide HIV testing to consenting individuals. Clients that test HIV positive will be referred to the Professional Nurse at the mobile unit for initiation and/or referral to the health facility. Condoms & lubrication distribution.
TB Screening	Screen clients using the DOH TB Screening Tools to identify presumptive TB patients. Collect sputum samples and send timeously to the laboratory at the local facility for TB testing. Link positive result patients to definitive care as soon as possible.
ART and TB treatment initiation	Collect baseline bloods and sputa. Initiate ART treatment as per standard guidelines. Do follow ups and linkage on patients on ART and TB patients as per guidelines. Mobile clinic serves as a distribution site for ARVs and other chronic medication for patients on treatment as per national guidelines.
TB/HIV Collaborative Activities	Screen all HIV positive clients, for latent and active TB and refer appropriately. All TB positive clients will be screened for HIV and referred appropriately. All HIV positive but TB negative will be initiated on IPT onsite.

[Table 1- HIV and TB Services Provided to Farm workers Through Mobile Outreach]

RESULTS: Table 2 shows people reached with various services through the programme. Seventy-seven percent of those testing HIV positive already knew their status and were on treatment. More males compared to females were screened for TB. All clients (100%) diagnosed with TB and 87% of new HIV positive cases were initiated into treatment.

Sub-district	Number of Farm Workers and Family Members Screened for TB and Initiated on Treatment				Number of Farm Workers and Family Members Tested for HIV and Initiated on Treatment				
	Screened for TB	TB Pre-sumptive cases	TB Pre-sumptive cases diagnosed with TB	TB patients initiated on TB Treatment	Tested for HIV	Known HIV Positives	New HIV Positive	Initiated on ART Treatment	Initiated on IPT
Richmond	1476	277	8	8	992	149	90	84	91
uMkhambathini	1723	231	0	0	1080	236	73	71	39
uMgeni	1618	246	2	2	785	308	50	32	17
uMshwathi	1117	649	5	5	606	173	50	45	41
Total	5934	1403	15	15	3463	866	263	229	188
Male	2519	769	9	9	1587	279	108	99	78
Female	3415	634	6	6	1876	587	155	130	110

[Table 2- HIV and TB Service Uptake among Farm Workers and Families between June - December 2018, uMgungundlovu District]

CONCLUSIONS: Universal test and treat requires multi-pronged approaches to reach underserved populations. Mobile outreach services proved reliable in improving access to HIV and TB services by farm workers and their families. However, for increased positivity yield, more targeted testing is required such as the use of index testing approach. More analysis on known HIV positive and linkage to care needed.

MOPDD0103

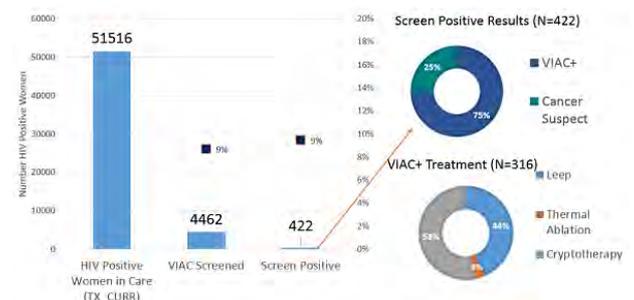
Cervical cancer screening and treatment cascade for HIV positive women in Zimbabwe: Gaps and opportunitiesM. Mandara¹, T. Maphosa¹, A. Mapanga¹, S. Page-Mtongwiza¹, P. Mbetu¹, D. Patel¹, T. Chinyanga¹, B. Madzima², K. Webb¹¹Organization for Public Health Interventions and Development, Harare, Zimbabwe, ²Ministry of Health and Child Care, Family Health Unit, Harare, Zimbabwe

BACKGROUND: Women living with HIV are up to five times more likely to develop invasive cervical cancers. With an HIV prevalence among women of 16.7%, cervical cancer accounts for 33.2% of cancers in Zimbabwe. The Cervical Cancer Screening and Treatment (C-CAST) Program seeks to strengthen cervical cancer screening and treatment among women above 30 years living with HIV in Zimbabwe. Our objective was to conduct a baseline health systems assessment to quantify the current cervical cancer and treatment cascade among HIV positive women and identify gaps and opportunities for program action.

METHODS: The C-CAST baseline assessment purposively targeted 39 health facilities in 24 USAID/PEPFAR-supported Districts serving an estimated 51 516 women on ART. Retrospective cohort data among HIV positive women VIAC screened and subsequent treatment services received from 1July-30Sept 2018 was abstracted from routine facility registers. De-identified data was entered into an electronic database (MS Forms), with descriptive analysis done using MS Excel and Stata V13.0. Health system facilitators and barriers to integrated VIAC/HIV service provision were documented using a standardized health facility questionnaire and analysed thematically.

RESULTS: From 1Jul-30Sept 2018, 4,662 HIV positive women received VIAC screening at 39 health facilities. Among those screened, 9% screened positive, the majority of these VIAC+ (75%; 315/442). Among the 77% (242/315) of HIV positive women VIAC screened+ that received treatment, the majority received Cryotherapy (51%;129/242). Only 38% (15/39) of facilities had a room for VIAC screening integrated into HIV service environments.

CONCLUSIONS: We document low VIAC screening coverage but high treatment rates for HIV positive women in Zimbabwe. Findings have informed development of facility-level dashboards to guide priority remediation actions within the OPHID C-CAST program. Future research should seek to understand the needs and preferences of subgroups of HIV positive women for integrated VIAC/HIV service provision and evidence-based demand generation strategies for integrated service uptake.



[VIAC Cascade among HIV positive women]

MOPDD0104

Beyond the caregiver: Diffusion of early childhood development knowledge and practices within the social networks of HIV-positive mothers in Malawi

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BACKGROUND: Early childhood development (ECD) is critical to the growth and well-being of children. It is particularly important for children exposed to HIV - who experience worse health and developmental outcomes than non-exposed children. ECD programs targeting caregivers improve ECD outcomes. However, such programs are often limited in reach, focusing on individual caregivers; impact on the caregivers' broader community and social-network is unknown. We assessed ECD-related perceptions and behavior among the social networks of HIV-positive mothers who participated in a 9-month integrated ECD-antiretroviral therapy (ART) program in Malawi.

METHODS: A subset of 30 randomly selected HIV-positive mothers who completed the integrated ECD-HIV program were asked to give study invitations to 7 friends/relatives >18 years of age with whom they speak regularly. As a comparison, community-based surveys were completed with adults >18 years, using census data for randomization. Both populations completed a one-time survey to assess ECD-related knowledge and practices for infants < 12 months, using validated measures. Multivariate analyses (adjusted for age and sex) were conducted to examine differences between social-networks and the broader community.

RESULTS: A total of 615 individuals were recruited (203 social-network, 412 community) and 563 completed a survey (172 social network, 391 community). Social-network and community respondents had a mean age of 31 and 38 years, 3 and 4 children, and 79% and 70% were married, respectively. Knowledge about the importance of ECD was dramatically higher among social network as compared to community respondents: 83% vs. 68% believed telling stories to infants was important (AOR:3.10 p-value:< 0.001); and 97% vs. 57% believed singing was important (AOR:10.57 p-value:< 0.001). There was also significant difference in practices that promote ECD among infants, such as actually making toys for infants (84% vs. 32%; AOR:8.03, p-value:< 0.001), singing (87% vs. 63%; AOR:3.65, p-value:< 0.001), telling stories (75% vs 49%; AOR:2.79, p-value:< 0.001), and father involvement in feeding/bathing (68% vs 51%; AOR:2.51; p-value:0.001).

CONCLUSIONS: An integrated ECD-HIV program targeting HIV-positive mothers is associated with diffusion of ECD information and practices to mothers' social-networks. The reach of ECD programs may be greater than initially anticipated and should be explored further.

MOPDD0105

Feasibility and outcomes of integrating diabetes screening into routine viral load monitoring among patients on antiretroviral therapy in Malawi

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BACKGROUND: People Living with HIV are at increased risk of diabetes mellitus due to HIV infection and exposure to antiretroviral therapy (ART). Despite this, structured diabetes screening has not been explored in African HIV clinics, possibly because of logistical challenges and uncertainty about the frequency of screening. We explored the feasibility and outcomes of diabetes screening, using the existing routine viral load (VL) monitoring schedule.

METHODS: A mixed methods study was conducted from January to July 2018 among patients on ART aged ≥18 years at an urban HIV clinic in Zomba Central Hospital, Malawi. Patients who were due for routine 2-yearly VL monitoring underwent a finger-prick for simultaneous point-of-care glucose measurement and dried blood spot sampling for a VL test. Diabetes was diagnosed according to WHO criteria. Quantitative data on demographics and medical history were collected using an interviewer administered questionnaire and electronic medical records. In-depth interviews were conducted among patients diagnosed with diabetes on the access, experience and perceptions regarding the integrated diabetes screening program.

RESULTS: 1316 of 1385 (95%) patients undergoing routine VL monitoring had simultaneous screening for diabetes during the study period. The median age was 44 years (IQR: 38-53); 61% were female; 28% overweight or obese; median ART duration was 83 months (IQR: 48-115); 49% were previously exposed to stavudine and 92% were virologically suppressed (<1,000 copies/mL). At the start of ART, median CD4 count was 199 cells/mm³ (IQR: 102-277), and 63% were in WHO clinical stages I or II. Diabetes prevalence was 2.4%. Only two of 31 patients with diabetes were newly diagnosed. In multivariable analyses, diabetes diagnosis was associated with age >40 years (aOR = 2.7; 95%CI: 1.6 to 4.6) and being on a protease inhibitor-based regimen (aOR = 3.3; 95%CI: 0.8 to 13.0). Patients appreciated integrated screening saying it could lead to early diabetes diagnosis and easy access to diabetes care.

CONCLUSIONS: Integrating diabetes screening with routine 2-yearly VL monitoring was feasible and appreciated by patients on ART. Diabetes prevalence was low. Cost-effectiveness needs to be studied and could benefit from prioritizing adults above 40 years and on protease inhibitor-based regimens.

CONCLUSIONS: Integrating diabetes screening with routine 2-yearly VL monitoring was feasible and appreciated by patients on ART. Diabetes prevalence was low. Cost-effectiveness needs to be studied and could benefit from prioritizing adults above 40 years and on protease inhibitor-based regimens.

MOPDD02 4G: Gaming, Grindr and getting the goods

MOPDD0201

Sexual health education in a digital savvy adolescent generation: Efficacy of gamified learning in a low-tech setting

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BACKGROUND: This study provides a preview of the benefits of using innovative gamified learning solutions to educate adolescents on healthy sexual behaviour and reduce the increasing trend in chronic diseases related to unhealthy sexual habits. The relevance of our findings is significant given the geographical location to which we focused our intervention and the public health crisis associated with sexually transmitted diseases. A majority of adolescents affected with HIV/AIDS, engaging in underage sexual intercourse, sexual violence and abuse, and adolescents' pregnancy are from Sub-Saharan Africa (SSA). This study investigated the effectiveness of deploying innovative game-based pedagogies in promoting healthy sexual behaviour and preventing risk sexual practices through health education among natives adolescent students in SSA.

METHODS: In three iterations, a participatory research design involving active game-users and other key stakeholders helped to develop and revise the digital gamified-learning platform for sexual health education. A quasi-experimental research design was conducted using two experimental conditions—game-based learning and gamification—with an existing traditional teaching method serving as a control condition. In total, 348 (55.5% boys and 44.5% girls) students aged 11-15 were recruited from three secondary schools based in Dar es Salaam, Tanzania, to participate in a series of sexual health education topics.

RESULTS: In the three iterations of developing and revising, students under gamified-learning achieved significantly more improvements in their sexual health knowledge than those under the traditional conditions: F(2, 345) = 210.554, p < 0.000. Moreover, feedback from gamified-learning

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indicates that the two experimental conditions significantly improved the students' motivation, boosted their attitude change, enhanced their knowledge acquisition, and fostered their engagement in active learning. In contrast, the traditional teaching method was shown to have largely failed to add value or generate students' interest to engage in active learning.

CONCLUSIONS: These results suggest that digital gamified learning designed for sexual health education have a potential of fostering health and reproductive health education necessary for positive changes in healthy sexual behaviour, attitude, and practices among today's digitally-savvy adolescents. We believe that this study offers a significant contribution to addressing sexual health education and the public health concerns associated with unhealthy sexual behaviour among adolescent students in SSA.

MOPDD0202

Managing stock levels of HIV commodities using electronic systems in Baylor Uganda, Rwenzori region

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BACKGROUND: Availability of HIV Rapid Test kits and antiretroviral (ARV) medicines are contributing significantly contributed to attainment of the 95-95-95 UNAIDS targets. However, stock levels of HIV commodities in Uganda have been intermittent in the past one year with at least 1-2 commodities getting stocked out. Additionally available stock monitoring techniques have proven to be inaccurate due to the quality of the data and complexity of the tools. We assessed the contribution of using a Real-time ARV Stock Status Monitoring tool (RASS) on stock management in Rwenzori region.

METHODS: As part of project implementation, a computer based system was developed by METS/CDC to monitor weekly stock levels of ARVs and Rapid Test kits in health facilities. RASS is a dashboard based tool that monitors data on ARV supplies while integrating it with WAOS data (Patient numbers, orders and distributions) for enhanced decision making. Health workers were trained on use of the manual tool, SMS reporting and online reporting. They were also provided with smart electronic reporting devices. District mentors were identified and trained as super users to support and mentor persistently stocked out health facilities. Data used in this analysis was extracted from the RASS dashboard between June and September 2018.

RESULTS: Following the interventions stock out reporting rates of HIV commodities have declined from 13% in January 2018 to < 1% in December 2018. Use of the RASS tool has improved stock levels of HIV commodities through evidenced based redistributions/redirection of stock to low stocked health facilities hence combating any eminent stock outs. The program was also able to save close to \$130,000 in costs for the ARVs distributed using the RASS tool.

CONCLUSIONS: The RASS tool provides accurate data for better decision making and it's easy and simple to use to all health workers across the region. Health service interruption was reduced and the country is on course to meet the 95-95-95 UNAIDS targets. Advocacy for other commodities like Anti-TB medicines, OI medicines and EMHS should be added on the RASS tool to reduce the stock out of these commodities in health facilities which impacts on the care and treatment of clients.

MOPDD0203

Empowering with PrEP (ePrEP) - a peer-delivered online social network intervention for PrEP adoption among young Black and Latinx men who have sex with men: Cluster randomized controlled trial

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BACKGROUND: Peer-driven strategies leveraging existing online social networks may be an effective approach to engage young Black/Latinx men who have sex with men (YBLMSM) for HIV prevention. We developed and tested the feasibility, acceptability, and preliminary impact of a theory-based, online intervention addressing barriers to PrEP adoption in a cluster randomized control trial.

METHODS: ePrEP was a six-week online campaign addressing PrEP barriers, developed and delivered by YBLMSM Influential Peers (IPs) via private Facebook/Instagram groups to their existing online-social-networks (e.g., friends/followers) in New York City. We recruited and randomized 10 IPs to ePrEP (n=5) or an attention-matched control (n=5). IPs then recruited YBLMSM participants (aged 18-29, Black or Latinx, New York City resident, HIV-uninfected, at high-risk) from their online networks to a private online Facebook/Instagram group. IPs then posted condition specific contents to their respective groups and facilitated discussions about the contents. Outcomes included retention, acceptability, and PrEP related-knowledge, -communication skills, -stigma, and -use collected through online surveys (baseline, 6- and 12-weeks).

RESULTS: Over three weeks from May-June 2017, IPs recruited 423 YBLGBM; 155 screened eligible and were enrolled (ePrEP [n=83] and control [n=72]). Baseline characteristics were similar across groups and 18% were on PrEP. At 12-weeks, >90% of participants were retained in both arms. 82% would continue participating, 78% reported high satisfaction, and 75% would recommend friends to participate. Engagement with online campaign posts was also similar in both arms (p=0.7). At 12-weeks, ePrEP participants compared to control, showed greater increases in knowledge (p=0.02), communication skills about PrEP use (p=0.06), and decreases in PrEP-stigma (p=0.06). Among those not on PrEP at baseline, there was a trend towards more new PrEP initiations in ePrEP (5/52) vs. Control (3/52) (p=0.2) at 6-weeks, but similar by 12-weeks (6 vs. 5).

CONCLUSIONS: A peer-developed and delivered online social-network intervention was highly feasible, acceptable, and efficient in engaging YBLGBM at high-risk of HIV-infection for a PrEP-uptake intervention, and may have utility for incorporation into programs to enhance PrEP uptake, adherence, and maintenance.

MOPDD0204

Effectiveness of HIV Telehealth Training Program in increasing the level of knowledge of HIV care personnel in the Philippines: A pilot study

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BACKGROUND: The rapid increase of HIV infection in the Philippines requires an equally aggressive response from the medical community. The paucity of infectious disease specialists has led physicians of general and varied specialties to head HIV centers and treat patients despite lack of rigorous training. Moreover, financial and geographic barriers present challenges in acquiring continuing medical education (CME) and referral systems to specialty centers needed for complicated clinical scenarios. HIV Telehealth Training Program (HTTP) was created as innovative model of learning, with HIV experts as teachers, to improve the level of knowledge among non-specialist HIV care providers.

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METHODS: A single-group, pre- and post-test quasi-experimental research was used to implement a bimodular web-based curriculum to 62 HIV care providers purposively recruited from 12 HIV facilities in 2 regions within four months. The curriculum was divided into Basic and Advanced HIV and AIDS Management. Standardized online surveys using a 5-point Likert scale was administered to measure perception toward the effectiveness of the program while a 10-item quiz measured the level of knowledge before and after each class. Responses were quantitatively analyzed using heteroscedastic t-test.

RESULTS: There is a significant improvement in the level of knowledge among HTTP participants reflected by a change in average scores from 5.4/10 to 6.9/10 in lecture-based quizzes ($p < 0.05$). Results of Likert scale revealed an improvement in perceived level of knowledge among trainees, with scores from 3.32 to 4.14 ($p < 0.05$); trainees regarded HTTP topics as practical (4.27), useful for their work (4.15), and very satisfactory in terms of overall quality (4.20). The only barrier to HTTP's success is the internet strength perceived as neither poor nor excellent (3.88). All participants strongly agreed that HTTP can be used to strengthen referrals among health providers.

CONCLUSIONS: HTTP is acceptable and practical in terms of overall quality despite challenges in internet connectivity. It is also a cost-effective approach in providing HIV non-specialists with CME and a venue for referrals and shared expertise with colleagues and experts, especially for those located in rural and remote areas of the country.

MOPDD0206

#endHIVbg: An innovative, targeted national campaign to engage hard-to-reach at-risk MSM and transgender people with a confidential rapid oral home HIV test, in partnership with Grindr™

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BACKGROUND: HIV testing services in Bulgaria are largely institutionalized, presenting a barrier to MSM and transgender people (the Target) who don't want to be associated with HIV testing due to stigma. The main hypothesis tested is that a large number of the Target don't use protection and don't regularly test for HIV. The objective of the research is to show that traditional methods are ineffective for these hard-to-reach communities and that home HIV testing marketed through Grindr™ might be the only viable alternative for the Target in Bulgaria.

METHODS: The methodology of the initiative included combination of distributing 900 free at-home HIV tests, Grindr™, and targeted online campaigns. The study was held for 1 month in October 2018 on a country level in Bulgaria (population of 7.1 mm), covering 1,574 MSM and transgender people, age 16 to 62. The study population includes MSM and transgender people (2.5%) of Bulgarian origin and 7% of minority background. Data collection was carried out through an online questionnaire. Pearson chi square test was applied (Fisher's exact test when applicable). P-values < 0.05 were considered as significant.

RESULTS: Results show that 54% of the Target have never tested for HIV and that 71.5% prefer home HIV testing over traditional methods at centers or mobile clinics. 29.7% rarely or never use a condom during sex, and 52.9% do not know their HIV status. 67.8% of those unaware of their HIV status never or rarely use condom. The proportion of the respondents reporting usage of drugs is 13.7% and they rarely tend to use condoms compared to those who don't use drugs ($p < 0.01$).

CONCLUSIONS: Results show that a considerable number of at-risk MSM and transgender people in Bulgaria have never been tested for HIV. The confidential, oral, at-home HIV test distributed through Grindr™ provides the only viable alternative for those who would not visit a medical center for testing. Changes in national legislation are needed to allow for more accessible testing outside the capital. This first of its kind community-driven pilot model covering the territory of an entire country can be replicated in other countries with similar demographics and problems.

MOPDD0207

Achieving 96% ARV collection compliance through innovative ATM technology

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BACKGROUND: The first Pharmacy Dispensing Unit (PDU) was deployed in South Africa in 2017 as part of a pilot project in partnership with National Department of Health to improve access to chronic medicine for public health patients. Consequently, PDU technology has been deployed to 5 different sites across the country in 2018. The PDU works like an ATM for medication, with Skype-like audio-visual interaction between patient and tele-pharmacists, cloud based electronic software and robotic technology to dispense and label medication. It provides an innovative solution to chronic patients through increasing convenience, quality of service, ease of access and allows for timeous follow up of patients. This solution has proved particularly beneficial to HIV patients collecting antiretrovirals on a regular basis.

METHODS: Standard data extraction is done monthly through the electronic interface to the PDU system. These extractions provide statistical figures on patient dispenses, including demographic information per region of operation.

Patient surveys were conducted to gauge patient experience with this technology. Surveys were done through an external partner who obtained ethical approval.

RESULTS: The PDUs have made 106 314 dispenses by the end of Nov 2018, achieving up to a 96% collection rate over the 18 active PDUs. 68% of patients are women, mainly between the age of 40 and 49 years. Patients receiving 1st line antiretroviral treatment as part of their chronic medication make up 79% of all patients served. PDU patients show a 99% overall satisfaction rate compared to 63% for patient attending local primary health clinics. It takes PDU patients a median of 10 minutes to collect medication while it takes 240 minutes at the clinic.

CONCLUSIONS: The high collection rate and level of satisfaction for patients using the PDU compared to primary health clinics is indicative of the success of this solution for HIV patients. This solution potentially has the power to increase adherence and compliance through increasing the ease of access to quality pharmaceutical services for HIV patients. Viral Load monitoring of PDU patients is ongoing and will form the basis of reporting on clinical stability for these patients in future.

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Innate immunity

MOPEA007

Dysfunctional natural killer cell subsets correlate with disease progression in HIV-infected Kenyan childrenA. Alankar¹, M. Generoso¹, B. McCarty¹, M. Kilberg¹, M. Mwamzuka², F. Marshed², A. Ahmed², A. Khaitan³¹New York University School of Medicine, New York, United States, ²Bomu Hospital, Mombasa, Kenya, ³New York University, New York, United States

BACKGROUND: Natural killer (NK) cells have potent cytotoxic and anti-viral effects. NK cells contain viral infection and shape adaptive immune responses via cytotoxic activity and inflammatory cytokine secretion. HIV+ adults display depleted functional and expanded dysfunctional NK cells, yet there is limited data in children. We investigated NK cell frequencies and exhaustion in HIV+ children and correlations with disease progression and adaptive T follicular helper (Tfh) and B cell subsets.

METHODS: The study cohort included 77 perinatally-infected HIV+ Kenyan children (43 untreated (ART-) and 34 on antiretroviral therapy (ART+)) and 43 HIV uninfected-unexposed controls between ages 5-19 years. NK cells (functional: CD16⁺CD56⁺ (NK_{F1}), CD16⁺CD56⁺ (NK_{F2}); dysfunctional: CD16⁺CD56⁻ (NK_{DF})), exhaustion markers (PD-1, Tim3, CD160) and peripheral Tfh and B cell subsets were evaluated by flow cytometry.

RESULTS: HIV+ have decreased NK cell frequencies compared to HIV-children (ART- p=0.02; ART+ p<0.0001). ART- have lower functional NK cells compared to HIV- (NK_{F1} p<0.0001; NK_{F2} p=0.01) and ART+ (NK_{F1} p=0.0006, NK_{F2} p=0.0001) and higher NK_{DF} cells than HIV- and ART+ (p<0.0001). NK_{F1} and NK_{F2} cells correlated inversely with HIV VL (NK_{F1} p=0.0002; NK_{F2} p=0.03) and directly with %CD4 (NK_{F1} p=0.004; NK_{F2} p=0.003). NK_{DF} correlated directly with HIV VL (p<0.0001) and inversely with %CD4 (p<0.0001).

In prospective analysis, NK_{DF} lowered after 1 year of ART (p=0.001). PD-1⁺ and CD160⁺ NK cells correlated inversely with NK_{F1} cells (PD-1 p=0.0004; CD160 p=0.0002) and directly with NK_{DF} cells (PD-1 p=0.001; CD160 p<0.0001). Low NK_{F1} and high NK_{DF} correlated with decreased (p<0.0001) and activated (p=0.01) Tfh cells. Low functional NK cells and high NK_{DF} correlated with decreased naïve (NK_{F1} p<0.0001; NK_{DF} p<0.0001) and resting B cells (NK_{F1} p=0.003; NK_{F2} p=0.01; NK_{DF} p<0.0001) and increased activated (NK_{F1} p=0.02; NK_{F2} p=0.003; NK_{DF} p<0.0001) and tissue-like memory B cells (NK_{F1} p<0.0001; NK_{F2} p=0.04; NK_{DF} p<0.0001).

CONCLUSIONS: HIV+ children have a dysfunctional NK cell profile linked to advancing HIV disease. Loss of functional NK cells correlates with NK cell exhaustion and activated Tfh and B cell states. Restoring NK cell perturbations is critical for therapeutic HIV vaccine strategies bridging innate and adaptive immunity.

MOPEA008

HIV-infected, ART-suppressed intravenous opioid users receiving naltrexone have lower immune activation compared to similar patients receiving methadoneL.J. Montaner¹, L. Azzoni¹, K. Lynn², L. Lalley-Chareczko³, E. Hiserodt³, M. Abdel-Mohsen¹, K. Mounzer³¹The Wistar Institute, Philadelphia, United States, ²University of Pennsylvania, Philadelphia, United States, ³Philadelphia FIGHT, Philadelphia, United States

BACKGROUND: Opiate use results in systemic immune activation and may accelerate the progression of untreated HIV infection through a variety of mechanisms including increased gut permeability and modulation of viral co-receptors CXCR4 and CCR5. Medication-Assisted Treatment (MAT) of opioid use disorder (OUD) is based on μ opioid receptor (MOR) agonists (e.g.: methadone -MET or buprenorphine) or antagonists (e.g.: extended-

release Naltrexone - NTX). Their effect on microbial translocation, immune reconstitution and HIV persistence in HIV-infected individuals receiving suppressive antiretroviral treatment (ART) remains unclear.

METHODS: We conducted a pilot study comparing levels of cell and plasma markers of immune activation, soluble microbial translocation and HIV persistence three groups of HIV-infected individuals receiving suppressive ART: 1) individuals with OUD receiving MET-based MAT (group 1, N=10); 2) or NTX-based MAT (group B, N=6), and non-OUD individuals (no MAT; group C, N=10). Our assessments included plasma levels of sCD14 (an indicator of myeloid activation and microbial translocation) using ELISA, CD4+ and CD8+ T-cell and myeloid activation using multicolor flow cytometry on fresh blood specimens. All subjects were recruited at the Jonathan Lax Clinic/Philadelphia FIGHT (Philadelphia, PA) under the supervision of the Philadelphia FIGHT and Wistar Institute IRBs.

RESULTS: Age, race and gender distribution, current and nadir CD4 count and time on ART were similar in all three groups. Time on MAT was significantly longer for the MET group (43 \pm 21 months vs. 13 \pm 7 for NTX). sCD14 was significantly higher in the MET group, as compared to NTX (p=0.0262) or control group (p=0.0058; Kruskal Wallis ANOVA: p=0.0091). A mixed effect model indicates that MET has a positive effect on sCD14 (p=0.0005), which was maintained after adjusting for time on MAT (p=0.0007) or ART (p=0.0005), indicating MET-based MAT is associated with greater microbial translocation. A similar significant MET effect on T cell activation (% of CD38⁺/HLA-DR⁺CD8⁺ T cells, p=0.0055) was also noted. **CONCLUSIONS:** After ART suppression of HIV, continued engagement of the MOR by MET-based MAT results in higher immune activation and microbial translocation when compared to MOR antagonists.

MOPEA009

Reduced immune activation and low inflammatory monocyte frequencies during pregnancy are associated with preterm deliveryN. Mdletshe¹, C. Thobakgale¹, T. Malaba², L. Myer², C. Gray³, M. Altfield⁴, M.-L. Newell⁵, T. Ndung'u⁶, Prematurity Immunology and HIV-infected Mothers and their Infants Study (PIMS)¹University of KwaZulu-Natal, HIV Pathogenesis Programme, Durban, South Africa, ²University of Cape Town, Division of Epidemiology and Biostatistics, Cape Town, South Africa, ³University of Cape Town, Division of Immunology, Cape Town, South Africa, ⁴Heinrich Pette Institute, "Virus Immunology", Hamburg, Germany, ⁵University of Southampton, Human Development and Health, Faculty of Medicine, Hampshire, United Kingdom, ⁶University of KwaZulu Natal, HIV Pathogenesis Programme, Durban, South Africa

BACKGROUND: Antiretroviral therapy (ART) use during pregnancy may be associated with increased risk of preterm birth (PTB) and small-for-gestational-age (SGA) deliveries. The biological reasons for these adverse outcomes are largely unknown and no reliable biomarkers exist that aid clinical management of at-risk pregnant women.

We explored whether activation markers on T-cells and monocytes during pregnancy among women initiating ART before or during pregnancy are associated with PTB and SGA.

METHODS: For this study a subset of women accessing antenatal care < 24 weeks gestation enrolled in the Prematurity Immunology and HIV-infected mothers and their infants Study (PIMS) conducted in Cape Town, South Africa was analysed.

Women with PTB (n=30) and SGA (n=30) deliveries were compared to term appropriate-for gestational-age (AGA, n=30) deliveries.

For each outcome, women were categorised according to whether they initiated ART before pregnancy (n=15) or during pregnancy (n=15).

Gestational age was assessed at baseline by ultrasound < 24 weeks; most common ART regimen was TDF-FTC-EFV (79%) Lymphoid and myeloid cell populations were enumerated from peripheral blood mononuclear cells obtained at baseline, using standard lineage markers. T-cell activation was determined using HLA-DR and CD38 expression and monocyte activation using HLA-DR, CD69 and CD86 markers.

RESULTS: CD38⁺T-cell activation was lowered in women initiating ART with PTB when compared to normal (p=0.0004) or SGA (p=0.017) deliveries. Bulk monocyte activation was also lower in PTB than in normal and SGA delivery in women initiating and those stable both ART (all p<0.05). Inflam-

matory monocyte (CD14^{dim}CD16⁺) frequencies were low in PTB for women initiating ART only and were higher in normal (p=0.011) and SGA (p=0.038) deliveries.

CONCLUSIONS: Low immune activation of CD8⁺ T-cells and monocytes during gestation appears to be a hallmark of PTB and could represent biomarker for PTB management among HIV-infected women. The biological mechanisms underlying these findings require further investigation.

MOPEA010

HLA-F on autologous HIV-infected cells activates primary natural killer (NK) cells expressing the activating killer immunoglobulin-like receptor (KIR) 3DS1

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BACKGROUND: HIV-exposed seronegative KIR3DS1 homozygotes have a reduced risk of HIV infection. HLA-F is the ligand for the activating NK cell receptor (NKR) KIR3DS1. HLA-F is expressed on HIV-infected CD4⁺ T cells.

METHODS: Cells from 5 KIR3DS1 homozygotes were tested. Sorted, HIV-infected CD4⁺ (siCD4⁻) T cells that were 96.7% HIV p24⁺ and 95% CD4⁺ were co-cultured with autologous NK cells for 6 hrs. CD3⁺CD56^{dim} KIR3DS1⁺ and KIR3DS1⁻ NK cells were gated on inclusively and exclusively and examined for the frequency of cells secreting IFN- γ , CCL4 and expressing CD107a as examples of anti-HIV functions.

RESULTS: Co-culture of siCD4⁻ T cells with NK cells activated a higher frequency of KIR3DS1⁺ than KIR3DS1⁻ NK cells from KIR3DS1 homozygotes to elicit anti-HIV functions. This was the case whether KIR3DS1^{+/+} NK cells were analyzed inclusively (p < 0.002 for all functions, Wilcoxon tests) or exclusively by gating out NK cells that co-expressed the NKRs, KIR2DL1/L2/L3, 3DL2, KIR2DS1/S2/S3/S5, NKG2A and ILT2 (p < 0.002 for all functions, Wilcoxon). Blocking the interaction of HLA-F on siCD4⁻ cells with KIR3DS1-Fc chimeric protein or an HLA-F specific monoclonal antibody on exclusively gated KIR3DS1⁺ NK cells, reduced the frequency of activated KIR3DS1⁺ cells compared to control conditions.

CONCLUSIONS: KIR3DS1⁺ NK cell activation by HIV-infected CD4⁺ cells may underlie the reduced risk of KIR3DS1 homozygotes to HIV infection.

MOPEA011

Toll-like Interleukin-1 Receptor Regulator (TILRR) is a risk factor in vaginal HIV-1 infection through mediating inflammatory response and potentiating the leukocytes chemotaxis

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BACKGROUND: TILRR is a transcript variant of Fras related extracellular matrix 1 (FREM1) protein and identified as a novel regulatory component, which stimulates host innate immune response against infection through binding to IL-1R1 as a co-receptor. Our previous study identified FREM1 as a novel candidate gene in resistance/susceptibility to HIV-1 infection in the Pumwani Sex worker cohort. In this study, we investigated the effect of FREM1 variant TILRR on the expression of genes in NF κ B inflammatory signaling pathway and on chemotaxis of leukocytes in human cell lines.

METHODS: We overexpressed the TILRR in HeLa and VK2 cells. TILRR protein overexpression was confirmed by confocal microscopy imaging, flow cytometry, and western blot analysis. Overexpression of TILRR RNA was confirmed by qRT-PCR. The effect of TILRR on expression of 84 genes

linked to NF κ B pathway was investigated by qRT-PCR. The production of pro-inflammatory mediators by the TILRR knocked-in HeLa and VK2 cells was measured using Bioplex multiplex bead assay and used in leukocytes migration assay using Boyden chamber migration approach.

RESULTS: TILRR overexpression significantly upregulated 49- and 41-genes in HeLa and VK2/E6E7 cells, respectively. We observed that mRNA transcript of inflammation regulatory genes, like CCL5, IL-1 β , IL-6, IL-8 and TNF α was significantly upregulated in both cell lines. The production of these proinflammatory mediators was also significantly increased in the culture media of HeLa and VK2/E6E7 cells. The culture supernatants from TILRR overexpressed HeLa cells significantly attracted higher percentage of monocytes and lymphocytes compared to the empty vector control. These data suggest that TILRR plays an important role in mediating inflammatory responses and a potential risk factor in vaginal HIV-1 infection.

CONCLUSIONS: Our study is the first to show that TILRR influences the expression of genes directly involved in HIV-1 infection in addition to its role in enhancing NF κ B and inflammatory responses and leukocytes migration. TILRR may present a novel target against HIV-1 vaginal infection.

Humoral immunity (including broadly neutralizing antibodies)

MOPEA012

Antibody-bound HIV-1 viruses transmigrate through tissue barriers

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BACKGROUND: The sexual transmission of HIV-1 can occur via the transport of free viral particles through the genito-rectal mucosal epithelium by a *transcytosis* mechanism. Early during infection, HIV-1 can also cross the blood-brain-barrier (BBB) endothelium via the migration of infected-monocytes and/or CD4⁺ T cells (the *Trojan horse* hypothesis) and possibly, by a direct trafficking of cell-free viruses through endothelial cells.

Antibodies are versatile immune effectors; they can neutralize cell-free and cell-associated HIV-1 viruses but also, eliminate infected cells by virtue of their Fc-dependent effector functions. However, whether antibodies can block HIV-1 penetration and endocytic transport into tissue barriers is currently unknown.

METHODS: To study the epithelial and endothelial transmigration of HIV-1 viruses in presence of envelope (gp160)-specific antibodies or not, we developed *in vitro* human cell culture systems using endometrial adenocarcinoma HEC-1A and brain microvascular endothelial hCMEC/D3 cell line monolayers coupled with confocal fluorescence microscopy analyses.

RESULTS: Our data demonstrate that IgG and IgA non-neutralizing and broadly neutralizing antibodies (bNAbs) do not interfere with the transport of HIV-1 across epithelial and endothelial cell monolayers. Instead, both viruses and antibodies are translocated to the basal pole of the cells. Confocal microscopy studies show that a large fraction of intracellular virions is bound by antibodies, indicating that HIV-1-antibody complexes are also transported across tissue barriers. Importantly, as opposed to free virions, viral particles bound by bNAbs are no longer infectious after transepithelial transit, with post-transcytosis neutralization activities comparable to those measured in classical neutralization assays. Likewise, although antibody-free viral particles post-endothelial transmigration lack infectivity in our system, capture ELISA assays indicate that the released HIV-1 virions are still complexed by antibodies.

CONCLUSIONS: Thus, HIV-1 antibodies do not block the transport of incoming HIV-1 viruses across the mucosal epithelium and BBB endothelium but bNAbs can neutralize translocated virions. These results highlight the importance of antibody neutralization in protecting tissues from viral penetration and dissemination.

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Cellular immunity

MOPEA013

CD3⁺CD8^{low} T cells harbored dysfunctional functions in patients at the earliest stage of HIV infectionB. Su¹, C. Moog², X. Lu¹, Y. Zhang³, L. Qin³, J. Sun³, Z. Li¹, R. Wang¹, L. Yuan¹, Z. Liu¹, L. Dai¹, H. Wu¹, T. Zhang¹, X. Zhang¹¹Beijing Youan Hospital, Capital Medical University, Center for Infectious Diseases, Beijing, China, ²INSERM U1109, Fédération de Médecine Translationnelle de Strasbourg (FMTS), Université de Strasbourg, Strasbourg, France, ³Beijing Youan Hospital, Capital Medical University, Beijing Key Laboratory for Biomarkers of Infection Related Diseases, Beijing, China**BACKGROUND:** In acute HIV infection in humans, HIV-specific CD8⁺ T cells are critical for the initial control of HIV infection. CD3⁺CD8^{low} T cells are recognized as a subset of CD8⁺ T cells with down-regulated CD8 expression, whose increase is observed in patients infected with chronic HIV infection, but little is known about whether HIV-1 suppression benefits from low CD8 expression on CD8 T subpopulation during acute infection stage in the absence of antiretroviral therapy (ART).**METHODS:** A total of 19 acute HIV-1-infected individuals in 1st, 3rd month, and 1st year after infection were enrolled from the Beijing Primo Cohort in this study to evaluate HIV-1-specific effector functions of CD3⁺CD8^{low} T cells. Samples of 20 individuals in chronic HIV infection were also analyzed, and without ART. Immunophenotypic and functional characterization of CD3⁺CD8^{low} and CD3⁺CD8^{hi} T cells were analyzed by the multicolor flow cytometry. HIV-specific CD8 T-cell responses were measured by quantifying interferon gamma (IFN- γ) release with an intracellular cytokine staining assay, and the degranulation (CD107a) of CD8 subpopulations were also measured in untreated individuals with acute/chronic HIV-1 infection.**RESULTS:** We found for the first time that CD3⁺CD8^{low} cells quickly expanded after HIV-1 infection and lasted for a short time, and then decreased until to the chronic phase of infection, while CD3⁺CD8^{hi} T cells were significantly increased from the 1st year of HIV infection to chronic infection over 2 years. Interestingly, the immune activation of CD3⁺CD8^{low} cells was significantly higher than that in CD3⁺CD8^{hi} T cells at different stage of HIV infection (all $p < 0.05$). In addition, we observed that a comparable proportion of CD3⁺CD8^{hi} and CD3⁺CD8^{low} T cells produced HIV-1-specific IFN- γ on the 1st, 3rd month and 1st year of infection, while the levels of CD3⁺CD8^{low} T cell expressing CD107a degranulation were lower in untreated individuals after 3rd month of HIV-1 infection than those induced in CD3⁺CD8^{hi} T cells.**CONCLUSIONS:** Our findings suggest that a better understanding of the involvement of CD3⁺CD8^{low} T subpopulation at the earliest stage of HIV infection would significantly improve our knowledge of the impaired T-cell responses in HIV-1-infected patients, which has important implications for HIV vaccine development.

MOPEA014

Comparative study of subpopulations of B lymphocytes of blood and lymph nodes in the different stages of HIV infection

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*Instituto Nacional de Enfermedades Respiratorias, Ismael Cosío Villegas, Departamento de Investigación en Enfermedades Infecciosas, Mexico City, Mexico***BACKGROUND:** B cells are an important part of adaptive immunity against pathogens due to the production of protective antibodies. The main interest of B cell studies during HIV infection has been related to the production of highly neutralizing antibodies in the blood. Nonetheless, to our knowledge, there are no studies that compare changes in frequencies of memory and functional subpopulations between tissue and blood and, in a lesser extent, that compare changes between stages of HIV infection in these two compartments.**METHODS:** PBMCs and lymph node cells from HIV+ individuals in acute (Acute, n=9) or in the chronic phase of infection (Chr, n=15), and from HIV- (n=18) participants, were used in this study. We set flow cytometry panels to characterize the differences in the frequencies of B cell subpopulations (defined by expression of CD21 and CD27) and in the expression of immunoglobulins and homing markers. We used Kruskal-Wallis test for multiple comparisons.**RESULTS:** HIV chronic infection results in a significant decrease in Naïve and Resting Memory B cell subpopulations, and a significant increase in B cells with a dysfunctional phenotype (Activated Memory and Tissue-Like Memory B cells) in blood and tissue. We also found a significant decrease in the frequencies of Resting Memory B cells that express IgG or IgM and triple negatives (IgD- IgM- IgG-) in the acute phase of infection compared to the HIV- and to the chronic phase in both blood and tissue. Additionally, we found that the Resting Memory subset expressed the highest amount of homing markers CXCR5 and CCR7 in both anatomical compartments and in the different stages of HIV infection. Remarkably, the Tissue-Like Memory B cells had the lowest expression of both homing markers.**CONCLUSIONS:** This study should be taken as a set point to continue studying changes between B cells subpopulations to better understand the effects that HIV has in the host tissues. Results suggest that the frequency and immunoglobulin expression of B cells change during HIV infection, suggesting a higher frequency of B cells with a dysfunctional phenotype.

MOPEA015

The expression of immunoregulatory molecules in HIV-specific cells is associated with the activation of CD8 T cells

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*Instituto Nacional de Enfermedades Respiratorias, Ciudad de México, Mexico***BACKGROUND:** CD8 T cells increased the expression of immunoregulatory molecules (immune checkpoints; ICP) such as CD160, PD-1, PDL-1, TIGIT, TIM-3, and LAG-3 during viral chronic infections. The expression of ICPs on CD8 T cells had been associated with the loss of cytotoxic functions, the loss of production of antiviral cytokines and lower proliferative capacity. The aim of this study is to know if the expression of ICPs in HIV-specific CD8 T cells is associated with the dysfunction of these cells.**METHODS:** Cryopreserved PBMCs from HIV positive donors with < 350 CD4 Tc (n=9), were stimulated for 18 hours with a pool of peptides of the Gag protein of HIV or cultured only in media. Cells were stained to determine the frequency of positive cells to different ICPs (TIM-3, Lag-3, PD-1, TIGIT, PD-L1, and CD160) and their expression in different memory subsets by flow cytometry. Kruskal-Wallis tests were performed.**RESULTS:** Of all the ICPs analyzed, we found a higher frequency of CD8 T cells positive to CD160 (8.2%), PD-1+ (8.9%), and TIGIT+ (47.1%), the frequency of the other ICPs on CD8 T cells was less than 6.6%. We next compared the frequency and expression of ICP between IFN γ + (HIV-specific) cells versus the IFN γ - CD8 T cells after an 18-hour stimulation with peptides of HIV. Effector (E), effector memory (EM) and central memory (CM) CD8 T cells had the highest frequency of IFN γ + cells (0.75%, 2.166%, 2.03%; for E, EM, and CM CD8 T cells, respectively). We found that IFN γ + CD8 T cells had a higher frequency of PD-L1+ and TIGIT+ E, EM and CM CD8 T cells, an increase of CD160+ and PD-1+ EM and CM, and an increase of LAG-3+ E and EM CD8 T cells. On the contrary, we found less TIM-3+ EM and TM IFN γ + CD8 T cells, compared to IFN γ - cells.**CONCLUSIONS:** Contrary to what was expected, we found an increase in the frequency of ICP+ of the IFN γ + cells. Therefore, the frequency of specific HIV CD8 T cells ICP+, might not be related to cellular dysfunction but to physiological activation of CD8 T cells during HIV infection.

MOPEA016

CD4⁺ T cells expressing negative checkpoint receptors are associated with decreased mitochondrial oxidative phosphorylation in chronic HIV

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BACKGROUND: Chronic HIV is associated with CD4⁺ and CD8⁺ T-cells bearing higher frequency of negative checkpoint receptors (NCRs). CD4⁺ T-cells expressing NCRs contribute to HIV persistence during antiretroviral therapy (ART). We have previously reported that HIV-infected patients had lower mitochondrial Complex I activity compared with HIV-negative controls. We report associations between NCR expression in T-cells and mitochondrial oxidative phosphorylation (OXPHOS) in peripheral blood mononuclear cells (PBMCs) among chronically HIV-infected patients on ART.

METHODS: The Hawaii Aging with HIV cohort enrolled patients with documented HIV infection, age ≥40 years old, and on stable ART ≥3 months. Multiparametric flow cytometry was performed on cryopreserved PBMCs to quantitate the percentages of CD4⁺ and CD8⁺ T-cells expressing exhaustion markers (PD-1/TIM-3/TIGIT). Spearman's correlations were used to identify cross-sectional associations between NCR-expressing T-cells and previously assessed mitochondrial Complex I (NADH dehydrogenase) and IV (cytochrome c oxidase) activities in PBMCs.

RESULTS: Of 43 HIV+ patients, median age was 51 years, current CD4 count 518.0 cells/uL, and nadir CD4 count 93.5 cells/uL. Majority (88.4%) were male and 83.7% had undetectable plasma HIV RNA < 50 copies/ml. Four patients (9%) were on zidovudine. Higher CD4 count was associated with higher Complex I (rho=0.33, p=0.01) and Complex IV activities (rho=0.43, p=0.005). Higher NCRs in T-cells correlated with lower Complex I and IV activities (Table). In multivariate linear regression analyses adjusted for age, zidovudine use, and undetectable HIV RNA, Complex I activity was significantly associated with TIGIT⁺CD4⁺ (β=-0.35, p=0.04), TIGIT⁺PD1⁺CD4⁺ (β=-0.35, p=0.04), and TIGIT⁺TIM3⁺CD4⁺ T-cells (β=-0.41, p=0.02). Complex IV activity was associated with TIGIT⁺CD4⁺ (β=-0.38, p=0.02), TIGIT⁺PD1⁺CD4⁺ (β=-0.41, p=0.02), TIGIT⁺TIM3⁺CD4⁺ (β=-0.49, p=0.003), and TIM3⁺PD1⁺CD4⁺ T-cells (β=-0.37, p=0.04).

CONCLUSIONS: OXPHOS activities were decreased in HIV-infected individuals on ART and correlated with disease severity, as assessed by CD4 count. Higher NCRs on CD4 T-cells were associated with decreased OXPHOS activities in PBMCs. Further studies on the relationship between NCR-expressing CD4 T-cells and immunometabolism are warranted to understand their role in HIV persistence.

Negative checkpoint receptors (%)	Complex I (optical density (OD)/μg of protein×10 ³)	Complex IV (OD/μg of protein×10 ³)
TIM3 ⁺ CD8 ⁺ T-cells	-0.20 (p=0.21)	-0.34 (p=0.03)
TIGIT ⁺ TIM3 ⁺ CD8 ⁺ T-cells	-0.16 (p=0.31)	-0.32 (p=0.04)
TIGIT ⁺ CD4 ⁺ T-cells	-0.33 (p=0.03)	-0.35 (p=0.02)
TIGIT ⁺ PD1 ⁺ CD4 ⁺ T-cells	-0.35 (p=0.03)	-0.36 (p=0.02)
TIM3 ⁺ PD1 ⁺ CD4 ⁺ T-cells	-0.31 (p=0.05)	-0.29 (p=0.06)
TIGIT ⁺ TIM3 ⁺ CD4 ⁺ T-cells	-0.40 (p=0.009)	-0.42 (p=0.006)

[Spearman correlation between negative checkpoint receptors in T-cells and mitochondrial oxidative phosphorylation activity in PBMCs]

MOPEA017

Nef genotype influences immune control in HIV-1 infected individuals carrying protective alleles

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BACKGROUND: In-depth understanding of factors leading to immune control in natural course of HIV-1 infection is pivotal in development of prophylactic and therapeutic vaccine. Certain HIV-1 infected individuals carrying protective HLA alleles exhibit durable control of viral replication due to superior CD8⁺ T cell responses, but extensive heterogeneity exist among these individuals in levels of HIV-1 control. It remains elusive whether and what extent viral factors including Nef-mediated immune evasion function may affect immune control of HIV-1.

METHODS: We began by determination of HLA-A and HLA-B downregulation ability of a large panel of 168 Nef clones isolated from chronically, HIV-1 subtype C-infected individuals in South Africa and employed statistical and biochemical approaches to identify Nef genotype associating with HLA downregulation function. Using the resultant Nef genotype data, we explored correlates with HIV-specific T cell responses and plasma viral loads in individuals from South Africa (N=668) and tested the hypothesis again on an independent cohort from Botswana (N=193).

RESULTS: We found that the amino acid polymorphism at Nef position 9 differentially influences HLA-B downregulation function where by the Ser at this position (Ser-9) associated with decreased HLA-B downregulation function; whereas no codon associated with HLA-A downregulation function. This decreased HLA-B downregulation by Nef Ser-9 resulted in increased susceptibility to recognition of a viral antigen by T cell receptor in vitro. Moreover, the protective allele* individuals infected with viruses harboring Nef Ser-9 exhibited significantly higher HLA-B restricted T cell responses (p<0.04) and lower viral loads (p<0.02) compared to those harboring other amino acids at this position. The same observation was corroborated in the independent cohort in Botswana.

CONCLUSIONS: Taken together, our results demonstrate that Nef Ser-9 associating with decreased HLA-B downregulation function leads to enhanced immune control in individuals harboring protective HLA alleles, highlighting the importance of Nef-HLA interaction in spontaneous immune control in vivo.

MOPEA018

Phenotype and functionality of CD8⁺ T cells before and after cART are related to the viral reservoir size in HIV-infected subjects

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BACKGROUND: The persistence of latently infected T-cells remains the major obstacle to cure HIV. Special emphasis has been placed to identify the characteristics of CD8⁺ T-cells (CD8TCs) associated with viral control. We aimed to determine the relationship between the quality of the immune response before and after antiretroviral treatment (cART) and HIV persistence on cART.

METHODS: 18 subjects were enrolled during acute/early HIV infection (median 2 month post-infection). Blood samples were obtained at enrollment (baseline sample, pre-cART) and after 18 months post-ART (on-cART). Phenotypic (CD45RO, CCR7, CD95, PD-1) and functional (CD107, cytokines) markers were studied on bulk and HIV-specific CD8TCs by flow

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cytometry, in both samples. Cell-associated HIV DNA forms (total and integrated) were quantitated by real-time PCR in samples on-cART. Data was analyzed using non-parametric statistics.

RESULTS: Spearman's correlations showed that higher HIV-integrated DNA levels on samples on-cART were related to lower expression of baseline CD107⁺ CD8TCs and lower proportion of HIV-specific terminal effector (TE) CD8TCs ($p=0,003$ and $p=0,049$). Moreover, total HIV DNA levels post-cART directly correlated with baseline HIV-specific PD-1⁺CD8TCs.

HIV-integrated DNA levels positively correlated with the percentage of PD-1⁺CD8TCs ($p< 0,0001$), and inversely with the percentage of bi- and trifunctional CD8TCs ($p=0,024$ and $p=0,048$) at on-cART samples. Moreover, direct correlations between the percentage of effector memory CD8TCs at: bulk, HIV-specific, and PD-1⁺ compartments and the levels of HIV-integrated DNA were observed ($p= 0,005$, $p=0,0003$ and $p=0,004$). Similarly, HIV-integrated DNA inversely correlated with the proportion of CD8TC TE in the same three compartments ($p=0,016$, $p=0,0003$ and $p=0,007$). Finally, negative correlations between HIV-integrated DNA levels and the percentage of naive and stem cell memory CD8TCs ($r=-0,561$, $p=0,002$; $r=-0,398$, $p=0,044$) were found.

CONCLUSIONS: Different immune parameters evaluated pre- and post-cART were related to HIV persistence. Overall, results suggest that an exhausted and dysfunctional HIV-specific immune response, both before and after treatment initiation, was related to a higher reservoir size at 18 months post-cART. This should be considered when designing functional cure approaches. Also, the potential use of these parameters as markers of reservoir size and/or remission should be studied.

MOPEA019

HIV reservoir size is related to CD4⁺ and CD8⁺ T cell differentiation in HCV/HIV-coinfected individuals treated with direct acting antivirals (DAAs)

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BACKGROUND: The dynamics of the HIV reservoir is shaped by the T-cell differentiation and activation. We aimed to determine the relationship between phenotypic immune markers and HIV persistence in HCV/HIV co-infected individuals following HCV treatment with direct acting antivirals (DAAs).

METHODS: In a prospective longitudinal observational study, HIV/HCV-coinfected individuals on suppressive cART (n=19) received sofosbuvir/daclatasvir+ribavirin. All achieved sustained virological response. Blood samples were obtained at enrollment (baseline sample, BSL); at end-of-HCV treatment (EOT) and at 12-month after EOT (12MPT). T-cell differentiation (CD45RO, CCR7, CD95, CD28), exhaustion (PD-1) and activation (HLA-DR, CD38, CD25) markers were quantified on CD4⁺ and CD8⁺ T-cells, by flow cytometry. Plasma cytokines were evaluated by ELISA. Cell-associated HIV DNA (total, HIV-integrated) and unspliced (US) RNA were quantified by real-time PCR. Data was analyzed using non-parametric statistics.

RESULTS: At enrollment, the median CD4⁺ T-cell count was 291 (IQR: 231-776) cells/ml. For CD4⁺ T-cells, the proportions of central and transitional memory cells (defined as CCR7⁺/CD45RO⁺/CD95⁺/CD28⁺ and CCR7⁺/CD45RO⁺/CD95⁺/CD28⁻) were higher than terminal effectors (TE, CCR7⁺/CD45RO⁺/CD95⁺/CD28⁻) at BSL and post-HCV clearance. In contrast, for CD8⁺ T-cells there were higher proportions of effector memory (EM, CCR7⁺/CD45RO⁺/CD95⁺/CD28⁻) and TE cells at all time points evaluated.

At 12MPT compared to BSL, HLA-DR, CD38/HLA-DR and PD-1 expression on CD4⁺ T-cells and CD8⁺ T-cells significantly declined ($p=0.0137$, $p=0.0371$, $p=0.0371$ for CD4 and $p=0.001$, $p=0.0186$, $p=0.0020$ for CD8, respectively). Plasma ICAM-1 (Intercellular Adhesion Molecule 1); CXCL10 (IP-10) and IL-8 were reduced after HCV clearance (EOT: all $p< 0.002$; 12MPT: all $p< 0.01$).

Spearman's correlations showed that the proportion of BSL naive CD4⁺ T-cells inversely correlated with levels of total and HIV-integrated DNA measured at EOT samples (total: $r=-0.7337$, $p=0.0008$; HIV-integrated: $r=-0.6583$, $p=0.0056$). On the CD8 compartment, higher proportion of BSL EM T-cells correlated with higher levels of HIV DNA at EOT and 12MPT (EOT: $r=0.5882$, $p=0.0147$ and 12MPT: $r=0.5874$, $p=0.0489$).

CONCLUSIONS: Cellular and plasma markers of immune activation were significantly reduced after treatment with DAAs. Moreover, preservation of a less differentiated memory panel (before DAA treatment) was related with a smaller HIV reservoir, post-HCV clearance. This data might contribute to elucidate the immune mechanisms involved in HIV persistence in coinfecting subjects.

Mucosal immunity

MOPEA020

Women exposed to recent sexual violence show increased inflammatory and decreased anti-HIV biomarkers in the reproductive tract

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BACKGROUND: The epidemics of violence against women and HIV/AIDS act synergistically to adversely and disproportionately impact women's health. Though the behavioral aspects of this have been well documented, less is known about the immunology that contributes to the increased risk. We have previously shown that women who experience chronic sexual violence may have a dysregulated immune microenvironment in the female reproductive tract (FRT) that may impact their risk to HIV infection. We hypothesized that even a single instance of sexual violence may result in a dysregulated immune microenvironment that can adversely impact HIV risk.

METHODS: Following IRB approval, Cases (n=13) who had experienced forced vaginal penetration within the last 90 days and Controls (n=25) who had no history of forced sex, were recruited for this longitudinal study from the Washington DC Metro area from 2014 to 2016. Cervico-vaginal lavage was analyzed by ELISA for inflammatory, anti-inflammatory/anti-HIV and wound healing biomarkers. Differences in levels between Cases and Controls were determined by Wilcoxon and Chi-square tests (R version 3.4.0).

RESULTS: Race distribution among Cases and Controls was significantly different with 60% of Cases being African-Americans. There were no significant differences in age or insurance type between Cases compared to Controls, though cases were more likely to have experienced additional forms of abuse beyond the defining incident of forced vaginal penetration. Cases had significantly decreased levels of the chemokines MIP-3 α and MCP-1 in the FRT as well as an increase in levels of IL-1 α , an inflammatory biomarker. In addition, Cases were significantly more likely to have detectable levels of the wound healing factor platelet derived growth factor (PDGF). Thrombospondin-1 (TSP-1), which has been shown to have anti-HIV activity, was also significantly lower in Cases.

CONCLUSIONS: Increased IL-1 α and PDGF among Cases may be impacted by the trauma during the event creating a dysregulated microenvironment. The lower levels of chemokines among Cases also point to a blunted immune function. Additionally, the lower levels of TSP-1, and MIP-3 α , both anti-HIV biomarkers, may increase susceptibility to HIV infection. Our data points to potentially adverse immune alterations in women exposed to recent sexual violence.

Systemic immune activation and inflammation

MOPEA022

Methamphetamine Use is associated with increased T cell immune exhaustion in ART treated HIV infected adults

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BACKGROUND: Methamphetamine (Meth) is a highly addictive stimulant that is frequently used by HIV-infected (HIV+) individuals and contributes to worse clinical outcomes. Chronic HIV infection is associated with persistent T cell activation and immune exhaustion, defined by the upregulation of negative checkpoint receptors (PD-1, TIM-3, TIGIT). Given that Meth exposure adversely impacts host adaptive immunity, mechanistic insight into T cell perturbations may provide avenues to overcome these deleterious effects.

Here we examined the associations between Meth use and T cell activation, senescence and immune exhaustion in HIV+ individuals on stable antiretroviral therapy (ART).

METHODS: Available data of self-reported methamphetamine use were drawn cross-sectionally from study participants in the *Hawaii Aging with HIV Cardiovascular Study*. Individuals were classified into 3 groups:

- (1) never-used,
- (2) recent-users (last use was less than or equal to 1 year ago), and
- (3) remote-users (last use was greater than 1 year ago).

Markers of CD4+ and CD8+ T cell activation (CD38+HLA-DR+), maturation (CD28-CD57+), and immune exhaustion (PD-1, TIM-3 and TIGIT expression) were measured in cryopreserved peripheral blood mononuclear cells by flow cytometry. Median percent frequencies of T cell subsets were calculated and compared between groups by the Kruskal-Wallis test.

RESULTS: 43 HIV+ participants had available T cell immunophenotype assessments: 88% male; 84% with plasma viral load < 50 copies/ml; 31 (72%) never-used, 6 (14%) remote-users and 6 (14%) recent-users. CD4 T cell counts were significantly lower in the recent-users (median (IQR): 229 cells/uL (165, 357)) compared to remote-users (524 cells/uL (424, 702)) and never-used (548 cells/uL (404, 700)), $p < 0.05$. Frequencies of single TIGIT+ CD8 T cells and TIGIT+ or PD-1+ and dual TIGIT+PD1+ CD4 T cell were significantly higher in the recent-users compared to never-used and remote-users (all $p < 0.05$). No differences among groups were seen for T cell activation or senescence.

CONCLUSIONS: Recent Meth users demonstrated the highest levels of CD4 and CD8 T cell exhaustion compared to never-used and remote-users. Meth-induced T cell exhaustion could potentially compromise immune effector responses and sustain viral persistence; hence Meth use should be avoided in HIV+ individuals and strategies targeting TIGIT or PD-1 may be prioritized in this population.

MOPEA023

Extracellular vesicle-associated cytokines in HIV-infected human ex vivo tonsils

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BACKGROUND: Cytokines can be carried on the surface or internal space of extracellular vesicles (EVs). These EV-associated cytokines may play a role in HIV infection and pathogenesis. Here we investigated the modulation of these cytokines during HIV infection and antiretroviral therapy (ART) in human *ex vivo* tonsils.

METHODS: Ex vivo tonsils were infected with HIV-1 strains, X4_{LAI04} or R5_{SF162}. HIV was either allowed to replicate for 15 days, or tissues were treated with ART (3TC and AZT) at day 2 post-infection. 33 cytokines in soluble and EV-associated forms were measured with multiplexed bead-based assays.

RESULTS: Early in HIV infection significant increases were seen soluble IFN γ , MCP-1, MIG, MIP-1 α , MIP-1 β , RANTES, and TNF α , while EV-associated cytokines that significantly increased were IL-13, IP-10, and MIP-1 β for X4, while MIP-1 α , MIP-1 β , and RANTES for R5. MIP-1 α and MIP-1 β shifted to a larger percent of EV-associated form, whereas RANTES increased in soluble form. In cumulative analyses, X4 infection increased total soluble production of IL-21, IFN γ , MIP-1 α , MIP-1 β , RANTES, and TNF α , and decreased TGF- β . R5 infection increased production of MIP-1 α , MIP-1 β , RANTES. Additionally, X4 significantly increased total EV-associated IFN γ , M-CSF, MIP-1 α , MIP-1 β , RANTES; R5 infection led to increased EV-associated IL-2 and RANTES.

ART treatment halted HIV-1 replication, but most cytokines levels remained similar to infected tissues, especially those most upregulated by HIV including MIP-1 α , MIP-1 β , and RANTES. X4 infected tonsils treated with ART showed significant decreases in only soluble IL-7, IP-10, and MIG, and an increase in IL-6; R5 infected tissues treated with ART showed decreased soluble IL-1 α , IL-1 β , IL-16, IL-17, IL-18, MIG, and MIP-3 α . While ART treatment was able to restore some soluble cytokines, EV-associated cytokines did not significantly change.

CONCLUSIONS: Cytokines which increase during HIV infection tend to increase in both soluble and EV associated form. Cytokines most upregulated by HIV did not decrease even after 13 days of ART. The most affected EV-associated cytokines were chemokines, which were not restored by ART. ART-treated ex vivo infected human tissues provide a new model to study tissue activation after HIV replication is suppressed. These studies will assist in deciphering mechanism of pathologies that develop in ART-treated patients.

MOPEA024

Primed immature neutrophils in primary and chronic SIV infection, a new player in systemic inflammation

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BACKGROUND: The HIV-1 infected host fails to eradicate the virus, despite significant control of viral replication by combinational antiretroviral therapy (cART). HIV persistence is associated with chronic inflammation in many infected patients, leading to an increased risk of comorbidities, such as cardiovascular diseases and cancer. Polymorphonuclear neutrophils (PMN) have been associated with chronic inflammation in autoimmune diseases such as rheumatoid arthritis. However, less is known about the impact of neutrophils in HIV pathogenesis and related inflammation. For this purpose, we characterize blood and bone marrow neutrophil maturation, priming and function in primary and chronic SIV infection and under cART.

METHODS: We monitored for 12 months 30 *Murinus m. auratus* macaques after infection with SIVmac251. 18 of these animals have been treated with the combination of Dolutegravir, TDF and FTC for 6 months. First, we performed a pilot study using high-dimensional multiparameter single-cell phenotyping by mass cytometry to obtain a global vision of the immune system in blood and bone marrow. Then, viral load, clinical parameters, lymphocytes activation, PMN phagocytosis, maturation and priming in these compartments were followed by conventional approaches.

RESULTS: In late chronic SIVmac251 infection, mass cytometry reveals that blood PMN consisted of mostly immature cells. In primary infection, flow cytometry analyses showed that immature CD10⁺ PMN were mobilized from bone marrow to blood, correlating with plasma viral loads. PMN priming, based on CD11b and CD62L expression, was associated with the peak of viremia (14 days p.i.). In chronic SIV infection, CD10⁺ mature PMN were reduced in bone marrow and blood, maintaining a primed profile and showing a reduced bacterial phagocytosis. Initiation of cART at day 28 p.i. restored PMN phagocytosis, but priming markers were still higher than in uninfected controls.

CONCLUSIONS: We provide here unprecedented insight into PMN phenotype and function in the course of SIV infection. Viral replication led to PMN priming, circulation of immature CD10⁺ PMN and phagocytosis impairment, partially restored by cART. Since PMN represent 40-70% of

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circulating leukocytes and primed PMN are more potent to release pro-inflammatory cytokines and to transmigrate, they should be considered as a new player in HIV chronic inflammation.

MOPEA025

Alteration of inflammatory cytokine levels in gut, despite its systemic normalization with ART in HIV+ patients

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BACKGROUND: Chronic inflammation in HIV infection has been associated with accelerated disease progression, characterized by an increase of systemic proinflammatory cytokines. With the use of antiretroviral therapy (ART), the levels of these cytokines are normalized; however, it has been observed that the inflammation in gut persists even with use of ART, favoring the microbial translocation and low-grade immune activation and chronic inflammation. The intestinal inflammation could be related with an alteration in the cytokine network, where the ART could not have a complete effect.

METHODS: Levels of 13 cytokines (IL-1 β , IFN- α , IFN- γ , TNF- α , MCP-1, IL-6, IL-8, IL-10, IL-12, IL-17, IL-18, IL-23, and IL-33) were measured by a multiplex-bead assay on serum and stool supernatant from HIV+ patient with ART, grouped accordingly to the absolute CD4+ T cell count: >350 T cells (n= 18) and < 350 T cells (n= 17), and a group of uninfected controls (n= 14), recruited from December 2017 to October 2018. Comparisons between groups were performed with Kruskal-Wallis test corrected with Bonferroni method.

RESULTS: We did not find differences in all cytokine serum levels between the three groups. However, in stool samples we find a significant increase of IL-1 β and IL-18 in HIV+ patients with < 350 T cells in comparison to the other groups; also, the other HIV+ group (>350 T cells) presented higher quantity of IFN- α , TNF- α , MCP-1 and IL-33, and lower concentration of IL-17. MCP-1 and IL-18 levels were significant higher in serum compared to stool supernatant in all groups; in contrast, the amount of IFN- α were increased in stool supernatant in both HIV+ groups.

CONCLUSIONS: Despite the systemic cytokine levels normalization as result of the use of ART, the alteration of cytokine network in the gut of HIV+ patients are evident. The perturbation of different cytokines associated with inflammation, chemotaxis and activation of innate immunity cells in gut, provide important evidence of the continuous damage caused by the HIV infection. These data, together with the absolute CD4+ T cells count and, other factors such as microbiota, could be related with immune re-constitution, the chronic inflammation and, the risk of develop AIDS.

MOPEA026

Persistence of "defective" HIV-1 proviruses and markers of immune activation and inflammation in HIV-infected individuals on suppressive combination antiretroviral therapy (cART)

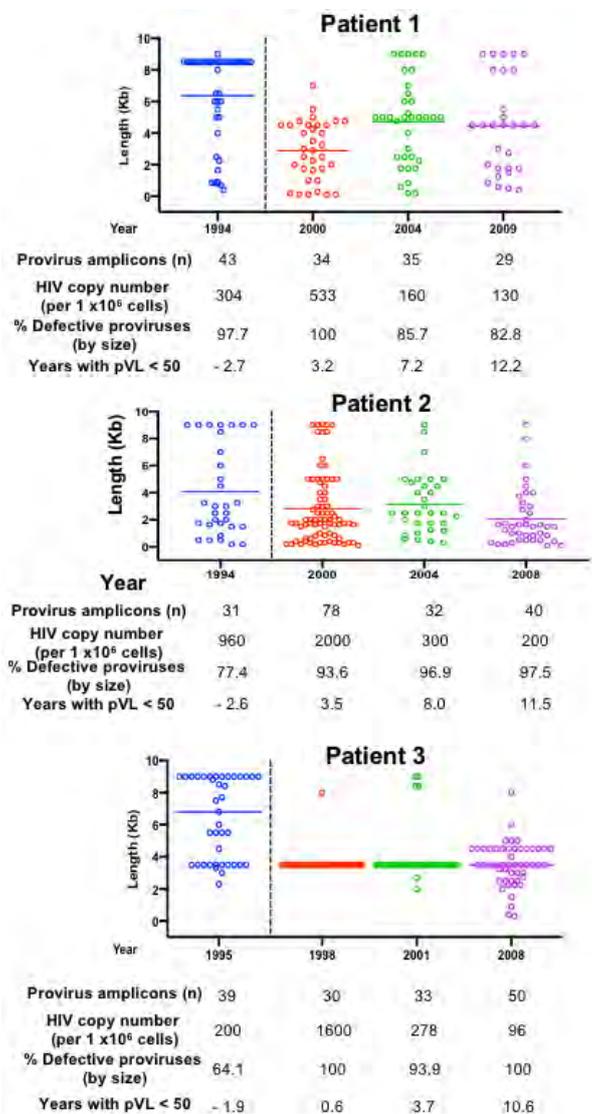
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BACKGROUND: Despite years of "successful" cART, defined as HIV-RNA levels < 50 copies/ml, HIV-1 proviral DNA persists in the majority of HIV-infected individuals. Greater than 95% of proviruses in circulating PBMCs are referred to as "defective" and unable to encode intact viruses. We have recently shown that these "defective" proviruses express novel HIV-RNA transcripts and produce proteins in vivo. In the present study, long-term changes in the "defective" provirus population and markers of immune activation and inflammation were assessed longitudinally (spanning >10 yrs) to understand potential role(s) "defective" proviruses play in HIV-1 pathogenesis.

METHODS: 3 HIV-infected individuals on suppressive cART with pVL < 50 copies/mL for >10 yrs (range 11-13) were studied. HIV-1 proviruses were characterized by 5'LTR-to-3'LTR PCR single-genome amplification (SGA) and direct amplicon sequencing. A minimum of 20 SGAs per time point and 3 time points during periods of pVL < 50 copies/ml were evaluated for each patient. Levels of proviral DNAs were determined by a semiquantitative PCR. Levels of D-dimer, IL-6, sCD14, TNF α , and IP-10 were measured on plasma by ELISA assays.

RESULTS: After a transient initial increase following viral suppression, levels of HIV-1 proviral DNA decreased in all patients over the time since viral suppression (mean 86% reduction, range: 76-94%). No consistent pattern was noted amongst any of the biomarkers measured, except IP-10, which increased 2-3 fold during the time of viral suppression. The long-term changes of proviral profiles also varied between patients, particularly with regards to HIV-1 provirus lengths and clonality (Figure).

CONCLUSIONS: Though reducing in size, the HIV proviral profile continues to persist and change dynamically in patients with prolonged viral suppression on cART. The lack of a clear correlation between the levels of provirus and the measured biomarkers suggests other possible confounders may play important roles in the process contributing to the chronic inflammatory state in some patients.



[Longitudinal assessment of HIV-1 proviral load and profile]

T cell depletion and reconstitution, and immune ageing

MOPEA027

Increased expression of TRAIL receptor DR5 in monocytes and its relationship with serum levels of IL-18 from HIV+ ART naïve patients

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BACKGROUND: Apoptosis is one of the main causes of immune cells loss during HIV infection, the Fas pathway has been extensively related to this, however there is evidence that suggest that TRAIL signaling is also involved in this depletion. *In vitro* models of HIV infection have shown TRAIL expression in several cell populations, there is also evidence that IL-18 is involved in upregulation of TRAIL in infected peripheral blood mononuclear cells (PBMCs).

The aim of this study was to evaluate the expression of Death Receptors (DR) 4 and 5 from the TRAIL apoptosis pathway in monocytes and its relationship to IL-18 concentration in serum.

METHODS: Ten male HIV+ ART naïve patients and seven age matched healthy donors were included. Monocyte immunophenotype was assessed by CD14/CD4 positivity; additionally, TRAIL receptors DR4 and DR5 expression as well as median fluorescence intensity (MFI) were measured by flow cytometry in whole blood samples. Concentration of IL-18 was quantified in serum samples using a bead assay by flow cytometry. Mann-Whitney U test was used for comparisons between the two groups and Spearman's test for the correlation amongst variables.

RESULTS: Monocytes derived from HIV+ patients showed a higher expression of DR5 in both, percentage of positivity and MFI, compared to healthy donors ($p < 0.05$); on the other hand, DR4 showed no statistically significant difference between the patients and the healthy donors. In the case of IL-18 concentration, the HIV+ group had a significantly higher level compared to the healthy donors ($p < 0.01$), however there was no correlation between the amount of IL-18 and the Death Receptors expression.

CONCLUSIONS: In HIV infections many immune cells are lost. Apoptotic pathways such as Fas and TRAIL are related to this loss. In this study we found an increased expression of the TRAIL receptor DR5 in monocytes of HIV patients, which make this cell population susceptible to apoptosis by the TRAIL ligand. The increased expression of TRAIL pathway has been associated with IL-18 secretion; this interleukin was also increased in patients compared with healthy donors, so this increase could favor the depletion of immune cells by this apoptotic pathway.

MOPEA028

Immune activation is associated with poor CD4 reconstitution - A study from South India

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BACKGROUND: In most people living with HIV, ART suppresses viral load and CD4 count increases (immunologic responders, IR), but 10-45% of people do not have sufficient CD4 count increases, i.e. immunological non-responders (INR). We investigated differences between IR and INR.

METHODS: Cross-sectionally enrolled 243 participants (median age 38 years): 142 ART suppressed (AS, < 40 cps/mL) and 101 ART naïve (AN) visiting YRG CARE medical centre, Chennai. From AS participants, INR was identified if any person did not: i) reconstitute ≥ 350 CD4+cells/ μ L after 2 years of ART, ii) reconstitute ≥ 200 CD4+cells/ μ L after 1 year of ART, or iii) gain 100 CD4+cells/ μ L from baseline after 1 year of ART. Pro (PI) and anti (AI) Inflammatory, activation, PD1, Ki67, microbial translocation (MT), T cell subsets were compared between INR, IR, and AN groups.

RESULTS: Among 142 AS participants, 12 (8.5%) were INR. We found PI and AI levels were not different between INR and IR; however PI was low among INR compared to AN. AI cytokine levels were higher among INR compared to AN persons ($p < 0.05$). MT markers were not different between INR, IR and AN participants. CD4 naïve cells was low and CD4_{TCM} was high among INR compared to IR and AN ($p < 0.05$); whereas, effector and other memory subsets of CD4 and CD8 cells was not different between INR and IR; however these subsets were low among AN. CD4 activation marker in INR was higher compared to IR ($p < 0.05$) and both were low compared to AN ($p < 0.0001$). CD4, CD8 exhaustion was low among INR compared to AN ($p < 0.0001$) (Table 1).

CONCLUSIONS: IA seems to be a marker of poor CD4 reconstitution despite viral suppression. Further study needs to be conducted to understand the underlying mechanisms of INR, which could help in the development of immune modulating drugs to supplement ART.

Variables	INR (n=12) Median (IQR)	IR (n=130) Median (IQR)	AN (n=101) Median (IQR)
Pro-inflammatory markers			
TNFR1	1937 (1772-2152)	2269 (1801-2788)	2526 (1736-3367) *
TNFR2	560 (464-640)	532 (404-729)	759 (589-992) **
TNFA	6.1 (4.4-7.2)	7.6 (5.6-10.3)	14.7 (9.6-24.4) ***
IFNa2	0.24 (0.24-1.98)	1.94 (0.24-2.2)	2.2 (1.9-2.2) **
IFNG	0.95 (0.52-0.95)	0.95 (0.13-2.1)	0.95 (0.23-4.4)
IL12	0.145 (0.14-0.22)	0.18 (0.15-0.33)	0.28 (0.22-0.28) *
IL17	0.028 (0.028-0.17)	0.12 (0.03-0.66)	0.69 (0.09-17.1)
IL1b	0.01 (0.01-0.28)	0.01 (0.01-0.28)	0.11 (0.01-0.11)
IL2	0.22 (0.19-0.22)	0.19 (0.19-0.22)	0.19 (0.19-0.22)
IL6	0.014 (0.014-0.03)	0.02 (0.01-0.15)	0.15 (0.06-1.57) **
IL8	0.495 (0.29-1.4)	0.79 (0.3-2.43)	1.46 (0.3-3.29)
Anti-inflammatory markers			
IL10	0.01 (0.007-0.1)	0.02 (0.01-0.34)	0.34 (0.01-4.2) **
Activation marker			
CD4+HLADR+CD38+	4.35 (3.23-5.75)	3.2 (2.5-4.2)*	8.24 (6.23-14) ***
CD8+HLADR+CD38+	20.15 (16.15-22.1)	15 (9.6-21.2)	46.1 (31.3-56.3) ***
Exhaustion marker			
CD4+PD1+	12.1 (9.3-16.1)	8.7 (6.5-14.8)	20.5 (9.2-46.6)
CD8+PD1+	14.1 (10-15.6)	11.6 (8.5-19.9)	29.6 (16.5-41.2) **
Proliferation marker			
CD4+Ki67+	0.35 (0.3-0.64)	0.41 (0.22-7.9)	0.62 (0.22-42.4)
CD8+Ki67+	0.46 (0.36-0.58)	0.42 (0.2-1.2)	0.83 (0.21-7.7)
Microbial Translocation			
sCD14	3087 (2316-4016)	3147 (2358-3939)	2791 (2045-3908)
LPS	167.5 (158-202.5)	79.7 (73.9-84.1)	193 (165-234)
CD4 subsets			
Naïve	40.1 (32.8-48.1)	48.8 (38.6-58.4) *	47 (36.3-59.1) *
Effector	4.1 (2.5-4.9)	2.8 (1.9-4.9)	3.7 (2.2-5.8)
Central memory	44.9 (34.4-48.2)	33.3 (27.4-40) *	32.3 (26.2-38.5) **
Effector memory	14.3 (12-15.3)	12 (8.8-16.8)	13.1 (10-18.5)
CD8 subsets			
Naïve	31.9 (28-40.4)	37.9 (26.8-51.6)	23.7 (10.6-34.5) *
Effector	31.3 (21.5-41.9)	28.3 (20.9-39.8)	35.6 (27.2-47)
Central memory	16.4 (13.8-22.2)	16 (12.6-20)	15.3 (10.9-19.8)
Effector memory	13.1 (11.6-18.6)	13 (9.3-18.7)	20.4 (14.2-28.2) *

* $p < 0.05$, on comparison with INR; ** $p < 0.01$, on comparison with INR; *** $p < 0.001$, on comparison with INR

[Table 1. Immunological markers associated with INR]

Microbiomes and microbial translocation

MOPEA029

Fecal exosomes differentially influence translocating bacterial taxa after SIV infection

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BACKGROUND: Microbial translocation contributes to persistent inflammation in both treated and untreated HIV infection. Although translocation is due in part to a disintegration of the intestinal epithelial barrier, there is a bias towards the translocation of Proteobacteria, suggesting that translocation is not stochastic. In murine models, epithelial-derived exosomes have been shown to influence bacterial gene expression and growth in a cargo-dependent manner. We hypothesize that intestinal epithelial exosomes biologically differ after SIV infection and that altered exosomal miRNA and/or antimicrobial peptide (AMP) content may contribute to biased translocation.

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METHODS: We isolated fecal exosomes from 12 healthy and 12 chronically SIV-infected rhesus macaques (RM, *Macaca mulatta*) and co-cultured these exosomes with 36 isolates of translocated bacterial species in order to quantify any influence of exosomes on bacterial growth. Fecal exosomes were isolated utilizing the exoEasy protocol and quantified by NanoSight. Viable bacteria that had translocated were isolated from mesenteric lymph nodes, livers, and spleens obtained from end-stage, SIV-infected RM, cultured and passaged in 4 unique media under aerobic and anaerobic conditions, and identified by MALDI-TOF. Bacterial growth was kinetically assayed by spectrophotometer. Exosomal miRNA profiles were assessed by human miRNA Array cards (n=768 miRNAs). AMPs alpha defensin 1, beta defensin (bDEF) 1, bDEF2, bDEF4, Lysozyme C, PLA2G2a, and Reg3g were assayed by ELISA.

RESULTS: Several bacterial species showed differential growth upon co-culture with exosomes derived from uninfected versus SIV-infected animals. For example, *Lactobacillus salivarius* showed significantly accelerated growth when co-cultured with exosomes derived from SIV-infected animals while in contrast *Corynebacteria ihumii* displayed stunted growth. Exosomal miRNA profiles derived from uninfected and SIV-infected RMs differed significantly by principle coordinate analysis. Ninety-three of 100 differentially expressed miRNAs displaying upregulated expression, with miR-197, -425, -584, -28, and let7b most highly upregulated.

CONCLUSIONS: Fecal exosomes can differentially influence the growth of bacterial isolates known to translocate in SIV infection. This effect may be attributable to a quantifiable shift in exosomal miRNA content and/or to a shift in AMP content. The identification of the precise mechanisms by which fecal exosomes differentially regulate the behavior of translocating bacteria will inform the development of therapeutics aimed at impeding microbial translocation.

Correlates of HIV susceptibility and disease progression (biomarkers and genetics)

MOPEA030

Extracellular vesicles and their microRNA contents are biomarkers of HIV-1 disease progression

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BACKGROUND: The discovery of extracellular vesicles (EVs) that mediate cell-to-cell communications offers an opportunity to gain better understanding the mechanism of HIV pathology. The contents of EVs vary depending on the condition of the cells that secrete them and may thus serve as biomarkers of physiological or pathological status. Studies have shown that leukocytes in contact with HIV secrete EVs with peculiar microRNA contents and that molecules such as miR-155 and miR-223 might play pivotal roles in HIV-1 replication or latency and the associated immune dysfunction by affecting the expression of key immunomodulatory molecules such as cytokines. In this study, we test the hypothesis that plasma EV subpopulations contain miRNA molecules that mark aspects of HIV-1 pathogenesis.

METHODS: Two EV populations (large and small) were purified from platelet-free plasma from 7 uninfected individuals, 6 infected antiretroviral-naïve patients and 11 infected HAART-treated HIV-1 patients. Both EV populations were marked with lipophilic tracers and CD4/CD8/CD45 antibodies and quantified by cytofluorometry. Expression of mature miR-155, miR-223 and miR-92 was measured using the two-step reverse transcription quantitative polymerase chain reaction. Correlations between clinical and EV data were tested.

RESULTS: HIV-1 increased EV secretion, in particular the abundance of small EVs from leukocytes, CD4 and CD8 cells, which was correlated positively with CD4 and CD8 cell counts. In association with large EVs, only miR-155 was preferentially enriched. Positive correlations were found between miR-92 (r=0.52, p=0.0410), miR-223 (r=0.6005, p=0.0124) and the abundance of small EVs from CD4 cells. A positive and strong correlation was found between miR-223 from large EVs and viral load.

CONCLUSIONS: Profiling differential expression of plasma EV miRNA may provide a novel approach to identifying immune functions and activation that play a key role in the progression of HIV-1 disease. In addition to serving as prognostic biomarkers, miRNA could provide targets for long-term therapy with benefits for HIV-1 patients.

MOPEA031

Persistent elevation of Tim-3 and PD-1 on memory T cells despite early ART initiation during primary HIV infection

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BACKGROUND: Early initiation of antiretroviral therapy (ART) at primary HIV infection (PHI) is associated with improved HIV clinical outcomes. Immune checkpoint receptor (ICR) expression is perturbed during PHI, but the impact of early ART on reversing this is unclear.

METHODS: We studied 66 individuals (100% male; median age 34 [IQR 28-41] years) in the HEATHER PHI cohort who commenced ART a median of 52 [34-98] days from estimated seroconversion, and 10 healthy controls (100% male; median age 35 [31-43] years). Using flow cytometry, we measured the frequency of CD4 and CD8 memory subsets from PBMCs, expression of immune checkpoint receptors (PD-1, Tim-3, TIGIT), CD38 and transcription factors (T-bet and Eomes). Assays were performed on samples from the earliest available pre-therapy time-point (baseline) plus 1 and 3 years (for a subset of 18 individuals) after ART initiation. Comparisons between groups were performed using principle component analysis and non-parametric statistical tests with adjustment for multiple comparisons.

RESULTS: PHI was characterised by expansion of differentiated CD4 and CD8 T cell subsets, CD8 T cell activation (CD38 expression; p< 0.0001) and elevation of PD-1, Tim-3 and TIGIT expression (all p< 0.05 on effector memory [EM] CD8 T cells). During PHI, Tim-3 and CD38 expression were closely correlated with markers of clinical progression (viral load, CD4 count, CD4:CD8). Following 1 year of ART there was partial, but incomplete, restoration of T cell phenotype towards that of healthy controls. This difference was driven by persistent elevation of Tim-3 on memory CD4 and CD8 T cell subsets. This further reduced but had not normalised following 3 years of ART. PD-1 expression was specifically elevated on EM CD4 T cells during PHI (p< 0.01) and remained unchanged following 3 years of ART. PD-1 expression on other subsets and TIGIT expression was comparable to healthy controls by 1 year.

CONCLUSIONS: Specific immunological perturbations observed during PHI persist despite early ART. In particular, Tim-3 expression on memory T cells and PD-1 on EM CD4 T cells remained elevated. Persistent immune dysfunction may have implications for the pathogenesis of non-AIDS comorbidities or the efficacy of immunotherapeutic interventions to target PD-1 and Tim-3 signalling.

MOPEA032

HIV DNA levels, IL28B genotype and CCR5Δ32 among different groups of HIV patients

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BACKGROUND: The aims of this study were to quantify HIV DNA levels in HIV Controllers, in ART-naïve or ART treated patients (pts), and to analyze its associations with IL28B and CCR5Δ32 genotypes.

METHODS: We evaluated 231 HIV-1 pts from the ICONA and the Elvis Cohorts categorized in 5 distinct groups: 20 Elite Controllers (EC; ART-naïve pts, with HIV-RNA < 50 cp/mL); 35 Long term non Progressors (LTNP; ART-naïve pts for ≥8 years, with VL>1000 cp/mL and CD4+ ≥500 cells/μL); 17 HIV controllers (ART-naïve pts, with HIV-RNA 50-1000 cp/mL); 122 ART-naïve (pts who started ART, with HIV RNA >50 cp/mL and CD4+ < 500 cells/μL); 37 pts under suppressive ART (HIV-RNA < 50 cps/mL). Total HIV DNA was extracted from PBMCs by droplet digital PCR (ddPCR); if HIV DNA was below the detection limit, it was classified as undetectable. CCR5Δ32 and IL28B rs12979860 genotypes were also analyzed. Multi-variable logistic regression model was performed to assess factors associated with undetectable HIV DNA.

RESULTS: Total HIV-DNA levels were significantly different among pts' group ($p < .0001$): 0 (0, 2.09) log₁₀cp/106 PBMC in EC, 2.15 (0, 2.97) in LTNP, 2.22 (0, 2.54) in HIV-controllers, 2.75 (1.93, 2.24) in ART-naïve pts, 2.13 (1.80, 2.55) in ART-treated pts (Figure 1); 55%, 35%, 34%, 18% and 19% of EC, HIV-controller, LTNP, ART-naïve and ART-treated pts, respectively, had undetectable HIV DNA ($p = .003$). IL28B rs12979860 CC genotype was differently distributed among pts' groups ($p = .011$) as well CCR5 WT genotype. ($p = .027$). Undetectable HIV DNA was found in 24% and 28% of pts with IL28B rs12979860 CC and TC/TT genotype, respectively ($p = .717$) and in 24% and 30% pts with CCR5 WT and CCR5Δ32, respectively ($p = .560$). After controlling for age, gender, nationality, HIV risk factor, HCV-coinfection, nadir CD4+, CCR5Δ32 and rs12979860 genotypes, the probability of observing an undetectable HIV DNA differed by pt's group [reference group=ART-naïve; EC: adjusted odds ratio (AOR)=5.34, 95%CI=1.58-18.11; HIV-controller: AOR=2.21, 95%CI=0.68-7.21; LTNP: AOR=1.66, 95%CI=0.59-4.68; ART-treated: AOR=1.08, 95%CI=0.42-2.78; overall $p = .041$].

CONCLUSIONS: EC were more likely to show an undetectable HIV DNA than ART-naïve patients. There was no evidence of an association between having undetectable HIV DNA and the detection of CCR5Δ32 or IL28B rs12979860 genotypes.

Co-morbidities (HIV)

MOPEA033

Serum bone-derived extracellular vesicles are associated with bone loss during antiretroviral therapy in HIV+ individuals

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BACKGROUND: Bone mineral density (BMD) decreases in HIV+ individuals after initiating antiretroviral therapy (ART). Since bone loss is consistently observed across different ART regimens, one theory is that the inflammatory state associated with T-cell reconstitution after ART disrupts the immune-skeletal interface. Extracellular vesicles (EVs) play a role in the regulation of bone remodeling, and serum bone-derived EVs may reflect the state of bone cells under healthy and pathologic conditions. We tested whether early change in EVs correlated with change in BMD by DXA at 12 months.

METHODS: EV phenotype was measured in blinded serum samples from 15 HIV+ adults at baseline (B), and 1, 3, 6 and 12 months after ART initiation. Not all samples were available at each time point so we averaged early (TP1, 1-3 months) and late (TP2, 6-12 months) time points. EVs were stained for osteocalcin (OC), RANKL, and RANK, characterized by flow cytometry, and reported as EVs/μL. Serum OC (ng/mL), serum P1NP (ng/mL), and serum C-terminal telopeptide of type 1 collagen (CTX) (ng/mL) were measured at similar timepoints.

RESULTS: A significant decrease in BMD (%) was observed from baseline to 12 months at the lumbar spine (-2.6±1.9), femoral neck (-3.7±3.6) and total hip (-4.3±2.9). Levels of OC+EVs (EVs/μL), serum OC (ng/mL), serum P1NP (ng/mL), and serum C-terminal telopeptide of type 1 collagen (CTX) (ng/mL) were significantly higher in early and late time points compared to baseline:

Mean OC+EV (B:13±12,TP1:21±13, $p = 0.02$; TP2:44±49, $p < .001$), serum OC (B:13±9,TP1:17±13, $p = 0.01$; TP2:20±14, $p = 0.02$), serum P1NP (B:45±18,TP1:52±23, $p = 0.11$; TP2:77±33, $p = 0.003$), and serum CTX (B:0.26±0.17, TP1:0.47±0.2, TP2:0.57±0.24; $p < .0001$).

There was a negative correlation between % change in total hip BMD 12m and % change in OC+EV baseline-TP1 ($r = -0.80$, $p = 0.001$), RANKL+EV baseline-TP1 ($r = -0.68$, $p = 0.01$) and RANK+EV baseline-TP1 ($r = -0.55$, $p = 0.05$). Also, % change in serum OC, P1NP and CTX from baseline to TP1 did not correlate with % change in BMD.

CONCLUSIONS: Our data demonstrated that early changes in levels of bone-derived EVs were associated with bone loss 12 months after ART initiation at the total hip. These data suggest that bone-derived EVs may be developed as novel serum biomarkers for measuring bone remodeling.

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Neuroimmunity

MOPEA036

Bystander cell death by pyroptosis of astrocytes requires cell-to-cell transmission of HIVD.S. Ojeda¹, S. Lautaro², J. Urquiza¹, C. Cevallos¹, N. Laufer¹, J. Quarleri¹¹Universidad de Buenos Aires. Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET). Instituto de Investigaciones Biomédicas en Retrovirus y Sida (INBIRS). Facultad de Medicina, Buenos Aires, Argentina, ²Universidad Favalora, Buenos Aires, Argentina**BACKGROUND:** The human immunodeficiency virus (HIV) is capable of infecting the brain parenchyma, causing neurological disorders associated with inflammation in the central nervous system (CNS), which persists despite combined antiretroviral treatment. Astrocytes, the most abundant cell types in the CNS, play a leading role in neuropathogenesis, promoting neuronal damage during CNS viral infections. The mechanisms involved in astrocytic pathogenesis remain obscure.**METHODS:** Normal human astrocytes (NHA) were infected in vitro using pseudotyped HIV-VSV-G co-expressing the green fluorescent protein (GFP). The infection was monitored by flow cytometry (FACS), discriminating in each culture productively infected cells (PI / GFP +) from those that were not (NPI / GFP-), and simultaneously, mitochondrial membrane potential ($\Delta\Psi_m$) and cell death (AnnexinV+/ 7AAD+) were evaluated. PI and NPI cells were sorted by FACS in order to measure pyroptosis differentially (NLRP3, cleaved forms of caspase-1 and GSDMD by WB). Besides, the role of PI and NPI on bystander cellular damage was measured in co-culture assays using vital proliferation dye (VCP) and FACS. To infer the viral stimuli associated with the activation of the pyroptosis, antiviral drugs (zidovudina, nevirapine, raltegravir and indinavir) were used to inhibit viral enzymes involved in the replication.**RESULTS:** NPI cells (but not PIs) exhibited $\Delta\Psi_m$ dissipation and cell death ($p < 0.001$) significantly higher than PI. Pyroptosis was involved with significantly higher expression of NLRP3, and caspase-1 and GSDMD cleavage ($p < 0.001$). The role of NPI was more prominent than PI ($p < 0.001$) propitiating bystander cell death of VCP pre-stained astrocytes in co-culture assays. Despite inflammasome activation and pyroptosis were slightly greater after accumulating viral RNA and (short chains) viral DNA, such phenomenon was significantly manifested ($p < 0.001$) when accumulating vDNA, viral proteins, and immature viral particles.**CONCLUSIONS:** Taken together, these results reveal that the intercellular contact between PI astrocytes and NPI propitiated bystander cell death by pyroptosis with loss of mitochondrial homeostasis, inflammasome and inflammatory caspases activation triggered by viral DNA, viral proteins and immature viral particle.

MOPEA037

Plasma brain-derived extracellular vesicles are associated with monocyte activation in individuals with HIV-related cognitive impairmentE. Marques de Menezes^{1,2}, H. Inglis¹, M. D'Antoni³, J. Liu³, D. Clements³, C. Shikuma^{3,4}, M. Abdel-Mohsen⁵, L. Ndhlovu^{3,4}, P. Norris^{1,2,6}¹Vitalant Research Institute, San Francisco, United States, ²University of California - San Francisco, Department of Laboratory Medicine, San Francisco, United States, ³University of Hawaii, Department of Tropical Medicine, Honolulu, United States, ⁴University of Hawaii, Department of Medicine, Hawaii Center for AIDS, John A. Burns School of Medicine, Honolulu, United States, ⁵Wistar Institute, Philadelphia, United States, ⁶University of California - San Francisco, Department of Medicine, San Francisco, United States**BACKGROUND:** Studies show circulating monocyte levels correlate with HIV-associated neurocognitive dysfunction. Extracellular vesicles (EVs) are vehicles of intercellular signaling that have emerged as novel modulators of immunological responses. We determined if plasma and CSF-derived EVs associate with monocyte perturbations and impaired cognition in HIV-infected individuals.**METHODS:** Using advanced flow cytometry techniques, we profiled plasma derived EVs from 79 HIV-infected individuals, having either normal cognition (non-CI, n=16) or cognitive impairment (CI) based on AAN criteria for HIV-Associated Dementia (n=25) or Mild Cognitive Motor Disorder (n=38). Matched cerebrospinal fluid (CSF)-derived EVs were profiled from a subgroup of 62 individuals and the phenotype of PBMC-derived monocytes was examined in a subgroup of 34 individuals.**RESULTS:** Plasma-EVs expressing monocyte-associated markers were significantly higher in the CI compared to the non-CI group: CD14+, CD16+, CD163+, CCR2+, and CCR5+. Increased plasma-EVs expressing neuronal markers were found in the CI compared to the non-CI group: MAP2+, GFAP+, and CD11b+. Comparisons of mean plasma-EV levels (EVs/ μ l) are shown in the table. CSF-EVs expressing GFAP were higher in the CI compared to non-CI group (112 vs. 53, $p=0.009$). Frequencies of circulating monocytes correlated with plasma-EVs expressing CD14 ($r=-0.62$, $p=0.014$), CD66b ($r=-0.49$, $p=0.053$), and GFAP ($r=-0.51$, $p=0.041$). Frequencies of CCR5 expression on monocytes correlated with plasma-EVs expressing the platelet markers CD41a ($r=0.63$, $p < 0.001$) and CD62p ($r=0.65$, $p < 0.001$), and the tetraspanin protein CD63 ($r=0.64$, $p < 0.001$), and CSF-EVs expressing CD62p ($r=0.61$, $p=0.046$). There was no significant difference between the two groups in age, CD4 count, viral load. EV phenotype/frequency did not correlate with viral load.**CONCLUSIONS:** EVs expressing monocyte activation and neuronal markers correlate with CI in HIV+ adults, suggesting that EV subsets may be novel biomarkers of neuronal damage during HIV infection. Moreover, monocyte activation associated with circulating platelet EV levels, indicating a potential interaction between platelet EVs and monocytes in the pathogenesis of HIV-related CI.

Marker	Lineage	CI	Non-CI	p-value
CD14	Monocyte	201	82	0.017
CD16	Monocyte	643	159	0.001
CD163	Monocyte	427	98	0.041
CCR2	Monocyte	460	219	0.027
CCR5	Monocyte	48	14	0.004
MAP2	Neuronal	231	40	0.055
GFAP	Neuronal	1218	450	0.004
CD11b	Neuronal	922	161	0.020

[Comparisons of mean plasma levels between cognitive impairment (CI) and non-CI in HIV-infected individuals]

Neurodegeneration

MOPEA038

Production of chemokine fractalkine in HIV brain inflammation: A new approach to understand and treat HIV neuro-pathogenesis

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BACKGROUND: HIV infection of microglia and astrocytes causes release of neurotoxic viral proteins with a neuro-inflammatory environment. Clinically, this results in HIV-associated neurocognitive disorders (HAND) with an uncontrolled prevalence in treated individuals. The objective is to shed light on HAND pathogenesis and study the interactions of HIV with neuro-protective factors. We focus on fractalkine, a chemokine highly produced by neurons that controls microglia neurotoxicity. We hypothesize that HIV alters fractalkine signaling which affects HAND severity.**METHODS:** Human astrocytes were infected and stimulated with pro-inflammatory cytokines. Fractalkine was measured by qPCR (RNA), on-cell western assay (membrane-anchored form) and ELISA (soluble form). The enzymatic activity of ADAM-10, the metalloprotease for fractalkine shedding, was evaluated with a fluorimetric assay. Some miRNAs targeting fractalkine were quantified in astrocytes. Supernatants from infected microglia were added to astrocytes to analyse fractalkine secretion. Microg-

lia were infected and evaluated for fractalkine receptor expression. Neuroprotective effect of fractalkine was evaluated on gp120-treated human neurons with a caspase 3/7 detection kit by fluorescence microscopy.

RESULTS: First, we saw a slight impact of HIV on fractalkine production in resting astrocytes, and a significant decreased production in inflamed astrocytes. Our recent data demonstrated the effect on both the soluble and membrane-anchored form. We rectified and confirmed with more sensitive approaches that ADAM-10 activity and membrane expression remain unperturbed. Moreover, we reported that miRNA-424, 503 and 195 were upregulated in infected astrocytes. Transfection with specific mimics and antagomirs for these miRNAs confirmed their involvement in fractalkine mRNA degradation. Conditioned medium from infected microglia increased fractalkine production by astrocytes; this effect was mostly due to TNF as demonstrated in experiments using anti-TNF neutralizing antibody. We also indicated that HIV reduces fractalkine receptor in microglia and their response to fractalkine. Finally, we observed that recombinant fractalkine protects neurons from gp120-mediated apoptosis and infected microglia-derived medium.

CONCLUSIONS: In conclusion, our results indicate and deepen new original interactions between HIV and fractalkine signaling in the brain. Considering its neuro-protective functions, reducing its production in astrocytes and functional effects on microglia could have important outcomes in chronic inflammation and immune activation. Overall, interventions with fractalkine-based treatments could offer neuroprotection and reduce HAND.

MOPEA039

Modeling the cross-talk between HIV-infected microglia and neurons

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BACKGROUND: Despite receiving effective anti-retroviral treatment, many patients develop HIV-associated neurocognitive disorders (HAND). Our working hypothesis is that neurological complications result from the periodic emergence of HIV from latency within microglial cells in response to neuronal damage or inflammatory signals. Here, we report the use of a cellular co-culture system between neurons or cerebral organoids and immortalized human microglial cells bearing an HIV/green fluorescent protein (GFP) construct (huglia/HIV). This unique co-culture system allows us to study the cross-talk between these cell types in regulating HIV expression in the central nervous system (CNS).

METHODS: To establish the co-culture system, neuron precursor cells (LUHMES/red fluorescent protein (RFP)) were differentiated into dopaminergic neurons. Neural differentiation from iPSC was carried out through generation of embryoid bodies (EBs) followed by neural rosettes and then neurospheres, from which cortical, dopaminergic, and motor neurons were generated. To generate cerebral organoids, individual iPSC colonies were grown in consecutive first, second and third forebrain media. Neurons or organoids were co-cultured with huglia/HIV cells. HIV expression was monitored through flow cytometry, and viability of neurons through live cell count and the *in-vitro* toxicology assay based on resazurin reduction.

RESULTS: Co-culture of a clonal huglia/HIV population (HC69) undergoing spontaneous HIV expression with neurons induced HIV silencing in a short-term (24 h). Co-culture with healthy neurons, but not with damaged neurons, reduced HIV expression in microglial cells. In a long-term culture (72 h), neurons prevented spontaneous viral reactivation in HC69 GFP⁺ cells, whereas in activated HC69 GFP⁺ cells, short-term neuron-mediated HIV silencing was reversed concomitant to neuronal deterioration. Additionally, we observed that activated huglia/HIV cells were able to penetrate iPSC-derived cerebral organoids, and preliminary data indicate that organoids can silence HIV in penetrated huglia/HIV.

CONCLUSIONS: Our results demonstrate that HIV expression in infected microglial cells is regulated by interactions with neurons. HIV infection disrupts the normal interplay between microglia and neurons and thereby exacerbates neurodegeneration. We are using these systems to identify pharmacological interventions that block HIV expression in the CNS and thereby to palliate HAND.

Immune responses during acute HIV infection

MOPEA073

Immune-phenotypic characteristics associated with an effective acute-phase response predict a reduced amount of integrated HIV DNA in naïve CD4+ T cells in patients treated during acute HIV infection

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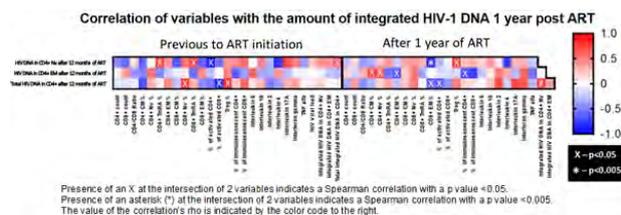
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BACKGROUND: ART during acute HIV infection is associated with a reduced viral reservoir. Its relationship with lymphocyte subsets' dynamics is yet to be described.

METHODS: Patients with acute HIV infection had blood samples drawn previous to ART initiation and after 12 months of ART. We measured intracellular HIV DNA in naïve(NV) and effector memory(EM) CD4+ T-cells using a cell sorter (Bio-Rad S3e) for subset separation and subsequently digital droplet(dd) PCR for DNA quantification. Immune-phenotyping was performed by flow cytometry on whole blood to determine cell activation, immune-senescence, and the proportions of the following subsets: Nv, EM, central memory(CM), terminally differentiated(TEMRA) and regulatory T cells(Treg). TNF-alfa, IFN-gamma and interleukin-2, -4, -6, -10 and -17A, were measured in serum by flow cytometry, using capture beads. We assessed for correlations between all variables and the amount of intracellular HIV DNA after one year using Spearman correlations. We controlled for the false discovery rate using the Benjamini-Hochberg procedure with an $\alpha=0.10$.

RESULTS: 14 male patients were included at Fiebig stages as follows: I(0%), II(7.14%), III(42.85%), IV(42.85%), V(21.42%), VI(14.28%). Median intracellular HIV DNA in EM-CD4+ T-cells decreased from 29.7 copies/10⁶ CD4+ (IQR=10.6-41.6) to 1.2 copies/10⁶ CD4+ (IQR=0.46-2.2) after 1 year ($p=0.006$), while there were no significant changes in the viral reservoir within Nv-CD4+ T-cell population ($p=0.664$). Lower proportions of pre-ART TEMRA cells ($\rho=0.714, p=0.046$) and higher CD4+ T-cell activation ($\rho=-0.857, p=0.006$) predicted a reduced viral reservoir in Nv-CD4+ T-cells, while an increased proportion of EM-CD8+ T-cells ($\rho=-0.811, p=0.002$) and decreased Treg ($\rho=0.705, p=0.022$) were associated with its reduction after one year of ART.

CONCLUSIONS: When initiated during acute HIV infection, ART reduces the viral reservoir of EM-CD4+ T-cells, but not of Nv-CD4+ T-cells. A pre-ART effective acute immune-response phenotype (low TEMRA, high activation) predicts a smaller viral reservoir in this hard-to-reach subset. Further investigations are needed to identify the mechanisms behind this phenomenon.



[Correlation of variables with the amount of integrated HIV-1 DNA after one year of ART]

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Cell-based preventative vaccines

MOPEA079

Vaccine-induced Vif-specific CD8⁺ T cells exert strong suppressive pressure on acute SIV replication post-infection

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BACKGROUND: Induction of effective T-cell responses by vaccination resulting in HIV control post-infection could contribute to the control of HIV epidemics. Our previous results in a macaque AIDS model indicated that induction of HIV-specific CD4⁺ T cells, preferential targets for HIV infection, by vaccination may accelerate acute viral replication post-virus exposure (J Virol 88:14232, 2014). We have then developed a novel immunogen (CaV11) to selectively induce CD8⁺ T cells but not CD4⁺ T cells targeting viral Gag capsid (CA) and Vif antigens. In the present study, we examined the protective effect of a vaccine expressing this CaV11 immunogen on acute viral replication after an intravenous high-dose simian immunodeficiency virus (SIV) challenge in rhesus macaques.

METHODS: Six rhesus macaques received prime-boost immunization with DNA and Sendai virus (SeV) vectors expressing CaV11, followed by an intravenous challenge with 1,000 TCID₅₀ of SIV_{mac239}. CaV11 consists of tandemly-connected overlapping 11-mer peptides spanning SIV Gag CA and Vif amino acid sequences. Plasma viral loads, viral genome sequences and SIV-specific T-cell responses were analyzed.

RESULTS: All the vaccinated macaques efficiently induced Gag/Vif-specific CD8⁺ T-cell responses with inefficient Gag/Vif-specific CD4⁺ T-cell induction. After SIV challenge, all of these six animals were infected, but two of them controlled setpoint viremia. None of them exhibited enhancement of acute viral replication post-challenge, which was observed in those immunized with DNA and SeV vectors expressing the whole Gag protein in our previous study. SIV-specific CD4⁺ T-cell responses were detectable at week 1 post-challenge. Remarkably, plasma viral loads at week 1 were inversely correlated with Vif-specific CD8⁺ T-cell frequencies post-vaccination. The two animals showing lower acute and setpoint viral loads exhibited rapid selection of a mutation in the vif region targeted by CD8⁺ T cells. In contrast, setpoint viral loads showed tendency to be inversely correlated with Gag-specific but not Vif-specific CD8⁺ T-cell frequencies post-vaccination.

CONCLUSIONS: Our results indicate that vaccine-induced Vif-specific CD8⁺ T cells exert strong suppressive pressure on acute SIV replication post-infection. This study suggests a rationale of selective induction of CD8⁺ T but not CD4⁺ T cells targeting viral Gag and Vif by vaccination for HIV control.

Novel vectors and strategies

MOPEA080

Novel gp41 W614A-3S peptide-CRM conjugated vaccine formulated in MF59-like squalene emulsion promotes broadly neutralizing antibodies against HIV-1

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BACKGROUND: We previously detected antibodies with broad neutralizing activity directed against a gp41-peptide, namely W614A-3S, in 23.5% (16/68) of untreated long-term non-progressor (LTNP) HIV+ patients

compared with < 5% (5/104) of HIV-1 progressor patients. The neutralizing capacity of W614A-3S Abs was inversely correlated with viral load ($r = -0.9013$; $p = 0.0001$), and viral DNA ($r = -0.7696$; $p = 0.0005$), suggesting that W614A-3S neutralizing Abs (Nabs) may confer a crucial advantage to LTNP patients. These results provide insights for the development of W614A-3S peptide-conjugated as a novel vaccine candidate. Here, we conducted preclinical studies in mouse and rabbit models to find an optimal vaccine formulation for induction of broadly Nabs against HIV using W614A-3S peptide conjugated to CRM197 carrier.

METHODS: Mice and rabbit models are used in an attempt to screen for the best adjuvant combination, vaccination schedule and doses for W614A-3S conjugated to CRM197 carrier vaccine. W614A-3S-CRM197 carrier were formulated with MF59-Like squalene emulsion, aluminium Salt and MonoPhosphoLipid-A (MPLA)-liposome. Immune responses were measured in the serum by Elisa and HIV NAb TzM-BI assays. Cellular responses for TFh and Germinal center B cells were measured by flow cytometry. In addition, single-cell Fluidigm gene arrays were performed to identify specific B cell gene expression

RESULTS: Preclinical mice and rabbit models demonstrated that squalene formulation induced Nabs, whereas formulation in Alum Salt induced similar levels of Ab without neutralizing activities. W614A-3S peptide-CRM197 carrier formulated in MF59-Like squalene emulsion elicited Nabs against 70% and up to 90% of 12 cross-clade HIV-1 Tier-2 viruses, when tested respectively with serum and purified anti-W614A-3S Abs. In addition, we have studied the dichotomy in the induction of Nabs versus non-Nabs depending of adjuvant formulation and found that gene expression in B cells is different in MF59-Like adjuvant compared to Aluminium salt, suggesting adjuvant-induced B cell differentiation program.

CONCLUSIONS: GP41-peptide W614A-3S is thus a promising target of vaccine efforts aimed at eliciting broadly neutralizing antibodies.

Co-infection: TB and other mycobacteria

MOPEA081

Inflammasome SNPs are associated with risk/protection for tuberculosis and TB-AIDS-immune reconstitution inflammatory syndrome (IRIS) outcomes

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BACKGROUND: Inflammasomes are multi-protein complexes of receptors and sensors that mediate innate immune responses and induce inflammation. Tuberculosis (TB) and AIDS are the leading death infectious diseases in the world in which inflammation plays a major role in disease progression. In some TB-AIDS patients, treated for both diseases simultaneously, a pathological inflammatory reaction arises, denominated Immune Reconstitution Inflammatory Syndrome (IRIS). The search of risk factors for IRIS is of relevance for clinical management. Here we investigated the association of cellular inflammasome SNPs among TB, AIDS, TB-AIDS and IRIS patients in an attempt to characterize potentially relevant innate immune response markers.

METHODS: Patients were divided into four groups: G1-TB/AIDS (n=88; 11 with IRIS), G2-AIDS (n=24), G3-TB (n=24) and G4-healthy volunteers (n=26). These patients were followed-up at INI/FIOCRUZ and HGNI, Rio de Janeiro, Brazil, from 2006 to 2016. SNPs of the cellular inflammasomes were determined by Real Time PCR. Protection/risk estimations were performed by unconditional logistic regression models.

RESULTS: IL1- β rs1143634 gene G/A genotype was associated with risk for TB among AIDS patients (aOR=4.37, P=0.04). Considering all groups (G1-G4) with TB as outcome, female gender was associated with pro-

tection for TB (aOR=0.33, p=0.01). CARD8 rs2043211 gene A/T genotype (aOR=0.07, P=0.03), CARD8 rs2043211 gene Carrier-T (aOR=0.06, P=0.02) and CARD8 rs6509365 gene Carrier-G (aOR=0.13, P=0.03) were associated with protection against IRIS, while CD8 count<500 (aOR=18.23, P=0.01) was associated with increased risk for IRIS among TB-AIDS patients, whereas a borderline association was observed for CARD8 rs6509365 gene A/G genotype (aOR=0.16, P=0.055).

CONCLUSIONS: As of our knowledge, this is the first study demonstrating the association of inflammasome CARD8 variants and IL1- β genotype with protection against IRIS and increased risk for TB, respectively. The functional role of such molecules in TB and IRIS pathogenesis are still to be demonstrated. These results, associated with previous data of HLA and KIR genes polymorphisms in this study group contribute to the discussion of the impact of host genes in TB-AIDS patients and the IRIS outcome.

MOPEA082

Role of active case finding of TB, HIV and HIV TB co-infection case notification amongst infants and children in high risk groups in Zimbabwe

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BACKGROUND: Notification of HIV and TB in children in Zimbabwe has been below expectations and estimations. Collaborative TB/HIV management and case detections are essential to ensure that HIV positive TB children are identified and treated immediately, appropriately, and to reduce the burden in the world. Passive case finding has been the main method in childhood TB and HIV detection and as a result low infant diagnosis have been experienced in Zimbabwe. End TB strategy emphasises on active case finding as a key method in early TB and HIV case detection. Zimbabwe Ministry of health rolled out active case finding amongst high risk groups where HIV and TB and screening was done.

METHODS: A medical team carried out outreach services to communities in the prioritized districts around Zimbabwe from February 2017 to Dec 2018. The process provided access to free TB Screening and HIV testing to high risk groups including children. Two TB screening tools were used to increase sensitivity and these are the symptom screening and digital chest radiography. Presumptive TB patients had a supervised spot sputum specimen collected and examined at the laboratory by XPERT/RIF machine. All patients due for HIV test were offered a test according to the World Health Organization and national HIV testing guidelines.

RESULTS: 6523 (8.18%) children (0-14 years), were screened for TB and 36.30% (n=2386) were TB presumptive. 4.32% (n=82) were detected with TB and started on appropriate treatment. 3.65% (n=78) were new HIV positive cases. 76.54% (n=62) of the TB diagnosed children were HIV positive and they were all new HIV cases. 386 children were HIV positive prior screening and 95.08% (n=367) were already on ART which is above the 90% target. Children 5 -14 years have a higher co-infection rate than infants (0 -4 years).

CONCLUSIONS: HIV positive and HIV TB co-infection are significantly higher in children (0-14) as compared the general population highlighted by the findings of Zimbabwe TB prevalence survey done in 2014. More collaborative efforts should be put in active case findings of high HIV and TB amongst children. More resources should be channeled towards childhood TB and early infant diagnosis.

Co-infection: Viral hepatitis

MOPEA083

HIV reservoir size is not affected neither by HCV coinfection nor by DAAs therapy

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BACKGROUND: A significant impact of HCV on relevant aspects of the pathogenesis of HIV infection such as exhaustion of CD8 T cells, has been recently described (Rallon *et al* Plos One 2017). However, the role of HCV on the HIV reservoir size in HIV/HCV-coinfected patients is an unclear issue. Given that current HCV treatment scenario with DAAs regimens are free of IFN α /RBV, it is possible to test the direct effect of HCV eradication on the HIV reservoir without the immunomodulatory effect of regimens with IFN α /RBV as a confounding variable. Herein, we assessed the impact of HCV eradication on HIV reservoir size in HIV/HCV-coinfected patients treated with DAAs regimens.

METHODS: HIV reservoir size was measured in total CD4 T cells from 50 cART-suppressed chronic HIV-infected patients maintaining undetectable pVL: 25 HIV-monoinfected and 25 HIV/HCV-coinfected patients. Samples prior to the start of treatment with DAAs and at 12 weeks after its completion (sustained virological response -SVR-) were analyzed. Measurement of cell-associated HIV-DNA was conducted by ultrasensitive digital droplet PCR performing a *Rare Sequence Detection* assay. Inter and intra-group comparisons were performed using non-parametric tests (Mann-Whitney U test and Wilcoxon signed-rank test respectively), and the potential effect of different confounding variables was checked by means of a generalized linear model (GLM).

RESULTS: Clinical, demographical, and epidemiological characteristics of patients were well balanced at baseline and no differences were found between the two groups. There were not differences in HIV reservoir size (median[IQR] copies/million cells) at baseline between HIV-monoinfected and HIV/HCV-coinfected subjects (485[229-1605] vs. 348[156-962]; p=0.229, respectively). A GLM confirmed this lack of association between HIV reservoir size and presence of HCV coinfection after adjusting by potential confounding variables (time since HIV diagnosis, time on cART and CD4 counts). HIV reservoir size in HIV/HCV-coinfected patients was not modified (348[156-962] vs. 218[127-1405]; p=0.753) after SVR with DAAs.

CONCLUSIONS: Our results do not support a role for HCV on HIV reservoir size in HIV/HCV-coinfected patients, and show the lack of anti-HIV activity by the anti-HCV regimens with DAAs.

MOPEA084

Establishment of anti-hepatitis C virus IgG avidity test for dried serum/plasma spots

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BACKGROUND: HCV-antibody (AB) detection from dried serum or plasma spots (DS/PS) is established for surveillance purposes. However, information on recency of infection helps to identify current transmission in target population for effective disease control.

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METHODS: HCV AB-avidity index (AI) was determined using Monalisa Anti-HCV ELISA (BioRad) and a modified protocol from Patel *et al* 2016. Based on a longitudinal data, a panel of DS/PS comprising acute (< 26 weeks, n=32) and chronic infections (>104 weeks, n=133) was used to analyze the temporal changes of AIs over time. A sub-panel of longitudinal DS/PS from 18 individuals [all genotypes; n=66] was taken to estimate the Mean Duration of Recent Infection (MDRI) using mixed-effects logistic regression analysis. The False Recent Rate (FRR) was calculated from DS/PS >104 weeks for genotype 1 (n=120), non-genotype 1 (n=13), and from a second panel with DS/PS prepared from resolved infections (≥ 1 year since last positive; n=32).

RESULTS: Among the 217 HCV infected DS/PS tested, 169 (77.9%) were genotype 1 and 48 (22.1%) were non-genotype 1. The median AI (%) < 26 weeks post infection [Genotype 1 (8.4; IQR: 5.6-22) and non-genotype 1 (9.3; IQR: 7.4-12.5)] was shown to increase progressively until >104 weeks [Genotype 1 (68.5; IQR: 56.1-82.6) and non-genotype 1 (62.3; IQR: 29.7-90)]. For all genotypes, at AI cut-off 40%, the MDRI was 364 days (95%CI: 223-485).

For chronic infection of >104 weeks, the assay had a FRR of 13.5% (95%CI: 8.2-20.5) for all genotypes, 11.6% (95%CI: 6.5-18.8) for genotype 1, and 30.8% (95%CI: 9.1-61.4) for non-genotype 1 infections. For resolved infections, the FRR was 53.1% (95%CI: 35.8-70.4).

CONCLUSIONS: For all genotypes, stronger antibody avidity is associated with the days post infection. A larger sample size is required to obtain MDRI and to confirm FRR for non-genotype 1 infections. However, as shown by FRR for genotype 1 infection, the assay performs well for the most prevalent genotype in Germany and is a useful tool to identify recent infections from DS/PS of HCV-viremic patients.

MOPEA085

HIV infection of hepatitis B virus (HBV)-infected hepatocytes increases CXCL10 production and is associated with liver fibrosis in HIV-HBV co-infected individuals

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BACKGROUND: In HIV-hepatitis B virus (HBV) co-infected individuals, adverse liver outcomes including liver fibrosis occur at higher frequency than in HBV-mono-infected individuals, even following antiretroviral therapy (ART) that suppresses both HIV and HBV replication.

METHODS: In a group of HIV-HBV coinfecting individuals naïve to ART, we investigated associations between liver fibrosis and plasma/liver markers of viral infection, microbial translocation and immune activation. Liver biopsies and plasma were collected from HIV-HBV co-infected individuals (n=39) living in Bangkok and naïve to ART.

RESULTS: Intrahepatic CXCL10, CXCR3 and HIV DNA were statistically significantly associated with liver fibrosis (transient elastography (kPa) and liver biopsy (Metavir score), by univariate and logistic regression analyses, both adjusted for CD4 count. Intrahepatic CXCL10 by immunohistochemistry was found in hepatocytes associated with inflammatory liver infiltrates in portal tracts. In an *in vitro* model, infecting an HBV-infected

hepatocyte cell line with HIV followed by interferon- γ stimulation resulted in a significant increase in CXCL10 production that was directly related to the multiplicity of HIV infection.

CONCLUSIONS: CXCL10 is an important factor in HIV-HBV coinfection and may explain the accelerated liver disease progression seen. Further investigation in individuals on ART and the role of CXCL10 as a target for treatment of liver disease should be pursued.

MOPEA086

Immune activation markers associated with levels and diversity of intact HIV proviruses during HIV-HBV co-infection

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BACKGROUND: HIV-Hepatitis B virus (HBV) co-infected individuals experience higher rates of liver disease than mono-infected individuals. Previous studies have found that HIV co-infection can impact the natural course of HBV infection, but the reverse has not been confirmed. We characterised the intact proviruses in HIV-HBV co-infected individuals prior to ART initiation and determined their association with clinical parameters.

METHODS: HIV-HBV co-infected individuals and HIV mono-infected individuals naïve to ART were recruited in Bangkok Thailand as part of a prospective observational cohort study. HIV proviruses were sequenced from peripheral blood CD4+ T-cells using full-length individual proviral sequencing. Employing primers adapted for specificity to HIV subtype AE, 92% of the genome was sequenced using Next Generation Sequencing. Genetically intact HIV proviruses were identified as those lacking inversions, stop codons/hypermutation, insertions, deletions or frameshifts.

RESULTS: A total of 650 HIV proviruses were sequenced and analysed from 19 HIV-HBV co-infected individuals, and 165 proviruses from 4 HIV mono-infected individuals. Both the co-infected and mono-infected individuals had high proportions of genetically intact provirus (range = 7-80% and 23-59% respectively). Intact sequences from these cohorts had genetic diversity ranging 0.2-2% and 0.3-1.6% for the co-infected and mono-infected cohorts respectively, but mean diversity between the two cohorts did not reach significance (p=0.19). While the majority of participants had genetically unique HIV proviruses, one co-infected participant had six genetically identical and intact sequences. No correlation was found between HBV infection parameters and the level or diversity of intact HIV proviruses in the co-infected individuals. However, higher levels of the activation markers CXCL10 and LPS were associated with increases in the proportion of genetically intact HIV proviruses (p=0.0098 and p=0.03 respectively), while soluble CD14 was associated with increases in genetic diversity of these intact proviruses (p=0.03).

CONCLUSIONS: Genetically unique and intact HIV proviral sequences were commonly identified in untreated HIV-HBV co-infected and HIV mono-infected participants. The frequency of intact virus was far higher than previous studies of individuals on suppressive ART. Activation markers were associated with the proportion and genetic diversity of intact HIV proviruses in HIV-HBV co-infected participants, however, these markers were not assessed in the mono-infected participants.

MOPEA087

Low-level detection of HIV DNA in the liver in HIV-HBV coinfecting individuals on HBV-active ART

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BACKGROUND: HIV can infect multiple cells in the liver including hepatocytes, Kupffer cells, stellate cells and intrahepatic T cells. HBV also infects hepatocytes and can cause intrahepatic inflammation through multiple mechanisms. We hypothesised that in HIV/HBV co-infected individuals, the liver is a persistent reservoir on antiretroviral therapy (ART) and the frequency of HIV-infected cells was dependent on HBV replication.

METHODS: Blood and matched liver biopsies were collected in a prospective observational cohort study of HIV/HBV coinfecting participants in Bangkok, Thailand prior to initiating HBV-active ART (n=39) and after an average of 3 years on HBV-active ART (n=19). Cell-associated (CA) HIV RNA and DNA, relaxed circular and covalently closed circular HBV DNA were quantified by qPCR. Liver biopsies and sorted CD4+ T cells from blood were examined. HIV RNA in liver biopsies prior to ART were examined by RNAScope.

RESULTS: At enrolment, participants had a median CD4 nadir of 320 (range 20-1197) cells/ul, were 90% male, and 64% HBeAg+. Prior to ART HIV DNA and RNA were detected in liver biopsies in 63% and 45% of participants, respectively. Similar frequencies of detection were found using RNAScope. The median copy number of HIV DNA and RNA was 1,679 copies/10⁶ cells and 112 copies/10⁶ 18s, respectively. There was a significant association between HIV DNA and RNA in liver (p< 0.0001) and between liver and plasma HIV RNA (p=0.0320). We found no relationship between intrahepatic HIV and CD4 count or any HBV parameter. On-ART, in liver biopsies CA HIV RNA was not detected and HIV DNA was detected only at low, non-quantifiable levels (< 1 copy per 18,474 to 57,975 cell equivalents) in 42% of participants. HIV DNA was detected in all samples from blood and HIV RNA was detected in most samples from blood, both pre-and on-ART.

CONCLUSIONS: Following HBV-active ART, while HIV clearly persisted in circulating CD4+ T cells, HIV was rarely detected in the liver. Infrequent detection of HIV DNA in liver may be a result of lower sample input or the use of non-sorted cells from liver biopsies. Further work is needed to understand which cells in the liver harbor HIV DNA on ART.

MOPEA088

Long-term modification of the HIV reservoir after HCV clearance with direct-acting antivirals (DAAs): The potential role of Ribavirin

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BACKGROUND: The effect of direct acting antivirals (DAAs) and ribavirin for hepatitis C virus (HCV) treatment on the persistence of HIV in HIV/HCV-coinfecting individuals on antiretroviral therapy (ART) is not completely understood.

METHODS: In a prospective longitudinal observational study, HIV/HCV-coinfecting individuals on suppressive cART (n=19) received sofosbuvir/daclatasvir alone (n=12) or with ribavirin (n=7). All achieved sustained virological response (SVR). Blood samples were obtained before HCV treatment (baseline sample, BSL), at end-of-treatment (EOT) and at 12 month after EOT (12MPT). Cell-associated (CA)-HIV DNA (total, integrated, 2LTR) and unspliced (US) and multiply spliced (MS) RNA were quantified by real-time PCR. Data was analyzed using non-parametric statistics.

RESULTS: Out of the enrolled subjects, 79% were male (mean age=49±5.9 years old). Median (IQR) time from HIV and HCV diagnosis were 16.3 (12-19.5) and 13.5 (9.5-17.5) years, respectively. Median (IQR) CD4+ T-cell count at enrollment was 291 (231-776) cells/μL. There were no statistically significant differences in CA-HIV DNA (total, integrated or 2LTR), for the three time points evaluated. Conversely, CA-US HIV RNA and the US/MS ratio were significantly higher in CD4+ T-cells collected at 12MPT compared to BSL (p=0.02 and p=0.03, respectively). In subjects not receiving ribavirin, statistically significant increments in CA US-RNA were observed at EOT and at 12MPT (both compared to BSL; p=0.0313 and p=0.0313, respectively). No such significant increments were observed in subjects who received ribavirin.

CONCLUSIONS: Administration of DAAs alters the dynamics of HIV persistence in coinfecting subjects with an increase in basal HIV transcription that persisted for 12 months after HCV clearance, particularly in those subjects not receiving ribavirin within their anti-HCV regimen. These differences between groups might provide insights into the mechanism controlling HIV expression.

MOPEA089

Implication and detection of hepatitis B virus immune escape mutants among HIV-infected population group in Southwestern Nigeria

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BACKGROUND: Hepatitis B virus (HBV) infection is vaccine preventable. Circulation of immune escape mutants (IEMs) has been documented. This poses a risk on the continual success of HBV prevention and control. Therefore this study was designed to determine the possible circulation of IEM among HIV infected dwellers in southwestern Nigeria.

METHODS: Blood samples collected from consenting 133 males and 305 female HIV infected participants in Ibadan were tested for HBsAg, HBeAg, HBcIgM, HBcTotal and HBsAb by ELISA technique. Samples positive for HBsAg were further analyzed for HBVDNA by amplifying and sequencing the S gene. Isolates were genotyped and subtyped based on amino acid residues at position 122, 127, 134, 160 of the S gene.

RESULTS: Of the 438 HIV infected subjects tested 31 (71%) were positive for HBsAg, 2(6.5%) of which were HBeAg positive. Ninety-nine (22.8%) had detectable HBsAb, 3(0.7%) were positive for HBcIgM and 195 (44.5%)

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were HBcTotal positive. HBVDNA was amplified and sequenced in 27 out of 31 and 4 could not be amplified due to low titres. After sequencing, 9(33.3%) were not exploitable due to the presence of multiple peaks. Of the 18 exploitable isolates, only 15 showed significant similarity to HBV S-gene. Eleven of the 15 isolates were subtyped as ayw4 while others could not due to substitution at s122p. Phylogram showed that the 11 isolates were genotype E. Two of the 4 isolates with R122Q/P substitutions also belonged to genotype E while the other 2 which were >11% divergent from the reference genotype E sequence clustered with an isolate previously described as an Immune Escape Mutant.

CONCLUSIONS: This study identified high endemicity of HBV among HIV co-infection, presence of markers of infection even in non detectable HBsAg levels and circulation of genotype E ayw4 and vaccine mutants in southwestern Nigeria. It therefore emphasizes the risk of development of an indigenous coinfecting population that may not be protected by the current vaccine.

Co-infection: Other

MOPEA090

HTLV-1 and HIV-2 co-infections in Cabo Verde

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BACKGROUND: Cabo Verde is an archipelago located at West Africa facing Senegal and Guinea-Bissau. The Human Immunodeficiency Virus types 1 and 2 co-circulate with an overall prevalence of 0.8% in the country, while the occurrence of the Human T-lymphotropic virus type 1 (HTLV-1) is unknown. Due to its strategic location (equidistant to Africa, Europe, and the Americas), Cabo Verde has served as a busy sea and air connection, with large business, tourism and political relationships with these continents, playing, therefore, an important role in infectious disease movement. Considering the impact of HIV/HTLV co-infections and the close relationship between others countries with high prevalence of HTLV infection, we conducted an HTLV serological survey among HIV-positive individuals living in the Cabo Verde islands.

METHODS: Blood samples and socio-demographic and clinical laboratory data were obtained from HIV patients as part of a large national cross-sectional study (De Pina-Araujo et al., 2014). One-hundred three of these patients were tested for HTLV-1 using the GOLD ELISA REM HTLV-I/II immunoassay. Reactive samples were submitted to PCR of the tax gene to determine the HTLV type, and phylogenetic analysis of the LTR region was used to determine the HTLV-1 subtypes.

RESULTS: Two samples were HTLV positive, resulting in an overall anti-HTLV-1/2 seroprevalence of 1.9%. These seropositive patients were confirmed further to be infected with the HTLV-1aD subtype (Zanella et al., 2016). They are females with 45 and 55 years old. One is from Guinea-Bissau and the other of unknown nationality, but both resided on Santiago Island at the time of sampling and were asymptomatic to the major HTLV-related diseases.

CONCLUSIONS: Here, we report the prevalence of HTLV-1 infection in HIV seropositive individuals in a non-continental West African country where information about the prevalence of HTLV infection is unavailable. HIV-2 and HTLV-1aD infections are prevalent in Senegal and Guinea-Bissau, which are countries that maintain strong ties with Cabo Verde. The occurrence of these co-infections represents additional challenges to the country's public health policies. The close relationship between Cape Verde and other countries in West Africa and Europe reflects the importance of surveillance and the possibility of HTLV co-circulating between these two continents.

MOPEA091

Immunosenescence, thymic output deficiency and mobilization profile of T cell Vβ repertoire are related to relapses of visceral leishmaniasis in HIV-coinfected patients

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BACKGROUND: Recently, we demonstrated that visceral leishmaniasis/HIV coinfecting patients (VL/HIV) with several episodes of VL (R-relapsing) presented a lower immune reconstitution and higher cellular activation degree in relation to non-relapsing VL/HIV patients (NR). This occurred even after 12 months post-treatment (mpt), controlled viral and parasite loads and under anti-*Leishmania* secondary prophylaxis. Although the activation status differed between R- and NR-VL/HIV, the percentages of senescent T-cells were equally elevated. The immunosenescence is not defined only phenotypically, but also by other factors that compromise qualitatively the immune response. Then, our aim was to evaluate the impact of cellular activation on the thymic functionality through the recent thymic emigrants (RTE) levels, as well the diversity of T-cell Vβ repertoire in R- and NR-VL/HIV.

METHODS: For this, 18 VL/HIV patients (R=11;NR=7) were evaluated from the active phase up to 12mpt. HIV only, LV only and healthy controls were included. To evaluate the RTE, DNA was extracted from PBMC for TCR rearrangement excision circles (TREC) quantification by qPCR. The TCRVβ repertoire was evaluated ex vivo by flow cytometry.

RESULTS: VL/HIV patients showed TREC/10⁶PBMC levels lower than controls during all follow-up. However, VL/HIV-NR presented an increase in the number of TREC/10⁶PBMC at 10mpt compared to R- (p< 0.01). R-VL/HIV maintained lower levels than HIV controls at all follow-up. In addition, was observed an altered mobilization profile of the TCRVβ families in VL/HIV patients when compared to controls (p< 0.05), either for higher or lower expression and independent of the follow-up phase. R-VL/HIV presented lower percentages of Vβ3/Vβ9/Vβ5.1/Vβ18 and higher expression of Vβ8/Vβ23/Vβ5.2 on the CD8 and CD4 T-cells compared to NR-VL/HIV at active phase of VL. Interestingly, R-VL/HIV presented a restricted repertoire on CD8 T-cells through the follow up. Moreover, by Luminex® assay, NR-VL/HIV reduced the plasmatic cytokine levels after the 6mpt, while R- maintained the inflammatory status during the follow-up.

CONCLUSIONS: These results suggest that the elevated immunosenescence degree associated to thymic output impairment may favor VL relapses in VL/HIV patients. Also, a TCRVβ repertoire more restricted or more mobilized can point the role of some Vβ families in parasite control or susceptibility to recurrence of VL.

MOPEA092

HIV-1 infection in astrocytes raises intracellular ROS improving *Trypanosoma cruzi* multiplication

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BACKGROUND: *Trypanosoma cruzi* (Tc) is an intracellular parasite that causes Chagas disease and may compromise seriously the central nervous system (CNS), mainly in immunosuppressed individuals as occurs in the HIV coinfection. Astrocytes play a crucial role in maintaining the environment of healthy neurons; however, they can harbor both, HIV and Tc. HIV infection triggers pronounced reactive oxidative stress (ROS) that if

increased to levels which cannot be neutralized by the defense mechanisms, they damage biological molecules, alter their functions, and also act as signaling molecules thus generating a spectrum of pathologies. Paradoxically and supported in recent evidence, it suggests that parasite growth is stimulated in oxidative environments. This type of interaction could worst manifestations of Chagas disease observed in immunocompetent patients.

METHODS: Cultured normal human astrocytes (NHA, Lonza) were infected with Tc (K98 clone modified to express GFP) and HIV (NL4.3). Tc infection and multiplication were evaluated by flow cytometry analysis at 3 days-post-exposition (dpe) and real time PCR to quantify parasite DNA. Cell death was measured by Annexin V/7-AAD, and propidium iodide detection by FACS. Oxidative stress on astrocytes was induced adding tert-Butylhydroperoxide (tBH; 50 μ M), while ROS was quantified by FACS using MitoSOX; MitoTEMPO and ascorbic acid (AA) were used as ROS-scavengers.

RESULTS: Trypanosoma cruzi infection was significantly higher in astrocytes previously infected by HIV (Tc 8.2% \pm 0.09 vs. HIV/Tc 20.45% \pm 1.20), as well as its multiplication (Tc 505.5 \pm 7.8 vs. HIV/Tc 706.5 \pm 12 measured as median fluorescence intensity). When ROS scavengers were added, a detrimental effect was observed on Tc infectivity [HIV/Tc + MitoSOX or AA 10.08% \pm 0.67 vs. HIV/Tc 40.75% \pm 2.90]. In contrast, Tc infection of astrocytes was significantly improved under pro-oxidant condition with tBH (Tc 3.9% \pm 0.27 vs. Tc+tBH 19.35% \pm 0.07). In line, the level of Tc DNA was 5-fold higher when HIV coexists than on its absence.

CONCLUSIONS: Increased level of intracellular ROS prompted by HIV on astrocytes enhances both Trypanosoma cruzi infection and multiplication. Such exploitation by the parasite may improve cell viability. This interaction between HIV and Tc could propitiate a worsened course of the Chagas disease in the CNS.

Co-morbidities: Non-communicable diseases

MOPEA093

Malnutrition reduces production of IFN- γ among HIV-infected adults initiating ART in Uganda

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BACKGROUND: Malnutrition affects up to 25% of HIV infected adults in sub-Saharan Africa and leads to reduction in CD4 cells counts, but its effects on cytokine production remains unknown. We describe the effect of malnutrition on production of interferon-gamma (IFN- γ) among malnourished HIV infected adults initiating antiretroviral therapy (ART), and the effect of ART and nutritional supplementation on its production.

METHODS: We enrolled ART-naïve well-nourished (WN) malnourished (MAM), severely malnourished (SAM) and malnourished ART-experienced (MAM-ART) HIV infected adults in Entebbe, Uganda. The MAM and MAM-ART were randomized to either receive nutritional supplementation and ART (intervention arm) or ART and nutritional counselling only (control arm). The WN participants were given ART only, while the SAM were all given nutritional supplementation and ART. Nutritional supplement used was plumpy nut, a ready to use therapeutic food (RUTF). Each participants received 2 sachets of RUTF daily equivalent to 1000 Kcal of energy. Participants were followed up 12 weeks. Peripheral blood mononuclear cells were isolated at baseline and follow up. IFN- γ production by CD4⁺ T cells, CD8⁺ T cells and V δ 1 T cells was measured by flow cytometry. Flow cytometric data was analyzed using flow Jo and statistical analysis was done using Mann-Whitney tests.

RESULTS: 25 WN, 32 MAM, 18 SAM and 27 MAM-ART participants were enrolled. In the MAM, 14 were randomized to RUTF and 18 to no RUTF. Average age was 36.5 years. At baseline, the WN had a 3 fold more production of IFN- γ compared to the MAM ($P < 0.01$) and a 2 fold more than the SAM. There were no significant differences in production of IFN- γ between the ART-naïve and ART-experienced malnourished participants, and RUTF did not have an effect on the production of IFN- γ among malnourished participants.

CONCLUSIONS: Malnutrition reduced production of IFN- γ among HIV infected ART naïve participants, which effect was not be reversed by ART and nutritional supplementation.

Since IFN- γ is one of the key cytokines involved in immunity against intracellular organisms, an increase of infections like tuberculosis among malnourished HIV infected patients may be due to the reduced production of this cytokine.

MOPEA094

Evaluating mechanisms of antiretroviral-mediated cardiovascular risk associated with platelet activation

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BACKGROUND: Increased cardiovascular risk is associated with specific classes of HIV antiretrovirals (ARVs) in some cohort studies. In particular, abacavir sulphate (ABC) has been reported to reversibly increase myocardial infarction risk. The underlying mechanism remains unclear but may stem from altered activation of platelets, endothelial cells or a combination of both. It is also important to consider whether newer ARVs (i.e. tenofovir alafenamide [TAF]) also influence cardiovascular risk. Guanosine and adenosine analogues such as ABC and TAF may hypothetically alter platelet function by modulating endogenous inhibitory nitric oxide (NO/cGMP) and prostaglandin (PGI₂/cAMP) signalling pathways.

METHODS: ADP- and thrombin-evoked thrombus formation *in vivo* was assessed using mice pre-treated with ABC or TAF. *In vitro* studies were conducted using platelets isolated from mice or ARV naïve HIV-negative volunteers. Real-time expression of platelet activation markers (integrin activation and granule release) and aggregation were performed following exposure to plasma C_{max} levels of ARVs. The impact of ARVs upon NO- and PGI₂-mediated inhibition of platelet function was assessed by aggregometry.

RESULTS: ABC, but not TAF, increased *in vivo* thrombus formation in response to ADP and thrombin (Table 1). The mechanism for increased platelet activation was further assessed *in vitro*. ABC elevated real-time activation of mouse platelet integrin $\alpha_{IIb}\beta_3$ and granule release ($P < 0.05$). Human platelets displayed a similar phenotype with ABC increasing granule release ($P < 0.05$). ABC interrupted NO-mediated inhibition of platelet aggregation, increasing aggregation responses by 15.3 \pm 6.5% ($P < 0.05$), whilst TAF had no overall effect. Neither ARV altered PGI₂-mediated inhibition ($P > 0.05$).

CONCLUSIONS: Elevated ABC-associated cardiovascular risk may be explained by enhanced platelet activation. We demonstrate ABC-mediated increases in thrombus formation *in vivo* and platelet activation *in vitro*, whereas TAF had no overall effect. Furthermore, we identified that ABC interrupted NO-mediated signalling in platelets, enhancing aggregation responses, suggesting interconnecting roles for the vascular endothelium and platelets in driving cardiovascular risk.

ARV	Max Aggregation (Change relative to control)		Area Under the Curve (Change relative to Control)	
	ABC	TAF	ABC	TAF
ADP (0.4mg/Kg)	+2.9 \pm 1.3% (P=0.07)	-0.4 \pm 1.0% (P=0.68)	+160.0 \pm 45.8 (P=0.02)	+0.1 \pm 35.1 (P=0.58)
Thrombin (65 I.U./Kg)	+7.3 \pm 2.2% (P=0.02)	+2.5 \pm 1.3% (P=0.08)	+190.6 \pm 75.3% (P=0.05)	+60.0 \pm 60.0 (P=0.47)

[Table1: Impact of ARVs on thrombus formation *in vivo*]

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Novel assays to measure immune responses

MOPEA095

Circulating mitochondrial DNA is higher in acute than in chronic HIV infection and correlates with plasma levels of LPS-binding protein but not of 16S rRNA bacterial DNA

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BACKGROUND: Microbial translocation likely plays a role in triggering and maintaining immune activation during acute and chronic HIV infection, but how quantitative changes in microbial translocation take place during different stages of infection has been poorly investigated. Thus, by using an original digital droplet PCR method, we quantified bacterial DNA in plasma from HIV+ patients, and compared the results with those obtained by other methods used for quantify microbial translocation or immune activation, and with circulating mitochondrial (mt) DNA.

METHODS: We analysed plasma samples from 19 HIV+ patients: 11 with acute HIV infection (AHI, up to two months after infection), and 8 patients who underwent CD4-guided structured treatment interruption (STI) at the moment of treatment interruption (T0), after two months (T2) and one year after the resumption of therapy (TR). Plasma from 10 healthy subjects was analyzed as control (CTR). Soluble CD14 (sCD14) and LPS-binding protein (LBP) levels were quantified in plasma by ELISA, while DNA was extracted from plasma for the quantification of bacterial 16S rRNA gene (by a Bio-Rad QX200 ddPCR™ System) and of mtDNA (by real-time PCR). **RESULTS:** Plasma concentration of bacterial DNA and sCD14 did not change among groups. LBP plasma levels were higher in AHI compared to STI T0 patients and to CTR ($p < 0.05$). STI patients at T2 displayed higher LBP levels respect to T0 ($p < 0.05$). MtDNA levels were higher in AHI group, compared to all STI groups ($p < 0.05$). No correlations were found between the amount of bacterial DNA and sCD14, nor with LBP or mtDNA levels. We found a positive correlation between the percentage of CD8+ T cells and bacterial DNA levels ($p < 0.05$) in STI. Considering all HIV+ patients, LBP was positively correlated with % and absolute count of CD8+ T cells ($p < 0.05$) and with mtDNA ($p < 0.01$).

CONCLUSIONS: Circulating mitochondrial DNA was higher in acute than in chronic HIV infection and correlated with plasmatic LPS-binding protein. Thus, beside a new use of ddPCR for the absolute detection of bacterial plasma DNA levels, the markers we have investigated could be useful for a better comprehension of microbial translocation and immune activation.

Acute and early infection

MOPEB112

Baseline CD4 count as indicator of success of Test and Treat campaign: Data from the Thai Red Cross Anonymous Clinic, Bangkok, Thailand

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BACKGROUND: As a part of global commitment to end AIDS, Thailand has used the strategy of Test and Treat since 2014 with particular campaign among men who have sex with men (MSM) and transgender women (TGW). We examine the trend of baseline CD4 count of those tested HIV-positive at The Thai Red Cross Anonymous Clinic (TRC-AC) in Bangkok from 2014 to 2018, as an indicator for success of the Test and Treat strategy.

METHODS: First CD4 within 7 days of all individuals tested HIV-positive at TRC-AC during January 1, 2014 to November 30, 2018 were analyzed according to risk of exposure: MSM, TGW, heterosexual men (HSM) and heterosexual women (HSW). Chi-square test was used to determine statistical difference of HIV prevalence with time. Nonparametric test for trend was used to assess the change of baseline CD4 overtime.

RESULTS: HIV infection was identified in 12,802 individuals out of 135,633 clients (9.4%). HIV prevalence overall has been significantly decreasing over time ($p < 0.001$) from 9.1% (2,676/29,194) in 2014 to 7.4% (2,620/35,007), 6.8% (2,429/35,508), 6.8% (2,688/39,115) and 6.6% (2,412/36,681) in 2015, 2016, 2017 and 2018, respectively. CD4 count around the time of HIV diagnosis was performed in 9,880 (77.2%) HIV positive individuals. As a group, MSM and TGW had significantly higher baseline median (IQR) CD4 than HSM, i.e., 301 cells/cu.mm (185-429) in MSM and 327 cells/cu.mm (204-470) in TGW as compared to 277 cells/cu.mm (151-409) in HSM ($p < 0.001$ and $p = 0.03$, respectively). However, there was no trend of increasing baseline CD4 count in any group from 2014 to 2018 ($p = 0.28$).

CONCLUSIONS: Our results indicate that HIV prevalence among all clients of TRC-AC is decreasing with time from 2014 to 2018 which reflects the success of Test and Treat strategy in preventing new infections which started since 2014. Higher baseline CD4 count among MSM and TGW also indicates the success of enhanced campaign among these 2 groups. However, there was no trend of increasing baseline CD4 count of those tested positive which underlines the need for earlier diagnosis.

MOPEB113

Rapid virological suppression at Primary HIV is not associated with long term immune recovery: Results from the HEATHER cohort

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BACKGROUND: Antiretroviral therapy (ART) at primary HIV infection (PHI) is associated with immunological recovery and low viral reservoir. Guidelines are moving to rapid ART initiation but it is not known whether speed of virological suppression at PHI is associated with long term immunological benefit. We examined a cohort of prospectively recruited individuals who started ART at PHI.

METHODS: Participants with PHI (HIV seroconversion in preceding 6 months, p24 antigen positive/antibody negative or an "incident" recent incidence test) (The HEATHER cohort), who commenced ART within 3 months of diagnosis for at least 2 years, were included in analysis. Factors associated with VL < 50 at 12-weeks of ART and immunological recovery (CD4 > 900 or CD4:8 ratio > 1) were explored using multivariate logistic regression.

RESULTS: Of 157 individuals, 99% were male, mean age 36 (SD 9.7) years. 56% commenced a protease inhibitor (PI) based regimen, 24% an integrase inhibitor (INI) based regimen and 20% a non-nucleoside-based regimen. Median (interquartile range: IQR) time to ART initiation and time on ART were 45 (27, 68.5) days and 3.1 (2.4, 3.9) years respectively. Median baseline HIV RNA was 179 010 (SD 25406 to 1.4million) copies/ml and CD4 533 (225.1) cells/mm³. Median (IQR) time to virological suppression was 6.19 (3.7, 11.5) months. 20 (13%) were undetectable by 12 weeks on ART. Initiation of an INI based regimen was associated with VL < 50 at 12 weeks (unadjusted odds ratio: OR [95% confidence interval: CI] 4.88 [1.54, 15.4] $p = 0.003$). At baseline 16.5% had CD4 > 900 or CD4:8 ratio > 1, at 2 years this had increased to 71% and by 4 years 91%.

There was no association with VL < 50 at 12 weeks and immunological recovery ($p > 0.05$). A high baseline CD4/CD8 ratio and CD4 count (adjusted OR [95% CI] 1.23 [1.04, 1.45] $p = 0.015$ per 0.1 increase and 1.21 [1.07, 1.37] per 50 cell/mm³ increase $p = 0.002$ respectively) were associated with immunological control.

CONCLUSIONS: Rapid virological suppression at PHI was associated with INI based regimens. Although this may reduce onward transmission risk, it was not associated with long term immunological recovery.

Morbidity, mortality and life expectancy in clinical research

MOPEB114

Mortality of HIV infection by age, period, disease stage, care cascade and antiretroviral therapy status

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BACKGROUND: Evaluation of intervention efficacy on improving HIV early diagnosis and treatment depends on the relative mortality across disease stages and care cascade, for which a comprehensive profile is lacking.

METHODS: We aimed to estimate HIV mortality rate across age groups, periods, disease stages, care cascade and ART status using Taiwan population-based HIV/AIDS registry database, focusing on men who were infected via sexual behavior. Mortality associated with patients unaware of infection was estimated by deducting excess suicide rate of HIV-negative men from the mortality rate of diagnosed but untreated patients of same age and CD4 category. Standardized mortality ratio (SMR) was calculated to compare the mortality of each scenario to the general population.

RESULTS: There were 237,505 person-years of follow-up and 5,686 death cases in the analysis. In general, younger patients with early diagnosis and rapid initiation of ART had the lowest mortality rate. However, for younger age group with CD4 >500 in the recent decade, mortality of those receiving ART are slightly higher than those unaware of infection due to suicide. In the SMR analysis, AIDS patients without ART had the highest SMR in recent periods among younger age group. Improvement of ART efficacy can be demonstrated by the decrease of SMR over time periods. Our estimated mortality rates were highly consistent with large cohort studies such as HIV-CAUSAL Collaboration and NA-ACORED Investigators, but were more finely structured.

CONCLUSIONS: Our study provided crucial mortality parameters for mathematical modeling studies, disease burden research and cost-effectiveness analyses of HIV program and policy.

15-44 year-old male					45-64 year-old male					
Period	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS
1986-1997	Unaware	0.53	1.45	3.50	100.00	Unaware	3.32	8.82	21.19	142.25
	Test/Care	0.55	1.46	3.52	100.00	Test/Care	3.32	8.82	21.19	142.25
	ART	0.42	0.81	1.34	15.90	ART	1.39	2.65	4.39	30.50
	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS
1998-2004	Unaware	0.46	1.25	3.03	99.53	Unaware	1.65	4.40	10.57	131.82
	Test/Care	0.48	1.27	3.05	99.53	Test/Care	1.68	4.48	10.76	131.82
	ART	0.37	0.70	1.16	12.24	ART	1.27	2.42	4.02	24.83
	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS
2005-2014	Unaware	0.16	0.59	1.56	98.04	Unaware	1.12	3.09	7.52	128.54
	Test/Care	0.26	0.69	1.65	98.13	Test/Care	1.19	3.15	7.58	128.63
	ART	0.20	0.38	0.63	3.52	ART	0.91	1.73	2.88	9.28
	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS	1/100PY	CD4 >500	CD4 500-200	CD4 <200	AIDS

[Mortality rate (1/100PY) of HIV infection, by age, period, disease stage, cascade, and ART status]

15-44 year-old male					45-64 year-old male					
Period	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS
1986-1997	Unaware	2.51	6.88	16.60	474.16	Unaware	3.15	8.37	20.11	134.97
	Test/Care	2.61	6.92	16.69	474.16	Test/Care	3.15	8.37	20.11	134.97
	ART	1.99	3.84	6.35	75.39	ART	1.32	2.51	4.17	28.94
	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS
1998-2004	Unaware	2.44	6.64	16.09	528.38	Unaware	1.88	5.00	12.02	149.89
	Test/Care	2.55	6.74	16.19	528.38	Test/Care	1.91	5.09	12.24	149.89
	ART	1.96	3.72	6.16	64.98	ART	1.44	2.75	4.57	28.23
	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS
2005-2014	Unaware	0.97	3.59	9.49	596.63	Unaware	2.08	5.55	13.34	166.32
	Test/Care	1.58	4.20	10.04	597.18	Test/Care	2.12	5.65	13.58	166.32
	ART	1.22	2.31	3.83	21.42	ART	1.60	3.05	5.07	31.33
	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS	SMR	CD4 >500	CD4 500-200	CD4 <200	AIDS

[Standardized mortality ratio of HIV infection relative to general population]

Determinants of HIV progression

MOPEB115

Determinants of sub-optimal immune response after antiretroviral therapy initiation in HIV-1 infection

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BACKGROUND: Suboptimal immune recovery (SIR) is commonly seen among treated HIV-infected individuals with suppressed viremia. We studied the prevalence of SIR and its associated factors including immune characteristics among HIV-infected Thais.

METHODS: Treatment naive participants with pre-ART CD4 < 200 cells/mm³ and suppressed HIV viremia (HIV-RNA level < 400 copies/mL) after cART initiation were retrospectively recruited from a Thai cohort. SIR was defined by CD4+ T cell count recovery < 200 cells/mm³ after ART initiation. A case-control sub-study matching age, gender and nadir CD4 cell count was conducted to compare the immunological characteristics between cases (CD4 < 200 cells/mm³) and controls (CD4 ≥ 200 cells/mm³). Serum biomarkers of stem cells function (interleukin-7, IL-7) and microbial translocation (soluble CD14, sCD14), cytomegalovirus (CMV) titers, baseline hemoglobin (Hb) levels, hepatitis co-infections, and T-cell subsets were compared.

RESULTS: A total of 375 participants after three years of ART initiation were recruited in the analysis. Prevalence of SIR were 39.73%, 19.7% and 7.73% at year 1, 2 and 3 after starting cART, respectively. At year 3 of ART initiation, pre-ART CD4 count ≤100 cells/mm³ (aOR, 9.92, 95% CI, 3.10-31.73, p< 0.001) was significantly associated with SIR in the multivariate analysis. In the matched case-control study, IL-7, sCD14, baseline Hb and CMV titers were not significantly different among SIR participants at year one. However, at year 3 of cART, higher prevalence of HCV co-infection (18.75% vs. 0%, p< 0.05), lower sCD14 levels (median, 6.23 vs. 6.27 log₁₀ pg/mL, p=0.04), CD8 cell count (median, 631 vs. 902, p< 0.001) and CD4/CD8 ratio (median, 0.28 vs. 0.51, p< 0.001) were found in SIR participants, compared to those who had CD4 ≥200 cells/mm³. Analysis of T-cell subsets showed significant higher activated CD8+ T-cell markers (PD-1 expression) among participants with CD4 < 200 cells/mm³ after three years of cART.

CONCLUSIONS: Nearly 10% of study participants who had achieved virological suppression failed to recover CD4 cell count to ≥200 cells/mm³ after 3 years of ART initiation and associated with very low pre-ART CD4 cell counts (< 100 cells/mm³). The long-term outcomes of SIR participants need to be further explored.

MOPEB116

Delay in the attention of virological failure and its impact on mortality in a country with high levels of pretreatment HIV drug resistance

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BACKGROUND: Since 2015, Mexico has responded the WHO call to address the increase on pretreatment HIV-drug resistance (PDR), including two WHO surveys in the last four years to guide Mexico's public health response.

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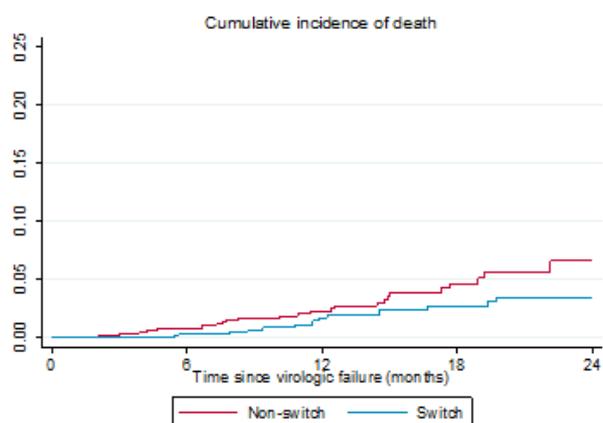
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Given the documented high PDR prevalence in Mexico and its heterogeneity in different regions of the country, we aimed to analyze the delay of antiretroviral treatment (ART) regimen switch and its impact on mortality. **METHODS:** A retrospective cohort study was conducted from 2016-2018 using Mexico's "Antiretroviral Management, Logistic and Surveillance System" (SALVAR in Spanish). We analyzed virologic failure on people living with HIV (PLHIV) who initiated ART between 2016-2017, with at least 18 years of age. Virologic failure was defined as two consecutive HIV-viral loads over 200 copies/ml after at least 24 weeks of ART. Kaplan-Meier analysis and Cox proportional-hazard models were performed. **RESULTS:** At the end of the study, 93708 patients were on ART, with a viral load testing coverage of 94.3%, of which 82.25% were in viral suppression. From the 31320 patients that initiated ART between 2016 and 2017, 1400 presented virologic failure during the observation time. The cumulative incidence of switch 180 days and 1 year after failure was 28.3% [95% CI 26.0 - 30.8] and 43.0% [95% CI 40.4 - 45.8]. Patients that remained on virologic failure presented higher adjusted mortality, in comparison with those that were switched (OR 2.22; 95%CI 1.08 - 4.57; p=0.031). **CONCLUSIONS:** The delay in ART regimen switch in patients with virologic failure is an important public health problem in Mexico, which negatively affects the survival of people living with HIV in the country. Interventions to reduce delay in the response to virologic failure are urgent.



[Cumulative incidence of death after virologic failure]

HIV testing and retesting

MOPEB117

What motivates or prevents frequent HIV testing among young men who have sex with men in New York City?

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BACKGROUND: Frequent, regular testing allows prompt diagnosis of HIV, improves care outcomes and reduces transmission. The U.S. Centers for Disease Control and Prevention recommends that all men who have sex with men (MSM) get tested at least annually for HIV, and has affirmed that "sexually active gay and bisexual men may benefit from getting an HIV test more often, perhaps every 3 to 6 months." This qualitative study explores the experiences and understandings of young MSM that may promote or impede such frequent HIV testing.

METHODS: Findings are based on in-depth interviews conducted in 2015-16 with 71 cisgender MSM recruited from a variety of venues in New York City. Participants were 18-39 years old and never diagnosed with HIV or diagnosed in the past year. They included men who reported testing frequently in the past 2 years (4 or more times; N=24); less frequently (2-3 times; N=25); and infrequently or never (0-1 times; N=22). We asked men what motivated their HIV testing; how they felt while testing and waiting

for results; situations in which they were reluctant to get tested; and communication with others about testing. Interviews were digitally recorded, transcribed, and coded and analyzed using an inductive thematic analysis approach.

RESULTS: In men's narratives, regular HIV screening could be motivated by knowing the benefit of prompt HIV treatment; responsibility towards partners; public health and provider encouragement to test regularly; and to allow men to share recent evidence of testing negative when seeking sex online. For some men, anxiety around possible HIV diagnosis made testing a stressful occasion that required time and energy to prepare for; this anxiety could be compounded by perceived stigma around sex between men, condomless sex and having HIV. Regular testing could also be stigmatized, with men anticipating judgment from providers or partners if they asked for a test or said they tested frequently.

CONCLUSIONS: Anxiety around possibly testing positive, and stigma related to sex and HIV, remain significant barriers to frequent HIV testing for some MSM. We describe New York City's efforts to promote frequent testing by countering fear and stigma associated with HIV and HIV testing.

MOPEB118

Viral load assay performs comparably to early infant diagnosis assay to diagnose infants with HIV

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BACKGROUND: Viral load (VL) testing is essential to manage HIV disease, especially in infants and children. Early infant diagnosis (EID) is performed using nucleic-acid testing in children under 18 months. Resource-limited health systems face severe challenges to scale-up both VL and EID to unprecedented levels. Streamlining laboratory systems would be beneficial to improve access to quality testing and to increase efficiency of antiretroviral treatment (ART) programs. We evaluated the performance of VL testing to serve as an EID assay in children younger than 18 months.

METHODS: This study was an observational, prospective study including children between one and 18 months of age who were born to HIV-positive mothers in 134 health facilities in Maputo Province, Mozambique. Dried blood spot specimens from heel or toe pricks were collected, processed using SPEX buffer for both assays, and tested for routine EID and VL testing using the Roche CAP/CTM HIV-1 Qualitative v2 and Roche CAP/CTM HIV-1 Quantitative v2 assays, respectively. The sensitivity, specificity, and positive and negative predictive values were estimated using the EID results as the reference standard.

RESULTS: Fifty-two percent of included children were female. Over 95% of mothers and children were on ART or received prophylaxis, respectively. The sensitivity and specificity of using the VL assay to detect infection were 100% (95% CI: 96.2 - 100%) and 99.9% (95% CI: 99.4 - 100%). The positive and negative predictive values were 99% (95% CI: 94.3 - 100%) and 100% (95% CI: 99.6 - 100). The McNemar's test was 1.000 and Cohen's kappa was 0.994. One child had a false positive VL test result (< 400 copies/ml); however, this could have signaled potential infection.

CONCLUSIONS: The comparable performance suggests that VL assays can be used as a diagnostic assay. Infants with either low levels of viremia or high cycle threshold values should be repeat tested to ensure the result is truly positive prior to treatment initiation, regardless of assay used. VL assays could replace traditional EID testing, substantially streamlining molecular laboratory services for children and lowering costs, with the additional advantage of providing baseline VL results for ART management.

MOPEB119

"Treat and Test": Engaging PLHIV for accelerated case detectionD. Darrow de Mora¹, M. Cassell², H. Mahler³¹FHI360, Global Health Population and Nutrition, Washington, United States, ²FHI 360 and LINKAGES, Hanoi, Vietnam, ³FHI 360 and LINKAGES, LINKAGES, Washington, United States

BACKGROUND: Achieving the 95-95-95 targets requires strategic focus to engage individuals who remain undiagnosed and untreated. Accordingly, the USAID- and PEPFAR-supported LINKAGES project developed the "Treat and Test" model, which prioritizes personalized support for PLHIV treatment and then extends options to refer sexual and injecting partners, biological children, and other risk contacts to HIV testing. Options include *voluntary partner referral* (VPR), based on the World Health Organization's partner notification model, and *risk network referral* (RNR), with self-guided opportunities to informally refer social- and risk-network members through virtual and physical means. We describe HIV case-detection results from "Treat and Test" in five countries.

METHODS: LINKAGES introduced the "Treat and Test" model in April 2018 in five countries and monitored community- and facility-based service sites using standard PEPFAR indicators. Data from July-September 2018 were analyzed and disaggregated by key population (KP) typologies to examine the effect of "Treat and Test" on HIV case detection. Depending on the country, we determined the percent change in case detection overall following the introduction of "Treat and Test" or compared case detection rates from Treat and Test to traditional outreach and testing activities.

RESULTS: In Angola, Democratic Republic of Congo, and Kenya, "Treat and Test" improved case detection for both female sex workers (FSW) and men who have sex with men (MSM) (Table). In Cote d'Ivoire, case detection was highest through "Treat and Test" (16%) compared to those reached through traditional testing activities (11.4%). In South Sudan, case detection was 71% through "Treat and Test" compared to 3.5% from traditional outreach and testing, and 60% of "Treat and Test" partners and clients were first time testers compared to 27% from traditional outreach and testing.

Country	FSW	MSM
Angola	176%	22.6%
DRC	16%	44%
Kenya	20%	57%

Percent increase in case detection between July-September 2018

CONCLUSIONS: LINKAGES' experience demonstrates that Treat and Test can be rapidly integrated into existing KP programs and result in increased case detection.

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Performance, usability and Acceptance of the blood-based INSTI HIV self test in high and low HIV prevalence populations in sub-Saharan AfricaR. Galli¹, H. Loemba²¹bioLytical Laboratories, Richmond, Canada, ²University of Ottawa Health Services, Ottawa, Canada

BACKGROUND: HIV self-testing is an emerging approach for effectively reaching the undiagnosed in key populations and other people at high risk for HIV infection. The objective of this study, conducted in three sub-Saharan Africa countries, was to determine the accuracy, usability and acceptance of the blood-based INSTI HIV Self Test (INSTI) in the hands of intended users.

METHODS: Field studies were conducted in Kenya (n=476), South Africa (n=900) and the Republic of Congo (n=506) under separate ethics review board approvals in 2017-2018. Participants were recruited from urban and village settings, and were asked to conduct the INSTI HIV Self Test in the presence of a non-interacting observer. For accuracy, self-test results obtained by the participant were compared to national algorithm 4th generation HIV enzyme immunoassay (EIA) results. For usability and accep-

tance, participants were scored on procedure performance and label comprehension. Satisfaction levels were measured through questionnaires. A subset of participants interpreted results of contrived INSTI test devices showing a range of positive, negative and invalid results.

RESULTS: Positive percent agreement between INSTI and EIA was 98.99-100% and negative percent agreement was 98.15-100% across the three studies. Usability scores for critical procedure steps ranged from 95.6-96.85%. 95.7-98.5% of participants indicated they would use this test again. Success rate of participants forming a free-flowing blood drop improved from 85.5% (Kenya) to 97.0% (Congo) after successive package insert (PI) iterations. 96.4-100% of study participants correctly interpreted strong positive, negative and invalid INSTI results. Interpretation of weak positive results improved from 34.07% (Kenya study) to 94.4% (Congo) after PI revisions.

CONCLUSIONS: The INSTI HIV Self Test is accurate, easy to perform and highly acceptable in the hands of intended users, and as a result became the first blood-based HIV self test to be prequalified by the World Health Organization, in November 2018. Prospective field studies to determine performance, acceptability and usability in Canadian populations are under way.

MOPEB121

Verification of cobas® c6800/8800 HIV 1/2 qualitative NAT assay for use in South Africa public sector and a new indeterminate range setL. Hans^{1,2}, B. Mashishi^{1,2}, Z. Mahlumba¹, S. Sarang¹, S. Carmona^{1,2}¹National Health Laboratory Service, Johannesburg, South Africa,²University of the Witwatersrand, Johannesburg, South Africa

BACKGROUND: The success of PMTCT campaigns does not eliminate the need for accurate HIV diagnostic tests in infants. Instead, it magnifies the diagnostic challenges of possible false results because of reduced positive predictive values in populations with low prevalence, and low-level viraemia detected in undiagnosed infected infants exposed to prophylactic ARVs. The WHO has updated its recommendation for screening and confirmatory HIV NAT testing in children < 18 months to include the use of a platform-specific indeterminate range in order to reduce the risk of inappropriate clinical management based on false results. South Africa intends moving from Roche CAP/CTM HIV-1 Test, v2.0 (CAPCTM) to cobas® HIV-1/HIV-2 Qualitative nucleic acid test (cobasHIV) for use on the cobas® 6800/8800 Systems. We verified this new HIV diagnostic assay and determined a new indeterminate cycle threshold (Ct) for the public sector in South Africa.

METHODS: Residual samples from appropriately stored DBS of 365 CAPCTM tested samples sourced from five laboratories in South Africa were enrolled for the clinical evaluation. Samples were categorised according to the NHLS CAPCTM results interpretation, including an indeterminate Ct of > 33 and/or RFI < 5. Mean Ct difference was determined according to individual samples, and to weighted and unweighted Ct ranges. A cobasHIV indeterminate Ct value was estimated by ROC analysis. DBS panels of 8E5 cells and HIV-1 supernatant spiked HIV negative whole blood were used to determine limit-of-detection, precision and carryover.

RESULTS: Sensitivity and specificity for CAPCTM non-indeterminate results were 100% [95% CI 97.51 -100] and 100% [95% CI 97.59 -100] respectively. Mean Ct difference results varied from 4.43 (indeterminate only) to 6.01 (positive only). Excellent agreement was observed by Bland-Altman analysis and quantifiable specimens observed a R²= 0.91. ROC curve cut-off was at Ct of 37. LOD was 289 copies/mL, precision was verified, and no carryover detected.

CONCLUSIONS: The cobasHIV assay on c8800 result platform claims are verified, and in adherence to recent WHO recommendations, an indeterminate range has been defined for this new assay. Countries intending to implement this new NAT assay should verify their range based on local paediatric HIV prevalence.

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Implementing an indeterminate range for more accurate early infant diagnosis: 2018 WHO recommendations

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BACKGROUND: Mother-to-child transmission rates have decreased considerably with implementation of Option B+ and Treat All policies, resulting in concern for false positive tests results due to lowering positive predictive values. There is limited guidance on how to interpret low levels of viremia in HIV-exposed infants; therefore, a systematic review, meta-analysis, cost-effectiveness model, and acceptability survey were conducted.

METHODS: The systematic review identified 32 studies from 14 countries including data from over 1.3 million HIV-exposed infants. The meta-analysis used a random effects model to calculate true positivity and false positivity across various proposed indeterminate thresholds. Additionally, a decision analysis model of 10,000 HIV-exposed infants was developed to estimate the clinical consequences of implementing an indeterminate range.

RESULTS: The optimal indeterminate range was the equivalent of a cycle threshold of 33 on the Roche COBAS TaqManHIV-1 Qualitative Test v2.0 assay, representing the best trade-off between the proportion of HIV-infected infants who would be incorrectly identified as indeterminate (approximately 8.43%) and the proportion of HIV-uninfected infants who would potentially start treatment unnecessarily (approximately 6.66%) (Table 1). Implementing an indeterminate range was found to be cost-effective across most cycle threshold ranges. Finally, a survey provided to program managers (n=85), health care workers (n=146), and people living with HIV (n=587), established that over 85% of respondents in each group thought the use of an indeterminate range was acceptable in order to prevent unnecessary lifelong treatment.

CONCLUSIONS: Implementing an indeterminate range will support more accurate nucleic acid-based early infant diagnosis: it is likely that fewer infants would be put on lifelong treatment unnecessarily as the majority of false positives would fall within the indeterminate range and receive additional testing prior to definitive diagnosis rather than being classified as HIV-infected. Confirmatory testing, retention during the exposure period, and end of exposure testing remain critical.

Cycle threshold	True positives		False positives	
	Above threshold	Below threshold	Above threshold	Below threshold
36	0.49%	99.51%	48.72%	51.28%
35	1.87%	98.13%	70.90%	29.10%
34	3.93%	96.07%	88.98%	11.02%
33	8.43%	91.57%	93.34%	6.66%
32	12.83%	87.17%	97.13%	2.87%
31	18.50%	81.50%	98.15%	1.85%
30	24.23%	75.77%	98.01%	1.99%

[True and false positives at several cycle threshold values]

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MOPEB123

Efficiency of risk assessment tool among Orphans and Vulnerable children to targeted HIV testing services: A case study of Calabar, Nigeria

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BACKGROUND: There are estimated 2.3 million children orphaned by HIV&AIDS related causes in Nigeria; a quarter of whom are Children (2 - 17 years) Living with HIV (CLHIV). However, less than 5% of these CLHIV, know their HIV status. The situation is compounded by scarcity of rapid diagnostic test kits. We set out to assess how best to target HIV testing services, in a resource limited setting using HIV risk assessment tool; targeting Orphans and Vulnerable Children (OVCs).

METHODS: Between January - June 2018, we administered a pre-tested structured risk assessment questionnaire to either caregivers of OVCs (2-9 years) or to the OVCs themselves who are 10 years+. The study was nested within an ongoing community OVC intervention project - HIFASS LOPIN-3, in Calabar, Nigeria. The questionnaire inquired into knowledge of HIV, risk perception, and sexual practices in the preceding six months. A total of 14,718 OVCs were enrolled as respondents and those with high risk of exposure referred for HIV testing services. We also measured HIV positive rate among those that were test indicated.

RESULTS: The median age of the children was 8 years and interquartile range of 10 years (Q1:3 - Q3:12). Seventy-five percent of the OVCs had never been tested for HIV and 62% reported acute malnutrition in the past six months. Among the children (10 - 17 years), 8% had experienced sexual violence. Twenty-six percent of the OVCs were indicated for testing of whom, a HIV positive rate of 0.49% (n=72) was seen; among whom 57% (n=41) were female.

CONCLUSIONS: HIV risk assessment among OVCs should be considered for a larger scale trial implementation in Sub-Saharan Africa; consequent to integration or otherwise into national testing algorithm to screen and recruit more CLHIV. Though with low yield positive rate, community OVC intervention programs provides additional opportunities to bridging the gaps in the number of OVCs who know their status for the attainment of first 90 in the UNAIDS target in Africa.

MOPEB124

Field evaluation of Alere HIV Combo to identify acute HIV infection in Lusaka, Zambia

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BACKGROUND: Individuals with acute HIV-1 infection (AHI) disproportionately contribute to HIV-1 transmission. Current test and treat programs can reduce transmission by suppressing viral load (VL) among HIV-positive individuals. Existing rapid tests in sub-Saharan Africa do not identify individuals with AHI, necessitating more sensitive, 4th generation antigen-antibody combination tests. Here, we evaluated the 4th generation point-of-care (POC) Alere HIV Combo rapid test as an AHI case-finding strategy in routine outpatient settings in Lusaka, Zambia.

METHODS: HIV-negative adults, as ascertained by a 3rd generation screening test (Alere Determine®HIV-1/2) and seeking care at two health facilities in Lusaka were tested by fingerprick on Alere HIV Combo. Samples were tested onsite by trained, study research assistants in the presence of the participant and plasma quantitative HIV-1 VL testing was performed as the reference test at CIDRZ Central Laboratory. Specificity, sensitivity and negative and positive predictive values (NPV, PPV) were calculated based on the reference test.

RESULTS: Of 3069 individuals approached, 3000 (97.8%) consented to AHI testing after a negative Alere Determine result. Participant median age was 27 years (IQR 23-32) and 59.0% were women. AHI prevalence in the absence of directed screening was 0.1% (3 cases of AHI/ 3000 partici-

pants). Sensitivity and specificity of the 4th generation Alere HIV Combo® to identify AHI was 67.0%, and the specificity was 99.8%. Sensitivity and specificity of the antigen portion of the test was 67.0% and 99.0% respectively. The false positivity rate was 0.2% (n =3). PPV was 50%, and NPV was 100%. Among those with confirmed AHI, mean plasma VL was 65,000 copies/ml (range 46,000- 75,000 copies/ml). Additionally, the study identified two participants with undisclosed HIV infection on ART who despite testing negative on the Alere Determine, tested positive on the antibody portion of the Alere HIV Combo.

CONCLUSIONS: AHI screening using a POC rapid test was acceptable among adults in Lusaka, even when administered in a serial testing algorithm. AHI prevalence in an outpatient setting was low (0.1%), and the Alere HIV Combo had low AHI case-finding utility given a PPV of 50.0%. Future studies should assess Alere HIV Combo performance when used following risk assessment screening in key, high-risk for AHI populations.

Genotyping and viral tropism testing (viral and proviral)

MOPEB125

Molecular epidemiology of clinical HIV-1 sequences isolated between 2008-2018 in Cuba

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BACKGROUND: The HIV epidemic in Cuba exhibits extraordinarily high genetic diversity. The objectives of this study were to determine the HIV-1 subtype distribution and evolution during the last 10 years of the epidemic, and to investigate associated risk factors.

METHODS: Samples were isolated from 1485 HIV-1 patients (398 therapy-naïve and 1087 therapy-experienced) attending the 'Pedro Kouri' Institute between December 2008 and October 2018 in Cuba. HIV-1 subtype was determined using Rega Subtyping Tool v.3, and confirmed by phylogenetic analysis, using the Maximum Likelihood Method in MEGA v.6. The most recent common ancestor (MRCA) of CRF19_cpx was done with BEAST, GTR model (4x gamma), relaxed lognormal. The association among virological, epidemiological and demographic variables was investigated using SPSS version 19.

RESULTS: The most prevalent HIV-1 genetic forms were subtype B (29.4%), CRFs_BG (20, 23, 24) (23.3%) and CRF19_cpx (20.1%). Subtype B infection was associated with male sex (p=0.0001, OR:1.9; CI:1.4-2.6) and MSM (p< 0.0001, OR: 2.56; CI:1.9-3.5), while subtypes A, C, D, F, G, H and J with heterosexuals (p< 0.0001, OR:4.32; 95%CI: 3.0-6.2). Subtype B infection (p=0.041, OR:1.3; CI:1.0-1.7) and CRFs BG (p=0.009, OR:1.6; CI:1.1-2.3) were more frequently detected among patients living in the west part of the country, while Subtype H was more frequently among patients living in the east (p=0.0001 OR: 26.4; CI:9.8-70.9). Subtypes A, C, F, G and H prevailed among individuals diagnosed with HIV between the years 1986-1990 (p< 0.05), while CRF_BGs, emerged since 2001 (p<0.0001, OR:3.25; CI:2.1-5.0). Interestingly, the MRCA of the recombinant CRF19_cpx (associated with rapid progression to AIDS in Cuba) traced the origin of this virus in Cuba, back in 1973, however, after the year 2011 it has significantly increased its frequency (from 14.9% in 2008-2011 to 22.5% in 2012-2018, p=0.0005, OR:1.64; CI:1.2-2.2). Conversely, subtype B showed a significant parabolic trend, increasing up to the year 2000, and decreasing again in subsequent years (p< 0.05).

CONCLUSIONS: This study indicates that the genetic diversity of the Cuban HIV-1 epidemic is very high. The increasing trend of local recombinants in recent years indicates a change in the dynamic of the epidemics that should be further studied.

Viral load measurement

MOPEB126

Is it time to change the WHO definition of virologic suppression in the era of HIV epidemic control? 12-month virologic outcomes in patients with WHO defined virologic suppression in Kenya

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BACKGROUND: WHO recommends a HIV viral load (VL) measurement of <1000 copies/ml to define ART failure and to define stability as part of care differentiation. This threshold means that the management of patients with VL of 20-1000 copies/ml in this setting has not been adequately investigated and may inform patient management in the era of epidemic control.

METHODS: A retrospective analysis of routine VL data from patients on ART >6 months enrolled in University of Maryland-supported facilities in Nairobi County, Kenya, was undertaken. Two sequential VL results per patient were reviewed, the first ("baseline") taken between October 1, 2015 and September 30, 2017 and was used to categorize them as stable (VL <1000 copies/ml) and the subsequent one taken 12 months later. Generalized linear models with robust standard errors were used to estimate the likelihood of being viremic at 12 months following a baseline VL < 1000 copies/ml.

RESULTS: Data from 6,921 patients with baseline VL < 1000copies/ml was analyzed. Of this, 6,056(87.5%) had VL≤20 copies/ml, 777 (11.2%) had VL 21-499copies/ml and 88(1.3%) had 500-999copies/ml. At the 12-month subsequent VL, among patients with baseline VL< 20copies/ml, 5233(88%) maintained this while 179(3%) had a VL≥1000 copies/ml.

Among those with a baseline VL of 21-499copies/ml, 61(8%) had VL ≥1000copies/ml, while 28(32%) of those with baseline VL of 500-999copies/ml had VL ≥1000copies/ml in the subsequent 12 month VL. After controlling for age, sex, and ART regimen, compared to patients with VL < 20copies/ml, patients with a VL 21-499copies/ml were 2.3 times (95% CI 1.7, 3.0) more likely to be viremic in the next 12 months while those with 500-999copies/ml were 8.3 (95% CI 5.6, 12.3) times more likely to be viremic.

CONCLUSIONS: This data from a cohort of almost 7,000 patients suggests an increased likelihood of treatment failure among patients with low level viremia who under current guidelines would be classified as stable. In this era of HIV epidemic control with focus on limiting incident infection and ensuring sustained long-term viral suppression, consideration should be given to extending case management to this population to include intense adherence support, particularly for those with VL >500 copies/ml.

MOPEB127

High prevalence of virologic failure among pregnant and breastfeeding women in HIV care in Kinshasa: First findings in a continuous quality improvement intervention trial

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BACKGROUND: There are virtually no published population-wide data on virologic failure among pregnant and breastfeeding women in routine care settings. Here, we report provincial estimates of virologic failure (two con-

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secutive viral loads ≥ 1000 copies/mL) among pregnant and breastfeeding women in HIV care in Kinshasa, Democratic Republic of Congo (DRC) and associated risk factors.

METHODS: The study was conducted as part of initial assessments for the CQI-PMTCT study: an ongoing cluster randomized trial to evaluate the effect of continuous quality interventions (CQI) on long-term outcome of ART among pregnant and breastfeeding women (NCT03048669). From November 2016 to June 2018, in each of the 35 Kinshasa provincial health zones, study teams visited the busiest (by numbers served) three maternal and child health clinics and enrolled all HIV-infected pregnant or breastfeeding women (≤ 1 year post-delivery). At enrollment and at each six-monthly follow-up visit, participants provided a dry blood sample for viral load testing.

RESULTS: At the time the database was closed for this analysis, 2049 women were enrolled, including 792 with two consecutive viral load measure. Of the 792, 39.5% had been on ART for < 12 months, 68.6% were on tenofovir-lamivudine-efavirenz, 12.7% were ≤ 24 years, and 63.3% were receiving care in a PEPFAR supported clinics. Overall, 16.5% were classified as having virologic failure. Virologic failure varied greatly by ART regimen (Table): 14.4% among those on tenofovir-lamivudine-efavirenz compared to 16.7% among those on zidovudine-lamivudine-nevirapine (aPR 1.48, 95%CI 0.84-2.60) and 24.3% among those on other or unknown regimen (aPR 2.11, 95%CI 1.37-3.25). The prevalence also varied by age: 20.4% among ≤ 24 years vs 17.5% among 25-34 years (aRR 0.88, 95%CI 0.47-1.63) vs 12.4% among women ≥ 35 years old (aPR 0.59, 95%CI 0.36-0.97). Receiving care in a PEPFAR supported facility was protective against virologic failure (aRR 0.76, 95%CI 0.59-0.99).

CONCLUSIONS: The high levels of virologic failure among pregnant and breastfeeding women in Kinshasa even among those receiving tenofovir-lamivudine-efavirenz plead for urgent interventions. Unless the quality of HIV care is improved, the ambitious goals of the UNAIDS *Start free, Stay free, AIDS free* initiative will not be reached even at 100% ART coverage.

MOPEB128

Quantification of HIV1-RNA viral load using automated filtered dried plasma spot, a head-to-head comparison study

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BACKGROUND: HIV viral load (VL) testing is the preferred method for monitoring the responses of HIV patient receiving treatment. However, standard plasma VL testing is not widely available in remote areas, highlighting the need for good performing specimen collection methods applicable to resource-constrained settings

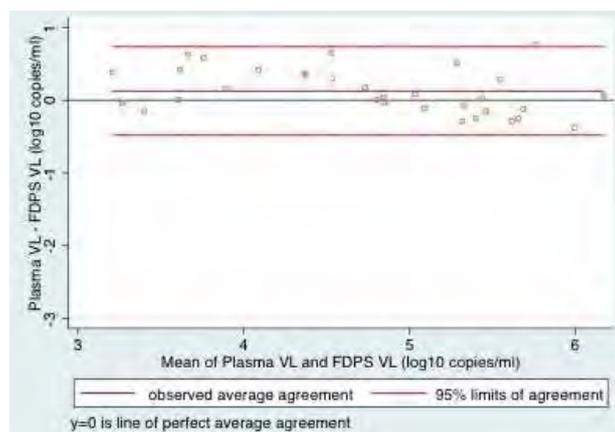
METHODS: We developed a low-cost, instrument-free plasma separation device (VLPlasma[®]) for HIV VL testing. 201 patients attending a HIV clinic in Malaysia were recruited and provided venous blood samples for study purpose. For each patient, three VL tests were done on the Roche Cobas AmpliPrep/TaqMan v2.0 system using three sample types:

- (1) a fresh plasma aliquot,
- (2) a filtered dried plasma spot (FDPS) prepared from a VLPlasma[®] device,
- (3) a conventional dried blood spot (DBS).

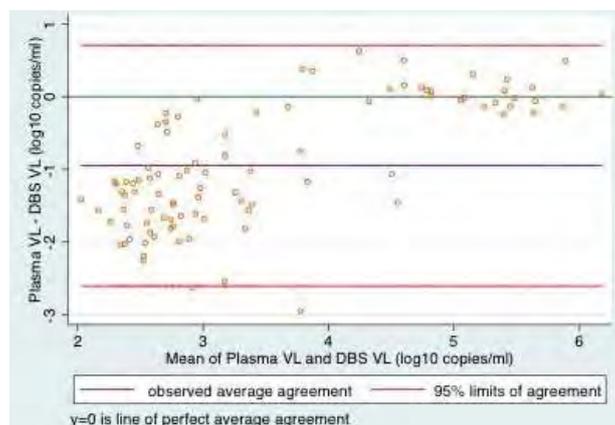
The lower detection limit was 20 copies/ml for fresh plasma and 400 copies/ml for FDPS/DBS. Bland-Altman analysis was used to compare FDPS to DBS using fresh plasma VLs as reference.

RESULTS: There were 32 and 95 patients had paired FDPS/plasma and DBS/plasma quantitative VL results, respectively. The mean difference in VL measures between FDPS and plasma (plasma VL - FDPS VL) was 0.127 (SD: 0.32) \log_{10} copies/ml compared to -0.95 (SD: 0.84) \log_{10} copies/ml for DBS; 95% limit of agreement was -0.48 to 0.74 \log_{10} copies/ml for FDPS compared to -2.06 to 0.71 \log_{10} copies/ml for DBS (Figure 1-2).

CONCLUSIONS: FDPS appears to outperform DBS for quantification of HIV VL. Future study with larger sample size is needed to further examine the performance of FDPS and/or confirm the finding of this study.



[Figure 1. Bland-Altman plot demonstrating agreement between FPDS and plasma VL (n=32)]



[Figure 2. Bland-Altman plot demonstrating agreement between DBS and plasma VL (n=95)]

MOPEB129

HIV viral load suppression among adult patients by time to ART initiation during a pilot of "Test and Start" – Nigeria, 2015-2016

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BACKGROUND: In 2014, the Federal Ministry of Health in Nigeria, with support from the President's Emergency Plan for AIDS Relief, piloted "Test and Start" (the initiation of antiretroviral treatment (ART) within two weeks for newly identified people living with HIV (PLHIV)). This study evaluates the effect of this pilot on viral suppression.

METHODS: We conducted a retrospective cohort analysis of adults patients from 31 of the largest pilot sites; patients were randomly selected using proportional to size sampling. PLHIV who initiated ART between October 2015 and September 2016 and had a documented viral load (VL) result 12 months after treatment initiation were included in the analysis. The main outcome measure was viral suppression after 12 months of treatment. Potential predictors for unsuppressed VL were assessed using logistic regression. We computed predicted probability with 95% confidence interval (CI) for unsuppressed VL by time to ART start using post-estimation linear regression. All analysis was done using Stata (Version 15) statistical software.

RESULTS: A total of 1,461 [1,025 (70.2%) females] patients met inclusion criteria for analysis. The median age and CD4 count at enrolment were 34 years (IQR: 28-41) and 315 (IQR: 160-505) cells/mm³ (n = 1,027/1,461), respectively. Proportions of patients by time to ART initiation: same-

day=533 (36.5%); within 1 week=704 (48.2%); 1-4 weeks=145 (9.9%); and >4 weeks=79 (5.4%), respectively. At 12 months on ART, 1,085 of patients (74.6%; 95% CI: 71.8-76.6%) had suppressed VL [males = 76.4% (76.4%; 95% CI: 71.9-80.4%); females =73.4% (95% CI: 70.4-76.1%)]. VL suppression rates by time to ART initiation: same-day=78.2% (95% CI: 74.3-81.7%); within 1 week=71.1% (95% CI: 65.9-75.8); 1-4 weeks=75.4% (95% CI: 68.8-80.8); and >4 weeks=70.8% (95% CI: 65.6-75.5), respectively. Compared with patients initiated on ART after 4 weeks, patients initiated on ART same-day as diagnosis had lower odds for unsuppressed VL at 12 months (OR 0.67 (95% CI: 0.5-0.9)).

CONCLUSIONS: Among PLHIV with a documented 12-month VL, those initiating ART the same day as diagnosis had better virological outcomes than those starting treatment four week or more after. Scaling up Test and Start in all facilities offering HIV services in Nigeria should improve individual and population virological suppression.

MOPEB130

Incidence of viremia events (≥ 50 copies/ml) among HIV patients with documented viral suppression (< 50 copies/ml) after ART initiation in Ndhiwa, Kenya

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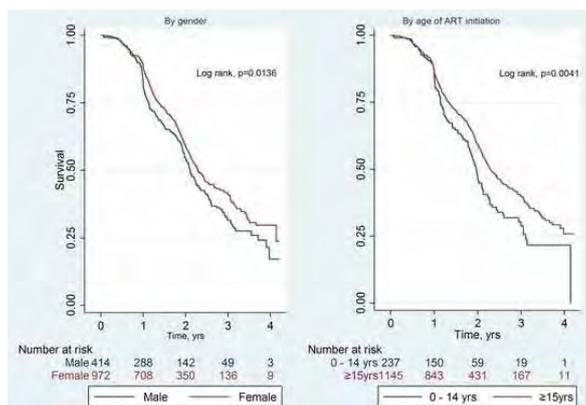
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BACKGROUND: The 2018 guidelines on use of ART in Kenya recommend similar management for patients with viremia events ≥ 50 to 999 to those with VL $\geq 1,000$ copies/ml. Single viremia events represent an entry point to the evaluation and management of such patients. We determined the incidence of viremia events ≥ 50 among patients with documented suppression (VL<50 copies/ml) post-ART.

METHODS: From routine evaluation data collected in August 2018, we reviewed patient charts randomly selected from 17 facilities in Ndhiwa Sub-county, Kenya. We included in this analysis patients on ART for ≥ 6 months with ≥ 1 viral load (VL) done ≥ 6 months after ART initiation and after introduction of routine VL testing in Kenya (June 2014). Proportions and 95% CI were used to describe distribution of initial post-ART VLs. Survival analysis was used to estimate the incidence of viremia events of ≥ 50 copies/ml among those with a documented suppression on their initial post-ART VL test. Data were analyzed using Stata 14.1.

RESULTS: Among 2,454 patients (66.7% female), 56.6% (95% CI, 54.6 - 58.6) achieved viral suppression by their first post-ART VL. Suppression was lower among men and those starting ART at age < 15yrs; 50.7% (95% CI, 47.2 - 54.2) vs 59.5% (95% CI, 57.0 - 61.9) and 40.8% (95% CI, 36.7 - 44.8) vs 61.4% (95% CI, 59.2 - 63.6) respectively. Over 2,615 PYS, the incidence of viremia events of ≥ 50 copies was 27.2 (95% CI, 25.2 - 29.2) per 100 PYS among those initially suppressed. There were differences by gender ($p=0.0146$) and age at ART initiation ($p=0.0041$).

CONCLUSIONS: The high incidence of viremia events in this cohort support the ongoing MoH initiative to optimize therapy by introducing Dolutegravir. Even with optimization, efforts to strengthen retention and adherence to ART are needed to reduce the incidence of viremia events.



[Kaplan-Meier survival estimates for viremia events ≥ 50 copies/ml]

MOPEB131

Time to switch to second-line antiretroviral therapy among HIV positive people with unsuppressed viral load in Mutare District, Zimbabwe

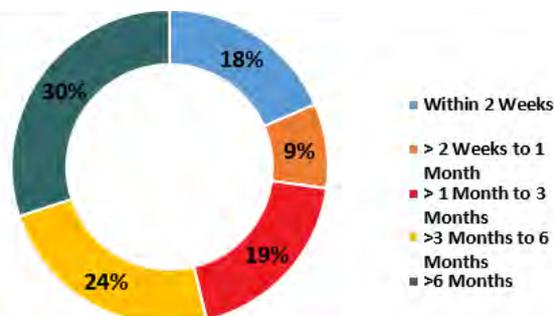
T. Bepe¹, V. Chitiyo¹, K. Webb¹, S. Page-Mtongwiza¹, C. Uzande², T.T. Chinyanga¹

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BACKGROUND: Delayed switching of antiretroviral therapy (ART) in virally unsuppressed clients leads to higher mortality and higher rates of treatment failure on second-line. Although, global and national guidelines recommend switching to second-line within two weeks of receipt of results unless clear psychosocial/clinical contraindication, there is limited data on timeliness of management clients with unsuppressed viral load (VL) in resource limited settings, including Zimbabwe. Our objective was to assess rates and duration between confirmatory unsuppressed VL and switch to second-line ART.

METHODS: District, Manicaland which are supported by the FACE HIV Program. De-identified retrospective cohort data of clients VL tested and received 1st unsuppressed VL results between October 2016 to September 2018 were abstracted from the electronic patient monitoring system (EPMS). Descriptive analysis was conducted using Ms Excel.

RESULTS: A total of 1060 (788 adults $15 \geq$ years and 272 children and adolescents 0-14 years) PLHIV received 1st unsuppressed VL results during the assessment period. Among these, 62% (658/1060) had second VL sample collected and 69% (454/658) received unsuppressed results. Approximately 40% (182/454) were switched to 2nd line ART and the median time to switch from date when second VL was received was 96 days IQR (29 - 208). Of the 173 clients eligible for analysis, only 32 (19%) were switched within two weeks of receiving results as recommended in the operational and service delivery manual (OSDM). Children and adolescents had shorter time to switch compared to adults, 30 and 120 days respectively.



[The Distribution of Time to Switch to Second-line ART among Clients with Repeat Unsuppressed VL]

CONCLUSIONS: Our findings demonstrate major gaps in guidelines-practice in management clients with unsuppressed VLs which urgently require support towards reaching the 3rd UNAIDS 90. Findings and lessons from the assessment will be used to support technical assistance and onsite mentorship to increase VL coverage and improve quality of management in 660 more health facilities supported by the FACE HIV program in Zimbabwe.

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MOPEB132

Use of undetectable viral load to improve estimates of prior HIV diagnosis and antiretroviral treatment coverage among people living with HIV in population-based surveysP. Young¹, E. Zielinski-Gutierrez¹, J. Wamicwe², I. Mukui², A. Kim³, A. Waruru¹, M. Kretzschmar^{4,5}, K. De Cock¹¹US Centers for Disease Control and Prevention, Nairobi, Kenya, ²NASCOP KENYA, Nairobi, Kenya, ³US Centers for Disease Control and Prevention, Atlanta, United States, ⁴University Medical Center Utrecht (UMCU), Julius Center for Health Sciences and Primary Care, Utrecht, Netherlands, ⁵National Institute of Public Health and the Environment (RIVM), Centre for Infectious Disease Control, Bilthoven, Netherlands**BACKGROUND:** Underreporting of prior HIV diagnosis and antiretroviral therapy (ART) use based on self-report is well-documented in national surveys. Antiretroviral (ARV) testing has been used to improve survey estimates, by reclassifying respondents with ARVs detected in blood as previously-diagnosed and on ART. Viral load testing is more affordable and more routinely available than ARV testing. Undetectable viral load (UVL) is a potential proxy for ARV use but may be confounded by elite controllers who, while believed to be rare, have UVL in absence of ART.

We examined impact of adjusting the Kenya HIV cascade using UVL with and without ARV detection.

METHODS: The 2012 Kenya AIDS Indicator Survey (KAIS) included questions on HIV diagnosis and ARV use, and collected dried blood spots for centralized viral load and ARV testing. We defined UVL as viral load < 550 copies/milliliter; ARVs were present if efavirenz, nevirapine, lopinavir or lamivudine were detected in blood. We reclassified participants as previously-diagnosed and on ART if either ARVs detected or viral load was undetectable.

We compare self-reported prior diagnosis, and ART coverage among previously-diagnosed, to indicators adjusted for ARV detection, UVL, or both, among respondents aged 15-64 years. Indicators were weighted to account for the complex survey design.

RESULTS: Among 235 of 648 HIV-infected respondents with UVL, self-reported status was: 65 undiagnosed (27.7%), 25 previously-diagnosed but not on ART (10.6%), and 145 currently on ART (61.7%). Prior diagnosis increased from 46.9% for self-report to 56.2% [95% confidence interval (CI) 50.7-61.7] when ARV-adjusted, 57.5% (95% CI 52.0-63.1) when UVL-adjusted, and 59.8% (95% CI 54.3-65.3) for ARV-UVL-adjusted.

Treatment coverage among those previously-diagnosed increased from 67.9% to 76.2% (95% CI 70.8-81.5) when ARV-adjusted, 80.2% (95% CI 75.7-84.8) when UVL-adjusted and 81.7% (95% CI 77.3-86.1) when adjusted for both markers. Sensitivity and specificity of UVL-adjusted prior diagnosis were 95.8% and 91.3%, and of UVL-adjusted ART use were 93.0% and 88.8% respectively, versus ARV-adjusted self-report.

CONCLUSIONS: In this survey, UVL-adjusted point estimates were similar to, but slightly greater than ARV-adjusted estimates of prior HIV diagnosis and ART coverage. Viral load may be useful for adjusting indicators of prior HIV diagnosis and treatment in surveys.

MOPEB133

A meta-analysis of using dried blood spots for HIV viral load testing with lower treatment failure thresholdsL. Vojnov¹, Y. Fong², M. Prescott³, N. Ford¹, C. Zeh⁴, J. Sacks³, M. Perez Gonzalez¹, M. Doherty¹, T. Peter³, H. Alexander⁴, DBS for VL Diagnostics Investigation Consortium¹World Health Organization, Geneva, Switzerland, ²Fred Hutchinson Cancer Research Center, Seattle, United States, ³Clinton Health Access Initiative, Boston, United States, ⁴Center for Disease Control and Prevention, Atlanta, United States**BACKGROUND:** Alternative specimen types, such as dried blood spots (DBS), can be used to support viral load (VL) scale-up and increase access. Recently, concerns regarding low level viremia and the possibility that patients with VL less than 1,000 copies/ml could have drug resistance have arisen; however, technical performance data and guidance on using DBS specimens for VL testing at lower thresholds are lacking. We conducted a

meta-analysis comparing VL results from paired DBS and plasma specimens run on commonly used HIV VL technologies with the specific consideration of potentially implementing lower treatment failure thresholds.

METHODS: Standard databases, conferences, and grey literature were searched in 2013 and 2018. Nearly all studies identified (60) were conducted between 2007 and 2018. Data from 40 of 60 studies were included in the meta-analysis, which accounted for a total of 10,871 paired data points. We used random effects models to determine the accuracy and misclassification for each viral load technology at various treatment failure thresholds (detectable, 200, 400, 500, 600, and 800 copies/ml).**RESULTS:** Technologies varied in their performance to accurately detect treatment failure at lower thresholds. The Abbott RealTime HIV-1 (two- and one-spot protocols), bioMerieux NucliSENS EasyQ HIV-1, and Roche COBAS TaqMan (using the PBS/FVE protocol) technologies performed reasonably (>85% sensitivity and specificity) at lower treatment failure thresholds; however, only the Abbott RealTime HIV-1 one-spot and bioMerieux NucliSENS EasyQ HIV-1 technologies performed with >85% sensitivity and specificity if the treatment failure threshold were lowered to the level of detectable. The Biocentric Generic HIV Charge Virale and Roche COBAS TaqMan using SPEX had specificities below 40% at all lower thresholds below 1,000 copies/ml.**CONCLUSIONS:** DBS specimens for VL testing can be used with lower treatment failure thresholds; however, given the variable performance across technologies, it will be important to reflect upon which technologies and thresholds are acceptable. The decision to implement a lower treatment failure threshold should weigh the prevalence and clinical implications of low level viremia, access to testing dependent on using alternative specimen types, result utilization rates, and other scale-up priorities to ensure that patients have access to high quality testing and necessary follow-up clinical care.

ART adherence measurement

MOPEB134

Incentives conditioned on tenofovir levels to increase adherence among young women on PrEP in Cape TownC. Celum¹, K. Gill², J. Morton¹, G. Stein¹, K. Thomas¹, M. McConnell³, A. van der Straten⁴, J. Baeten¹, M. Duyver², E. Mendel², K. Naidoo², L. Myers², J. Dallimore², L. Weisner², L.-G. Bekker²¹University of Washington, Seattle, United States, ²Desmond Tutu HIV Centre, University of Cape Town, Cape Town, South Africa, ³Harvard School of Public Health, Boston, United States, ⁴RTI International, Research Triangle Park, United States**BACKGROUND:** In placebo-controlled PrEP trials, African adolescent girls and young women (AGYW) had low adherence; < 30% with detectable plasma tenofovir. The 3P demonstration project evaluated PrEP adherence and the effect of incentives conditioned on high tenofovir levels among South African AGYW.**METHODS:** 200 sexually active, HIV-negative AGYW ages 16-25 in Msimpumulele township near Cape Town were enrolled March 2017-18. Adherence was assessed by tenofovir diphosphate (TFV-DP) concentrations in red cells in dried blood spots (DBS), a measure of cumulative use in the prior month. TFV-DP_{≥700} fmol/punch was chosen as the threshold for high adherence (correlates with ≥4 doses/week and associated with high efficacy in MSM). At enrollment, 101 AGYW were randomized to the incentive arm (counseling at months 2 and 3 about the prior month's drug level with a 200 Rand, \$13, incentive conditioned on TFV-DP_{≥700}), and 99 to the standard arm (counseling at months 2 and 3 about the prior month's drug level without an incentive). Visits were at 0, 1, 2, 3, 6, 9 and 12 months. Month 3 levels were compared by study arm by intention to treat (ITT) analysis, assuming women without a visit and missing a test were not highly adherent.**RESULTS:** Women had a median age of 19; 30% had chlamydia, gonorrhoea or trichomonas at enrollment. Retention was 89% at month 3. In the first 3 months, all but one sample had detectable TFV-DP; median TFV-DP at months 1, 2, and 3 were 622, 707, and 694 fmol/punch, respectively. We observed a somewhat higher proportion of AGYW with TFV-DP_{≥700} fmol/

punch at month 3 in the conditional incentive arm (45/81, 56%) than the standard arm (35/83, 42%), RR=1.32 (95% CI 0.96, 1.81, p=0.09), and in ITT analysis, 45/97 (46%) vs. 35/97 (36%), RR=1.29 (0.92, 1.81; p=0.15).

CONCLUSIONS: PrEP adherence was very good among high-risk African AGYW in Cape Town, with almost half having tenofovir levels that have been associated with protection among MSM at 3 months, demonstrating these AGYW were motivated and able to use PrEP. Incentives conditioned on high drug levels in the prior month had a modest but nonsignificant association with the likelihood of high adherence.

MOPEB135

A method to quantify dapivirine in small hair samples as a metric of adherence and exposure to the dapivirine vaginal ring

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¹University of California - San Francisco, San Francisco, United States, ²University of California - San Francisco, Medicine, San Francisco, United States, ³University of Pittsburgh/Magee-Womens Research Institute, Pittsburgh, United States, ⁴Family Health International 360, Durham, United States, ⁵University of Washington, Seattle, United States

BACKGROUND: Dapivirine (DPV) has been formulated in a vaginal ring (VR), which is currently being studied as an HIV prevention tool in open-label studies. Two clinical pharmacokinetics studies reported average plasma concentration of DPV over 30-days of VR use as 231±64 (MTN-013) and 273.5±98.2 pg/mL (MTN-024). Hair concentrations of antiretrovirals have proven useful as biomarkers of adherence and long-term exposure to orally-administered antiretrovirals. Hair is easier to collect and store than plasma or used VRs. We report, for the first time, the development of an assay to measure DPV concentrations in hair using liquid-chromatography tandem mass-spectrometry (LC-MS/MS).

METHODS: Hair samples were collected from participants in the Microbicide Trials Network open-label extension (OLE) DPV-VR trial, MTN-025, for method development and optimization. DPV was extracted from hair (2-mg) by incubation in acidified methanol containing ²H₁₁-DPV (internal standard). The extracted solution was evaporated and reconstituted. DPV was extracted via liquid-liquid extraction using methyl tert-butyl ether. The organic layer was evaporated to dryness and reconstituted, and DPV was analyzed by the LC-MS/MS system (Shimadzu UFLC with Sciex API-5000 triple-quadrupole-mass-spectrometer) via multiple-reaction-monitoring electrospray in positive ionization mode. The standard curve was linear over the range of 0.01-10 ng/mg hair. Quantitation of DPV was determined by plotting peak area ratios of DPV to ²H₁₁-DPV versus the nominal concentration of DPV.

RESULTS: Our analytical method exhibited high sensitivity (0.01 ng/mg hair) and a wide linear dynamic range (0.01-10 ng/mg) using 20-30 strands of hair. Precision (defined by the coefficient variation) and accuracy (defined by relative error) were both < 15%. DPV in hair specimens from four MTN-025 participants (as proof-of-concept) demonstrated a range of concentrations (0.0150, 0.0464, 0.0224, 0.0418 ng/mg).

CONCLUSIONS: We describe the development of a sensitive, specific, accurate and precise method per analytic parameters to determine adherence and exposure to DPV for women using the vaginal ring in small hair samples (20-30 strands). As proof-of-concept, this method provided a range of values among four MTN-025 participants. Further work in MTN-025 is ongoing to investigate the use of hair levels as a long-term measure of DPV use and to analyze DPV hair levels as predictors of seroconversion.

Drug resistance testing

MOPEB136

Emerging resistance to integrase inhibitors by next generation sequencing

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BACKGROUND: Integrase strand transfer inhibitors (INI) are recommended as first line therapy in treatment-naïve persons and are widely used to either simplify or intensify therapy in experienced persons. Although the need to monitor for INI resistance (INI-R) in those who are INI naïve is controversial, wide-spread use of INI may increase the prevalence and transmission of INI-R HIV.

METHODS: HIV genotypes for patients followed at Henry Ford Hospital, an inner-city hospital in Detroit, MI, were obtained as part of their routine HIV care. Next generation sequencing (NGS) including integrase was performed for detection of HIV resistance associated mutations (RAMs) as defined in the Stanford University HIV drug resistance database. Thresholds of ≥10% defined majority population RAMs (MRAMs) and 1- < 10% minority population RAMs (mRAMs). Descriptive analyses were performed with parametric or non-parametric analyses. P-value of 0.05 was used for statistical significance.

RESULTS: From 9/2015-12/2018, 760 NGS assays were performed for INI, of which 229 were done on treatment-naïve (TN), 238 treatment-experienced/INI naïve (INI-N), and 293 INI-experienced (INI-E) individuals. Cumulative major INI MRAMs and mRAMs were identified in 0.9% and 3.5% of individuals, respectively. Major MRAMs increased in prevalence annually from 2015-2018: 0.0%, 0.0%, 0.83%, 2.10% (p = 0.013). Major mRAMs increased in prevalence annually from 2015-2018: 1.72%, 0.42%, 3.75%, 6.72% (p = 0.015). Major MRAMs (N, %) were greatest in individuals INI-E (6, 2%) vs TN (0, 0.0%) vs INI-N (1, 0.4%) (p = 0.023). Major mRAMs were greatest in INI-E (15, 5%) vs TN (5, 0.2%) vs INI-N (7, 3%) (p = 0.032). Combined Major MRAMs and Major mRAMs in our population increased annually: 1.85%, 0.42%, 4.66%, 9.01% (p < 0.001).

CONCLUSIONS: Major INI resistance mutations in both majority and minority viral variants have significantly increased over time in our patient population, particularly among INI-E individuals. Although MRAMs remained infrequent among TN and INI-N persons, the increase in minority population RAMs even in INI-naïve patients raises concern and supports our continued surveillance.

MOPEB137

HIV-1 resistance testing at second-line: Avoiding unnecessary switch to third-line

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BACKGROUND: Though patients on second-line (2L) Antiretroviral therapy is growing, data on HIV drug resistance at failure are scarce in Low and Middle Income Countries (LMIC) and very limited in South India. Hence, we aimed to examine the impact of evolving resistance mutations at the time of failure and their future available ART options.

METHODS: Cross-sectionally, 127 HIV-1 infected patients attending YRG CARE, Chennai, who were failing 2L HAART were studied, their *pol* gene spanning 1-99 codons of PR & 20 - 250 codons of RT region and mutation pattern was examined as per IAS 2018 and level of resistance were interpreted with Stanford Drug resistance database and subtype examined using REGA v3.

RESULTS: Of 127 participants failing 2L HAART [(57%) ATV/r; (43%) LPV/r], 82% had NRTI DRMs, 87% had NNRTI DRMs and 29% had PI DRMs and they were stratified according to the duration of PI exposure (months):12,

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13-24 & >24); PI major DRMs observed were M46I/L (5.4% vs. 10.4% vs. 33.3%), I54V/T/A/L/M (5.4% vs. 6.2% vs. 20.4%), V82A/F/T/S (8.1% vs. 4.1% vs. 25%) and minor DRMs L89M/T (5% vs. 2% vs. 14%) were significantly higher among participants were on >24 months ($p < 0.001$). The median PI DRMs accumulation rate was 0.08 PR mutations per month (PRMPM) [IQR 0.07-0.12] at >24 months, 0.06 PRMPM [IQR 0.04-0.23] at 13-24 months and 0.25 PRMPM [IQR 0.14-0.3] for participants failing at 12 months ($p < 0.0001$). Participants who were failing at >24 months had more resistance to DRV/r (13%), LPV/r (43%) and ATV/r (44%), compared to participants failing at 13-24 months DRV/r (6%), LPV/r (14%), ATV/r (16%) then at 12 months DRV/r (11%), LPV/r (19%), ATV/r (19%). Despite all, 71% of the 2L failures have not acquired resistance mutations in HIV-1 PR.

CONCLUSIONS: Mutation patterns reveals that currently WHO recommended third line and subsequent ART options are still an effective option for the vast majority of patients failing 2L HAART. Virological monitoring with good adherence support and individual level drug resistance testing in LMIC would reduce unnecessary switches to more costly regimens amongst those failing second-line ART.

MOPEB138

Can genotyping after second-line ART failure reduce the need for DRV/r-based third-line ART in Kenya?

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BACKGROUND: World Health Organization Interim HIV Treatment Guidelines 2018 recommend a third-line ART regimen of DRV/r +/- DTG + 1-2 NRTIs after failing a second-line regimen containing either ATV/r or LPV/r or DTG. High cost, limited accessibility, and high pill burden are disadvantages of DRV/r-based regimens. The cost of genotypic drug resistance testing (DRT) is approximately equal to two months of DRV/r in Kenya. We evaluated the impact that DRT has on reducing need for DRV/r-based third-line ART for patients failing PI/r-based second-line ART in Kenya

METHODS: Patients on PI/r-based second-line ART with viral load (VL) \geq 1,000 copies/ml are reviewed by the Kenya National HIV Clinical Support Center (NHSCC). Patients undergo enhanced adherence sessions, with VL repeated three months after addressing likely causes of viremia. A DRT is recommended if the repeat VL is still \geq 1,000 copies/ml, meeting the definition of treatment failure. DRT is performed on a Genetic Analyzer 3130xl and results are interpreted using the Stanford HIV database.

We reviewed the DRT results of all patients failing PI/r-based second-line ART who were reviewed by the NHSCC between January 2016 and December 2018

RESULTS: During the review period 348 patients (78% failing LPV/r; 22% failing ATV/r) were reviewed by the NHSCC, of whom 179 (51%) met criteria for treatment failure after intervention and repeat VL (52% female; median age 37 years). Only 86 (48% of those approved for DRT) had samples sent to the testing laboratory, with 6 (7.5%) failing amplification. Of the 80 samples with successful genotyping, we found 38 (48%) susceptible to all PIs and 2 (2%) susceptible to LPV/r and DRV/r but not ATV/r. Only 11 (14%) samples showed resistance to LPV/r and ATV/r while being fully susceptible to DRV/r, with 20 (25%) having low- or potentially low-level resistance and 9 (11%) intermediate resistance to DRV/r.

CONCLUSIONS: Access to DRT was a challenge, with samples received for only half of patients approved for DRT. However, of the patients who accessed DRT, we found that only half required a change from their current PI/r, vastly reducing the cost of switching to DRV/r-based third-line ART.

MOPEB139

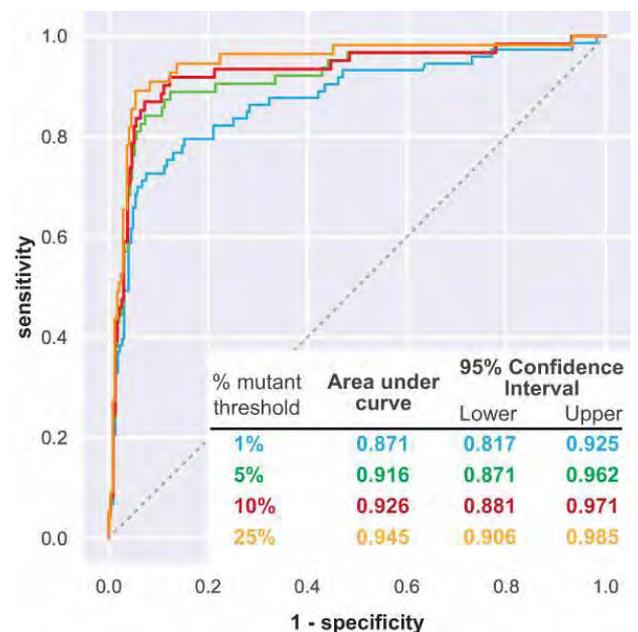
Development and evaluation of a low-cost drug resistance test "OLA-Simple" for non-nucleoside-based ART for Mexico's HIV population

N. Panpradist¹, I.A. Beck², P.S. Ruth¹, S. Avila-Rios³, C. Garcia-Morales³, M. Soto-Nava³, D. Tapia-Trejo³, M. Matias-Florentino³, H.E. Paz-Juarez³, S. del Arenal-Sanchez³, G. Reyes-Teran³, B.R. Lutz¹, L.M. Frenkel^{1,2}
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BACKGROUND: Pre-therapy HIV drug resistance (HIVDR) to non-nucleoside reverse transcriptase inhibitors (NNRTIs) is increasing globally. NNRTIs continue to be used as 1st-line antiretroviral therapy (ART) in some communities due to the cost of Dolutegravir-based ART or associated adverse events. OLA-Simple is an easy-to-use assay, guided by interactive software that reports HIVDR mutations as colored lines on lateral flow strips. OLA-Simple costs < \$20/specimen for reagents, and sample-to-result time is < 4.5h. In this work, we designed and tested the OLA-Simple probes for a Mexican cohort.

METHODS: OLA-Simple probe sequences were designed to detect K65R, K103N/S, Y181C, M184V and G190A, based on 2,412 *pol* sequences from individuals initiating NNRTI-ART across Mexico between September 2017 - March 2018. Assay conditions were optimized to discriminate mutants at frequencies of 10% within mixtures of plasmids from wild-type plasmid. Sixty plasma specimens were blindly analyzed at 300 codons by OLA-Simple kits. Signal of colored lines on OLA-Simple lateral flow strips read by in-house software was used to calculate Receiver Operating Characteristic (ROC) curves compared to next-generation sequencing (NGS).

RESULTS: PCR for OLA-Simple successfully amplified 59/60 plasma specimens (median: 103,586 range: 176 - 10,000,000 copies/mL); one with 176 copies/mL failed PCR. ROC curves show that OLA-Simple classifies mutant within an individual's HIV quasispecies at 10% and 25% by NGS (Figure 1) with an estimated accuracy of 93% and 95%, respectively.



[Figure 1. Receiver Operating Characteristic (ROC) curves of OLA-Simple compared to NGS]

CONCLUSIONS: Compared to NGS, the OLA-Simple detected HIVDR with high sensitivity and accuracy, demonstrating a significant step towards expanding access to affordable and rapid HIVDR testing, which could help guide appropriate ART choices in populations using NNRTI-based ART. Our next step is to conduct a feasibility study using software-guided protocol at CIENI/INER in Mexico City and other regional labs.

MOPEB140

High prevalence of drug-resistant HIV-1 among infants newly diagnosed with HIV-1 in Malawi

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BACKGROUND: Malawi has achieved ~90% coverage of prevention of mother-to-child transmission (PMTCT). The estimated number of perinatally infected infants among known HIV infected women has declined to 1,400 (2.5%) in 2018. Enrolment of known HIV exposed infants is almost complete and early infant diagnosis (EID) coverage among infants in follow-up is around 75%. WHO recommends HIV drug resistance (HIVDR) surveillance using remnant EID specimens from children ≤18 months to inform ART regimen selection.

METHODS: Following World Health Organization (WHO) recommendations, remnant dried blood spots (DBS) specimens from children ≤18 months of age who were confirmed HIV positive by PCR from all PMTCT sites in Malawi from September 2016 to December 2017 were included. For children with multiple DBS, the initial sample was selected. A total of 477 remnant DBS met inclusion criteria and were genotyped CDC ILB using Sanger sequencing. Drug susceptibility was predicted using the Stanford HIVdb algorithm (version 8.7).

RESULTS: A total of 453 samples, 286 (63.1%) were successfully amplified of which 267 (58.9%) were successfully sequenced. Poor quality samples and samples with longer duration before being frozen increased the amplification failure rates. Prevalence of any ARV resistance was 66.7% (178/267) and 19.9% (53/267) of samples showed dual resistance against nucleoside reverse transcriptase inhibitors (NRTI) and non-nucleoside reverse transcriptase inhibitors (NNRTI). Resistance to NRTI, NNRTI and protease inhibitors (PI) were 20.6%, 65.5% and 0.7%, respectively. Dual resistance to both NRTI and NNRTI was 19.9%. In the logistic regression analysis, being breastfed was significantly associated with an increased risk of having drug resistance mutations (OR=2.661, 95% confidence interval 1.249-5.667, p=0.011) potentially due to accumulations of sub-optimal transmitted ARV.

CONCLUSIONS: About 2/3 of children newly diagnosed with HIV had NNRTI resistance mutations, but PI resistance was very uncommon. This finding supports the preferred use of PI-based ART regimens for children under 3 years that was introduced in the Malawi guidelines in 2016. Routine PI-based treatment initiation or prompt switch to PI-based 2nd line ART for children not suppressed after 6 months on ART remain a high priority until potent and more convenient regimen options become available for small children.

MOPEB141

Validation of PANDAA qDx HIVDR RTI, a simple and scalable real-time PCR-based HIV drug resistance genotyping kit for the management of NNRTI-based ART failure

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BACKGROUND: Effective management of HIV drug resistance in low- and middle-income countries (LMICs) has been hindered by a lack of simple and scalable drug resistance genotyping options. Here we present performance validation data for the PANDAA qDx HIVDR RTI kit: a rapid, simple, real-time PCR based test that detects clinically-actionable drug resistance mutations (DRMs) in >98% of patients experiencing NNRTI-based ART failure in LMICs.

METHODS: The PANDAA qDx HIVDR RTI kit comprises three simultaneous triplex reactions, each measuring total viral nucleic acid and one of three pairs of DRM loci: K103N/G190A, K65R/Y181C, and V106M/M184V. Target-specific oligonucleotide reagents utilize Pan-Degenerate Amplification and Adaptation (PANDAA) technology, which mitigates target-proximal genomic variability that would otherwise negatively affect assay performance (e.g. false negatives, reduced sensitivity). All three triplex reactions were validated using multiple synthetic RNA constructs representing >95% of genomic diversity in target primer- and probe-binding sites (n=114,960 sequences). Linear range and lower limit of selectivity detection was determined for all triplexes using 100,000-500 RNA copies with target DRMs present at 10-100%. A small clinical study (n=38) was also performed and included plasma samples obtained from patients failing an NNRTI-based ART regimen in Botswana, for which Sanger sequences were available for concordance analysis.

RESULTS: The PANDAA qDx kit detected all DRMs with high specificity and sensitivity (>99%) across the tested linear range despite significant HIV sequence variation in target primer- and probe-binding sites. DRMs were detected when present at 10% and 20% of synthetic RNA mixes of 1,000 copies and 500 copies total viral RNA, respectively. Patient samples included in the clinical study had resistance profiles inclusive of all 6 DRMs detected by the PANDAA qDx kit, and results were 100% concordant with Sanger genotyping results.

CONCLUSIONS: With Sanger-equivalent sensitivity, the validated PANDAA qDx HIVDR RTI kit represents a simple, rapid alternative to sequencing for drug resistance genotyping relevant to NNRTI-based ART in LMICs. Clinically-actionable resistance profiles are obtained from input viral RNA within 2 hours (24 samples/run). Leveraging existing real-time PCR infrastructure in centralized testing labs, the PANDAA qDx kit is an implementable and scalable HIV genotyping option for LMICs.

Markers for the prediction of disease progression

MOPEB148

HIV viral load dynamics and impact on mortality in El Salvador, 2015-2017

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BACKGROUND: The Joint United Nations Programme on HIV/AIDS's 90-90-90 targets to end the HIV epidemic call for 90% of people on antiretroviral therapy (ART) to be virally suppressed by 2020. Progress toward this target is typically based on a cross-sectional measure of patients' most recent viral load (VL) < 1,000 copies/ml. By examining VL dynamics over time, we shed light on durable viral suppression and treatment outcomes in El Salvador.

METHODS: Using data from El Salvador's national HIV surveillance system, we summarized viral suppression among ART patients who had at least two VL tests in 2015-2017. We calculated the percentage who had at least one VL suppressed, last VL suppressed, all VLs suppressed (durable suppression), and no VL suppressed. We examined the association between viral suppression and death using multiple logistic regression to estimate adjusted odds ratios (AOR) and 95% confidence intervals (CI).

RESULTS: Of 8,901 patients who had two or more VL tests, 94% had at least one VL suppressed, 88% had last VL suppressed, 77% had durable viral suppression, and 6% had no VL suppressed. Results did not differ between men and women, but children had higher suppression than adults across all categories. Compared to patients with durable suppression, patients not durably suppressed had significantly higher odds of death after controlling for age and sex (last VL suppressed: AOR 1.61, 95% CI 1.04-2.50; at least one but not last VL suppressed: AOR 4.00, 95% CI 2.65-6.06; no VL suppressed: AOR 14.13, 95% CI 10.63-18.77).

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Characteristics	Total [n (column %)]	≥ 1 viral load(s) suppressed [n (row %)]	Last viral load suppressed [n (row %)]	All viral loads suppressed [n (row %)]	No viral load suppressed [n (row %)]
All	8,901 (100)	8,344 (94)	7,845 (88)	6,880 (77)	557 (6)
Sex					
Female	3,813 (43)	3,578 (94)	3,336 (87)	2,896 (76)	235 (6)
Male	5,088 (57)	4,766 (94)	4,509 (89)	3,984 (78)	322 (6)
Age (years)					
< 15	188 (2)	180 (96)	174 (93)	153 (81)	8 (4)
≥ 15	8,713 (98)	8,164 (94)	7,671 (88)	6,727 (77)	549 (6)

[Viral suppression (<1,000 copies/ml) among ART patients with at least two viral load tests, El Salvador, 2015-2017]

CONCLUSIONS: Nearly 90% of ART patients in El Salvador were virally suppressed at their last VL test. However, use of the last VL measure resulted in viral suppression that was 11 percentage points higher than durable suppression. Because non-durable suppression was significantly associated with mortality, further investigations could identify reasons for non-durability to ensure patients maintain viral suppression.

MOPEB149

Progressive linear antibodies quantitation decay over time among individuals under antiretroviral suppressive treatment; results of SPARC-7 clinical trial

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BACKGROUND: Major obstacles to HIV achieving a sustained HIV remission without antiretrovirals include latency, sanctuaries, and residual HIV replication. Establishment of tools to measure the size of HIV reservoir is fundamental for HIV curative strategies. We evaluate antibodies/antigen quantitation (Ab/Ag) as a potential surrogate marker for persistent of HIV replication.

METHODS: Tested samples are from the pilot proof of concept clinical trial (SPARC-7 Trial; NCT02961829) aiming to reduce residual HIV replication and the pool of HIV chronically infected cells from antiretroviral treated individuals. 5 arms with five male patients each followed every 4 weeks of the experimental treatments with

- 1) no intervention, i.e. continuation of ART (tenofovir/3TC and efavirenz),
- 2) intensified ART (ART + dolutegravir and maraviroc),
- 3) intensified ART and histone deacetylase inhibitors (intensified ART + nicotinamide),
- 4) intensified ART plus auranofin and
- 5) partially intensified ART (ART + dolutegravir) were evaluated.

Antibody quantitation using the Abbott Architect HIV Ag/Ab Combo assay which simultaneously detects HIV p24 antigen and antibodies to HIV-1 group M and group O was tested were measured over time (baseline, week 12, week 24, week 36, and week 48). Total viral DNA was measured as an estimate of the viral reservoir by real time PCR following in-house analyses aimed at ruling out the effect of PCR inhibitors.

RESULTS: A progressive linear decline in the HIV antibody/antigen quantitation was observed in groups. Paired t-tests of differences between baseline and wk48 showed significant decrease in Ab/Ag measurement (RLU (S/CO) in G1 from 840.79 to 776.400 (p=0.0006), G2 from 235.82 to 227.955 (p=0.0220), G3 from 91.75 to 59.0 (p=0.0099), G4 from 992.67 to 957.38 (p=0.0009), G5 from 735.46 to 698.17 (p=0.0067). there was no relationship in the level of Ab/Ag decay and quantitation of total proviral DNA.

CONCLUSIONS: These findings suggest that there is a progressive antigenic decay over time among individuals under suppressive antiretroviral therapy, probably due to the progressive decrease of the pool of replicative competent viruses.

ART in acute infection

MOPEB223

Mortality trends among early ART initiators following implementation of test and start approach at 11 high volume HIV clinics, TASO Uganda

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BACKGROUND: Studies have shown that ART reduces Mortality among HIV/AIDS patients by 90%.The UNAIDS 95 95 95 fast-track strategy hall-marks the current global effort to end the HIV/AIDS epidemic by 2030. High attrition and mortality characterize many HIV clinics. Uganda has reported a decline in mortality with increased ART coverage since 2005, and revised the treatment guidelines in 2014 with test and start among specific vulnerable populations, and adopted the WHO's 'treatment for all positives' in 2016. We analyzed the trend of mortality among early ART initiators at 11 high volume HIV clinics in TASO before and after test and start implementation.

METHODS: We conducted a systematic review of 118,272 HIV positive patients enrolled on ART at the 11 high volume centers of excellence between 2004 and 2018, and analyzed de-identified patient data retrieved from our medical data bases to establish trends in mortality among ART initiators at the 11 high volume ART sites. For each year of ART start, we estimated the proportion of patients who died over the follow-up period.

RESULTS: There was a sharp decline in mortality among patients initiated on ART from 2004 to 2014, consistent with the known ART benefits. However, the mortality started rising from 2014 to 2016 among new ART initiators, coinciding with the implementation of Test and Start (see Figure below). The later observed decline between 2016 and 2018 could be due to improvement in managing patients starting ART early.

CONCLUSIONS: Test and start approach reduces delayed ART initiation and increases coverage. However, inadequate adherence counselling before ART commencement among early ART initiators may result into attrition including death which ART clinics need to monitor.

ART in first- and second-line therapies

MOPEB224

TDF-based regimens: Are they suitable for same-day antiretroviral treatment initiation without baseline laboratory test results in Thailand?

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BACKGROUND: Same-day antiretroviral treatment (SDART) initiation is vital for accomplishing the 2nd 90 of the UNAIDS 90-90-90 targets for treatment-as-prevention. The recommended first-line ART regimen in Thailand is tenofovir disoproxil fumarate (TDF)/emtricitabine or lamivudine/efavirenz. Renal function is a major concern when using TDF-based

regimens. We explored the prevalence of abnormal renal function and associated risk factors among HIV-positive clients accessing SDART services in Thailand.

METHODS: SDART has been implemented among eight hospitals throughout Thailand: Bangkok and Chonburi (Central), Chiang Mai and Chiang Rai (Northern), and Songkhla (Southern). Data from the SDART cohort were collected from July 2017 through December 2018. HIV-positive clients who accepted SDART underwent laboratory investigations, according to national guidelines. Physicians determine SDART eligibility based on medical history, physical examination, and chest x-ray to exclude serious opportunistic infections, particularly tuberculosis and cryptococcal meningitis, without waiting for all laboratory test results. Creatinine clearance (CrCl) was calculated using the Cockcroft-Gault equation. Logistic regression was used to explore factors associated with low CrCl (< 60 ml/min).

RESULTS: Among 2,594 HIV-positive clients who accepted SDART, 84% were eligible for initiation. Sixty-four percent were men who have sex with men, and 5% were transgender women. Mean age was 30 years old (SD 9.10). Low CrCl was found in 0.89%. ART was initiated on the first day of HIV diagnosis or care engagement in 74.5%, another 17.5% started within the next 7 days. TDF-based regimens were prescribed for 99.3% at initiation, only 0.07% of these clients had to subsequently switch to non-TDF-based regimens due to low CrCl. In multivariable analysis, age >50 years (OR 10.81; 95% CI 1.23-95.49; $p=0.032$) and clients in Northern Thailand (OR 2.63; 95% CI 1.01-6.90; $p=0.049$) were associated with low CrCl.

CONCLUSIONS: Given the low proportions of creatinine abnormalities among Thai HIV-positive clients, TDF-based regimens are still applicable as country's first-line regimens to safely and rapidly roll out SDART initiation. SDART services were proved to be feasible and very effective in key strategic provinces in Thailand. Affordable abacavir and/or tenofovir alafenamide-based regimens could be safer alternatives for older clients and clients in certain geographical areas.

MOPEB225

Week 96 resistance and adherence analyses of the once-daily, single-tablet regimen (STR) darunavir/cobicistat/emtricitabine/tenofovir alafenamide (D/C/F/TAF) in the AMBER and EMERALD phase III trials

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BACKGROUND: Through 96 weeks in two phase 3 trials, D/C/F/TAF 800/150/200/10mg showed a high virologic response rate and low virologic failure rate in AMBER (ART-naïve adults) and EMERALD (virologically-suppressed adults). Week 96 resistance and adherence results from both trials are presented.

METHODS: Patients in the D/C/F/TAF and control arms (AMBER: D/C/F/TDF; EMERALD: bPI+F/TDF) of both trials switched after/at Week 48 to D/C/F/TAF in an open-label extension phase until Week 96.

Post-baseline samples for genotyping/phenotyping were analyzed in patients with PDVF in AMBER (virologic non-response, virologic rebound, and/or viraemic at final timepoint) or EMERALD (protocol-defined virologic rebounders) with viral load ≥ 400 copies/mL at failure or later timepoints. In AMBER, deep sequencing was performed post-hoc.

D/C/F/TAF treatment adherence was measured by drug accountability.

RESULTS: Through Week 96 across both studies, no darunavir, primary PI or tenofovir RAMs were observed in the D/C/F/TAF or control arms (Table 1).

In the AMBER D/C/F/TAF arm, an emtricitabine RAM (M184I/V) was identified at Week 36 in one patient. M184V was detected pre-treatment as a minority variant (9%) in this patient. In the control arm, M184V was detected at Week 84 (after switch to D/C/F/TAF) in one patient, but M184V was not detected pre-treatment by deep sequencing.

After switch to open-label STR D/C/F/TAF, the proportion of adherent patients ($\geq 95\%$) was high, with a trend for improved adherence after switch: 87.2% to 90.0% ($p>0.05$ improved adherence) and 82.6% to 90.0%

($p=0.0046$) for, respectively, D/C/F/TAF and control arms in AMBER, both switching from 3 pills (double-blind) to 1 pill; and from 83.3% to 87.3% ($p=0.064$; post-hoc) for the control arm in EMERALD.

CONCLUSIONS: The STR D/C/F/TAF provided a high genetic barrier to resistance with rare emergence of emtricitabine RAMs (< 0.1%) and no darunavir, primary PI or tenofovir RAMs, and achieved high adherence rates through 96 weeks in both studies.

Study	ART	Patients, N	Patients with PDVF, n (%)	PDVF patients evaluated for resistance, n (%)	Patients with ≥ 1 RAM post-baseline, n (%)	
					Reverse transcriptase	Protease
					FTC/TFV	Primary Pildarunavir
AMBER (NCT02431247)	D/C/F/TAF	362	15 (4.1)	9 (2.5)	M184IV ^a , n=1	0
	Control	363	19 (5.2)	8 (2.2)	M184V ^b , n=1	0
EMERALD (NCT02290977)	D/C/F/TAF	763	24 (3.1)	4 (10.5)	0	0
	Control ^c	352	8 (2.3)	2 (10.6)	0	0
Total	D/C/F/TAF	1125	39 (3.5)	13 (11.2)	1 (<0.1)	0

RAM, resistance-associated mutation; ART, antiretroviral treatment; PDVF, protocol-defined virologic failure; FTC, emtricitabine; TFV, tenofovir; PI, protease inhibitor; D/C/F/TAF, darunavir/cobicistat/emtricitabine/tenofovir alafenamide

^aConferring phenotypic resistance to emtricitabine and lamivudine. M184V was detected pre-treatment by deep sequencing (9%). At week 12 only the wild-type genotype was detected. At week 36, M184I (32%) and M184V (87%) were detected. This patient had transmitted NNRTI resistance shown by the presence of K103N at screening. Adherence based on pill count from baseline to switch was $\geq 95\%$. Observed darunavir plasma concentrations were low, and the patient discontinued due to non-compliance.

^bM184V was not detected pre-treatment at screening by deep sequencing and was detected at week 84 (99%). Adherence was 90% (baseline-switch) and 92% (switch-week 96) (no PK data were available).

^cSwitch to D/C/F/TAF through Week 96.

[Table 1. Post-baseline resistance through Week 96 evaluated in patients with PDVF in the AMBER and EMERALD Phase 3 clinical studies]

MOPEB226

Characterization of HIV-1 gag polymorphisms in Ugandan patients failing second line ART

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BACKGROUND: Naturally occurring HIV-1 polymorphisms affect response to ART, which may be exacerbated in highly variable non-B subtype HIV-1 strains. Here we evaluated a group of Ugandan patients failing a PI-based regimen -despite good adherence- without known PI-resistance mutations in the protease (PR). We hypothesize that unidentified polymorphisms in Gag could be responsible for treatment failure.

METHODS: Plasma samples and clinical/demographics data were obtained from HIV-infected individuals failing a PI-containing regimen with (n=28, Group A) or without (n=64, B) PI-resistance mutations in the PR as detected by Sanger sequencing at the Joint Clinical Research Center Kampala, Uganda. Samples from PI-naïve patients (n=28, C) were included as control. An all-inclusive deep sequencing-based HIV-1 genotyping assay (DEEPGEN™) was used to sequence gag and pol. We used a Support Vector Machine to identify novel polymorphisms in Gag that could be associated with clinical outcome.

RESULTS: Majority of the participants were females (62%), with median plasma HIV-1 RNA loads of 5.21, 5.47, and 4.69 log₁₀ for Groups A, B, and C, respectively. All patients in Groups A and B were failing mainly LPV/r-based regimens, with no difference in exposure to NRTIs and/or NNRTIs. As expected, A1 was the most prevalent subtype (50%), followed by subtypes D (23%), C (2%), and singular recombinant forms (25%). No difference in subtype distribution was observed among the groups of patients. Multiple viruses showed reduced susceptibility to NRTIs and/or NNRTIs, e.g., up to 54% and 68% were highly resistant to 3TC/FTC and/or EFV/NVP, respectively. Interestingly, we identified 8 polymorphisms in Gag, i.e., one in p2 (T12N), one in p17 (D117Q), and six in p6 (E12A, R16G, V19E, T21I, I31K, and R42K), present in all viruses from Group B but absent in the other two groups of patients.

CONCLUSIONS: To our knowledge, this is the first description of these particular polymorphisms as potentially associated with PI resistance. Ongoing phenotypic assays based on Gag/Pol-recombinant viruses will help characterize their association with reduced susceptibility to PIs.

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MOPEB227

Options for clinically diagnosing cART neurotoxicity in HIV-positive patientsG. Arendt, M. Piek, E. Orhan
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BACKGROUND: In the era of antiretroviral combination therapy (cART) HIV-positive patients have almost the same life expectancy as HIV-negative persons. This means that they have to take their medication over decades. Thus, discussion of treatment side effects is vivid, among others that on a potential neurotoxicity of antiretrovirals. But besides this discussion patients are not examined for neurotoxic side effects of their cART in clinical practice.

METHODS: We retrospectively analysed data of more than 4000 patients for individuals with pathological neuropsychological test results before treatment start (T-1), improvement and/or test normalisation during the months following therapy start (T1) and neuropsychological deterioration in the years after improvement (T2) despite sustained virological response and good CD4+ cell counts on stable cART. We focused on patients receiving a nucleoside backbone with ABC/3TC or TDF-TAF/FTC combined with non-nucleoside inhibitors of the reverse transcriptase (NNRTIs) or protease inhibitors (PIs). Patients with rising plasma viral load and deteriorating test results under similar cART combinations served as controls.

RESULTS: We extracted 929 patients on ABC/3TC backbone and 325 on TDF-TAF/FTC. 27% of the patients on ABC/3TC and 22.5% on TDF-TAF/FTC deteriorated neuropsychologically despite successfully suppressed plasma viral load within a decade following treatment start. We classified them as patients with potential neurotoxic cART side effects. 5% of this group on ABC/3TC backbone group and 3.9% of the TDF-TAF/FTC treated patients had a detectable cerebrospinal fluid (CSF) viral load whereas 20% in the ABC/3TC and 16.8% of the TDF-TAF/FTC group had a CSF lactate > 2.5 mmol/l, while having an undetectable CSF-VL. We expect the latter to have neurotoxic cART side effects.

CONCLUSIONS: We conclude that there are options for finding clinical hints for cART neurotoxicity which could be further evaluated by f. ex. MR-spectroscopy. We are well aware that these are preliminary results which have to be confirmed by prospective analysis.

MOPEB228

Validation of HIV-ASSIST, an online clinical decision support tool to guide patient-centered ARV regimen selectionM.V. Maddali¹, J. Ramirez², J.Z. Budak³, J.Z. Li⁴, H. Lampiris^{3,5}, M. Shah⁶
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BACKGROUND: Current US guidelines advocate for an individualized approach to ARV regimen selection that can be complex. HIV-ASSIST (www.hivassist.com) is a free, online, educational tool developed at Johns Hopkins University to provide ARV decision support for clinicians caring for patients with HIV. Using a multi-criteria decision analysis framework, HIV-ASSIST synthesizes patient-specific (e.g., comorbidities, comedication, CD4 cell count, treatment history) and virus-specific (e.g., HIV viral load, mutation profile) attributes to rank all ARV combinations by an aggregate 'weighted utility score.' Algorithms are calibrated such that regimens with lower scores (i.e., < 2 on a continuous scale 0-10+) are considered more preferred in relation to the composite objective of achieving viral suppression while maximizing tolerability and adherence.

METHODS: We conducted a retrospective validation study of newly enrolled patients to assess concordance of HIV-ASSIST recommendations with prescribing practices of experienced HIV providers at the Johns Hopkins Bartlett HIV clinic (2017-2018) and San Francisco VA HIV clinic

(2015-2018). Patient characteristics were abstracted from chart review to generate HIV-ASSIST recommendations, which were compared to prescribed regimens. For each provider prescribed regimen, we assessed the 'weighted score,' concordance (to the top five ranked outputs), and overall rank (relative to other regimens).

RESULTS: Among 93 patients (13% female), 20 (21.5%) were treatment naïve. HIV-ASSIST outputs for treatment naïve patients were 100% concordant with prescribed regimens (median rank 1 [IQR 1-2], median weighted score 1.0 [IQR 1.0-1.0]). For 15 (16%) ART-experienced patients with ongoing viremia, HIV-ASSIST outputs were 87% concordant with prescribed regimens (median rank 1 [IQR 1-3], median weighted score 1.0 [IQR 0.9-1.2]). For the 53 (57%) patients that were suppressed, HIV-ASSIST recommendations were concordant 88% of the time (median rank 1 [IQR 1-3], median weighted score 1.0 [IQR 1.0-1.2]). In 7% of cases, HIV-ASSIST weighted score suggested that the prescribed regimen would be considered 'less preferred' (score > 2) than other available alternatives.

CONCLUSIONS: HIV-ASSIST is a patient-centric educational decision support tool that provides ARV recommendations concordant with experienced HIV providers at two major academic centers for a diverse set of patient scenarios. Larger prospective studies are needed to assess the impact of implementation on provider knowledge and patient outcomes.

MOPEB229

Cost-effectiveness of Dolutegravir in HIV-1 treatment-naïve patients in MexicoY. Puneekar¹, O. Cerezo², M. Banda², G. Tremblay³, T. Holbrook⁴, J. Piercy⁴
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BACKGROUND: The aim of this analysis was to evaluate the cost-effectiveness of dolutegravir in combination with abacavir and lamivudine (DTG/ABC/3TC; Triumeq[®]) compared to cobicistat-boosted-efavirenz with tenofovir alafenamide and emtricitabine (EVG/c/TAF/FTC; Genvoya[®]) among treatment-naïve HIV-1 infected patients in Mexico.

METHODS: A Markov model was developed taking the health care system perspective. Response rates defined by the probability of virologic suppression (HIV RNA < 50 copies/mL) at 48 weeks were obtained from a recently published network meta-analysis. Patients were distributed across CD4 health states based on their response to treatment, allowing the calculation of both costs and quality-adjusted life-years (QALYs). Baseline patient characteristics and health state utilities were informed using pooled data from DTG phase 3 clinical trials (SINGLE, SPRING-1, SPRING-2 and FLAMINGO). Costs included were drug costs, medical and non-medical routine care, treatment for complications, adverse events and loss of productivity. A patient lifetime (60 years) analysis was conducted discounting costs and outcomes by 3.5%. Outcomes included QALYs, life-years (LYs), incremental cost per QALY ratio (ICER) and incremental cost per responder (ICPR). The year of analysis was 2018. Probabilistic sensitivity analyses (PSA) were also conducted to explore the impact of multiple parameters.

RESULTS: Treatment costs for 30-days were estimated to be \$2,285.85 for DTG/ABC/3TC, \$2,000 for EVG/c/TDF/FTC and, \$5,326.55 for follow-on treatment of ritonavir-boosted-darunavir (DRV/r)+TDF/FTC. Treatment with DTG/ABC/3TC resulted in higher proportion of responders and longer duration of response resulting in higher LYs and QALYs. The total treatment and management costs were lower resulting in DTG/ABC/3TC dominating EVG/c/TDF/FTC (Table 1).

Interventions	Proportion of responders	Mean months of response	LYs	QALYs	Total drug costs	Adverse events costs	Total costs	Incremental cost per month of response	Costs/QALY
DTG/ABC/3TC	71.8%	88.74	11.47	10.24	\$372,229	\$3,608	\$387,793	-\$617	Dominant
EVG/c/TAF/FTC	66.4%	82.65	11.40	10.18	\$374,581	\$4,889	\$391,546		

[Table 1. Discounted costs and outcomes]

PSA suggested that the probability of DTG/ABC/3TC being cost effective was 57% at a willingness to pay of \$10,000/QALY.

CONCLUSIONS: DTG/ABC/3TC is likely to be a cost effective treatment for naïve patients with HIV-1 in Mexico compared to EVG/c/TAF/FTC. These results need to be further confirmed with further long-term real-world studies.

MOPEB230

Predictors of death in a large cohort of HIV patients in Ukraine

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BACKGROUND: Timely initiation of ART, adherence support, proper management of virologic failure are important strategies for reaching the ambitious 90-90-90 goals in Ukraine and globally. Key national stakeholders and international donors set ambitious fast track goals to increase the number of patients from 88,270 on 01/01/2018 to 140,000 by the end of 2018. This study was commenced to obtain reliable data on key determinants of mortality that need to be tackled to improve treatment effectiveness and inform program planning.

METHODS: Data from medical charts of all patients who started ART in 2010-2016 in 18 out of 27 regions of Ukraine were entered into an electronic medical record system. After verification of data quality, depersonalized datasets linked by unique patient code were extracted at each facility and merged for analysis.

This analysis focused on the effect of clinical variables (mode of HIV transmission, clinical stage, CD4, VL, TB, HCV, injecting drug use [IDU]) on probability of death. The entire dataset, excluding children younger than 15 at diagnosis, was analyzed using Cox proportional hazard models.

RESULTS: The cohort included 33,589 patients; median age at ART initiation was 36 years, 47.9% were females. 2,418 (7.2%) patients died during 90,486 person-years (PY) of observation, resulting into 2.67/100PY death rate (95% CI: 2.57-2.78).

In the multivariable Cox regression model, higher probability of death was associated with male gender (aHR=1.42, 95% CI: 1.26-1.59), history of IDU (aHR=1.17, 95% CI: 1.04-1.31) and current IDU (aHR=2.03, 95% CI: 1.70-2.42, compared to unconfirmed IDU status), and a positive TB clinical test (aHR=1.95, 95% CI: 1.69-2.24, compared to unknown TB status). Protective factors were higher CD4 count at ART initiation (aHR=0.20, 95% CI: 0.16-0.24, for >500 compared to < 200), last viral load result < 200cp/ml (aHR=0.28, 95% CI: 0.25-0.31).

HCV negative status was a significant predictor of survival in univariable analysis (HR=0.59, 95% CI: 0.53-0.65), but became not significant in the multivariable model.

CONCLUSIONS: Survival of patients on ART in Ukraine remains suboptimal. Higher mortality in advanced stages of disease highlights the importance of implementation of test-and-start strategy. Adequate management of comorbidities, especially drug dependence, TB and HCV is crucial for improved survival.

MOPEB231

Dolutegravir (DTG) plus lamivudine (3TC) versus DTG plus tenofovir/emtricitabine (TDF/FTC) fixed-dose combination in the GEMINI studies - viral load rebound including blips' through 48 weeks

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BACKGROUND: GEMINI-1 and GEMINI-2 are identical double-blind, multicentre, randomized, phase III, non-inferiority studies comparing dolutegravir+lamivudine (DTG+3TC) two-drug regimen (2DR) with DTG+tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) three-drug regi-

men (3DR) once daily in HIV-1-infected ART-naïve adults, with screening HIV-1 RNA viral load (VL) < 500,000 c/mL. DTG+3TC was non-inferior to DTG+TDF/FTC through 48 Weeks, with respectively 91% (655/716) versus 93% (669/717) achieving VL < 50 c/mL using FDA snapshot algorithm. We assessed VL rebound through 48 weeks of therapy.

METHODS: VL rebound after suppression to < 50 c/mL was assessed in two major participant categories (see TABLE): (1) with only VL ≥ 50 and < 200 c/mL, or (2) at least one VL ≥ 200 c/mL after Day 1 (Baseline), and also (3) never suppressed to < 50 c/mL. Blips were defined as VL ≥ 50 and < 200 c/mL bounded by VL < 50 c/mL. Confirmed Virologic Withdrawal (CVW) criterion for resistance testing was: VL decrease < 1 log₁₀ c/mL by Week 12, with subsequent confirmation, unless VL < 200 c/mL; or confirmed VL ≥ 200 c/mL on or after Week 24; or confirmed VL ≥ 200 c/mL after prior confirmed VL < 200 c/mL.

RESULTS: 1433 participants were randomized and exposed (DTG+3TC, 716; DTG+TDF/FTC, 717) across both studies. At Week 48 six participants in the DTG+3TC group (0.8%) and four in the DTG+TDF/FTC group (0.6%) met CVW criteria; no participants in either arm meeting CVW had blips. No participants had treatment emergent resistance. Elevated VLs (Table) were comparable across arms; most participant VL rebounds occurred in Category 1, and most occurrences as defined blips.

	DTG + 3TC (N=716)	DTG+TDF/FTC (N=717)
1. Subjects with VLs between 50-200 c/mL and no viral load ≥ 200 c/mL after suppression to < 50 c/mL	98 (14%)	101 (14%)
1a. VLs between 50-200 c/mL with adjacent values < 50 c/mL ("blips")	83 (12%)	93 (13%)
1b. ≥ two consecutive VLs between 50-200 c/mL	15 (2%)	8 (1%)
2. Subjects with least one VL ≥ 200 c/mL after suppression to < 50 c/mL	19 (3%)	22 (3%)
2a. a single VL ≥ 200 c/mL with adjacent viral loads < 200 c/mL	14 (2%)	19 (3%)
2b. ≥ two consecutive VLs ≥ 200 c/mL (CVW)	5* (0.7%)	3** (0.4%)
3. Subject VL never < 50 c/mL (most had only Day 1 (Baseline) visits)	8 (1%)	7 (1%)
Total (all categories)	125	130

*One CVW in DTG+3TC arm never achieved < 50 c/mL, thus is counted in category 3. **One CVW in DTG+TDF/FTC arm was confirmed after Wk48 at Wk 60, thus is counted in category 2a in this analysis.

[Subject Categories (both 1 and 2 were after suppression to < 50 c/mL)]

CONCLUSIONS: The incidence of participants with blips through 48 weeks was similar between the DTG+3TC 2DR and DTG+TDF/FTC 3DR arms. Other categories for VL ≥ 50 occurred infrequently in all groups. CVWs were not associated with VL blips. This is further evidence for the efficacy and potency of DTG+3TC for the treatment of HIV.

MOPEB232

Adoption of 2018 WHO recommendations on preferred first line antiretroviral therapy

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BACKGROUND: The 2018, WHO interim guidelines on the use of antiretroviral regimens for treating and preventing HIV infection recommends a dolutegravir (DTG)-based regimen as preferred 1st-line therapy. In women of child-bearing potential (WCBP), caution and contraception use when taking DTG was advised, due to a reported risk of neural tubal defect. We present the current situation on adoption of DTG preferred 1st-line therapy in countries.

METHODS: Between June -December 2018 we collected data on the adoption of DTG in countries through calls with national HIV treatment programmes and review of national guidelines. We categorized adoption as

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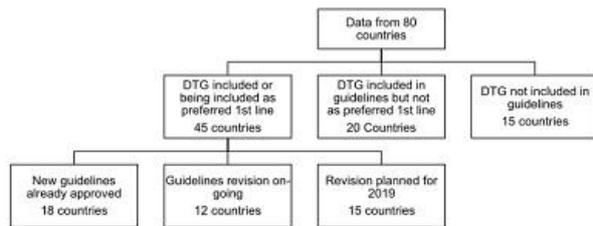
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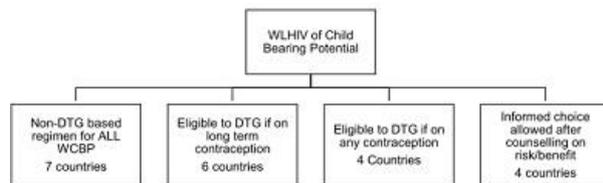
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follows: DTG not included in guidelines, DTG included but not as preferred 1st-line and DTG included as preferred 1st-line. For the latter, we described the population eligible for DTG-based regimens.

RESULTS: Data from 80 countries are summarized in figure 1. Among 30 countries that included DTG as preferred 1st line, 21 shared information on the eligible populations; in all countries DTG is preferred 1st-line therapy for men and in 20 countries for women of postmenopausal age. Ten countries adopted DTG for children, and discussions are ongoing in the remaining. The main difference is the approach by countries for WCBP (Figure 2). **CONCLUSIONS:** There has been rapid uptake of 2018 WHO recommendations on the use of DTG as preferred 1st-line therapy, however gaps remain in its adoption for all population. Expanding access to contraception for women will be key to ensure harmonisation and optimisation of ART regimens for children, adolescents and women living with HIV.



[Figure 1. DTG as first-line therapy: policy adoption by countries (Dec 2018)]



[Figure 2. Eligibility for DTG-based regimens for women of child-bearing potential in countries with]

MOPEB233

Comparing low-dose efavirenz to standard-dose efavirenz and dolutegravir: A systematic literature review and network meta-analysis

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BACKGROUND: The ENCORE-1 trial suggested that low-dose efavirenz (EFV₄₀₀) may be a more tolerable and as efficacious alternative to standard dose efavirenz (EFV₆₀₀). With dolutegravir (DTG) now the anchor treatment drug of the preferred first-line regimen, results of the NAMSAL trial could provide further insights into the therapeutic landscape.

METHODS: We updated the evidence base obtained from a systematic literature review conducted on February 2018 by adding recently presented results of the NAMSAL trial. This was the same evidence base used to update the WHO consolidated HIV guidelines in 2018. Outcomes extracted from the NAMSAL trial were: viral suppression at 48 weeks, change in CD4 cell count at 48 weeks, discontinuations, mortality, AIDS defining illnesses (ADI), and treatment-related adverse events. Data were analyzed using network meta-analyses (NMA) in the Bayesian framework. We defined nodes by the anchor treatment drug and adjusted for differences in backbone therapies using arm-specific meta-regression adjustments. Meta-regression on baseline CD4 cell count, HIV RNA levels, proportion of males and age were conducted. Note that the NAMSAL trial was seen as an outlier with respect to baseline HIV RNA.

RESULTS: A total of 71 trials reporting on 163 arms and containing 33,764 patients were included in the analysis. The random-effects unadjusted model was selected throughout. Meta-regression adjustments did not change estimate sizes. DTG continued to have the highest probability of suppression (odds ratio [OR] relative to EFV₆₀₀: 1.80; 95% credible interval

[CrI]: 1.43, 2.26) and was now statistically differentiable from EFV₄₀₀ (OR: 1.40; 95% CrI: 1.06, 1.88). EFV₄₀₀ was differentiable from EFV₆₀₀ with respect to improvement in CD4 cell count (mean difference: 26.85 cells/mL; 95% CrI: 4.30, 49.77) and treatment related adverse events (OR: 0.70; 95% CrI: 0.61, 0.96). There were too few deaths and ADIs for meaningful differences to be found.

CONCLUSIONS: The addition of the NAMSAL trial did not alter the results of the 2018 NMA. EFV₄₀₀ appears to be equivalent to EFV₆₀₀ with some favorable efficacy and safety results.

ART in highly treatment-experienced people

MOPEB234

A subgroup analysis of the week 96 efficacy and safety results evaluating fostemsavir in heavily treatment-experienced HIV-1 infected participants in the phase 3 BRIGHT study: Results from the randomized cohort

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BACKGROUND: FTR is an investigational, first-in-class, attachment inhibitor prodrug of the active moiety temsavir (TMR). BRIGHT is an ongoing Phase 3 study evaluating fostemsavir (FTR) in heavily treatment-experienced (HTE) patients with multidrug resistant HIV-1 and unable to form a viable ARV regimen. Results through Week 48 were presented previously. Subgroup analyses of Week 96 outcomes from the Randomized Cohort (RC) are presented here.

METHODS: HTE participants failing their current ARV regimen (confirmed HIV-1 RNA >400 c/mL) were assigned to the RC if they had 1-2 ARV classes remaining at baseline. Following an 8-day period of blinded fostemsavir or placebo atop failing ARV regimen, participants commenced open-label FTR plus individualized optimized background therapy (OBT). The Non-Randomized Cohort is not described. Virologic and immunologic response was analyzed by demographic and key baseline disease characteristics. Safety results were analyzed by baseline CD4 categories.

RESULTS: Virologic response at Week 96 for the RC was increased from Week 48 and comparable across most subgroups (Table-1) except in subgroups with well-established predictors of reduced response [high baseline viral loads (VL), low baseline CD4 count]. A higher percentage of participants with baseline CD4 counts < 20 cells/μL compared to ≥200 cells/μL had SAEs (46% vs 27%) and deaths (8% vs 3%). Importantly, immunologic improvements were comparable across all subgroups, including a mean increase of 240 cells/μL in participants with baseline CD4 counts < 20 cells/μL.

CONCLUSIONS: Subgroup analysis of the Week 96 BRIGHT data for the RC show remarkable efficacy with FTR across a wide spectrum of HTE patients including comparable and durable rates of virologic response in older, Black and female participants compared to their counterparts. Serious adverse events were predominantly in participants with very low starting CD4 counts. Clinically meaningful improvements in CD4 counts were seen across all subgroups, including those most immune suppressed at baseline.

	Week 96 (Fostemsavir plus Optimized Background Therapy)			
	HIV-1 RNA (<40 copies/mL) – Snapshot Analysis		CD4+ Count (cells/μL)	
	N	n (%)	n	Mean ΔBL (SD)
Total Randomized Cohort	272	163 (60)	213	204.7 (191.28)
Subgroups				
Age (years)				
<35	61	35 (57)	41	291.6 (230.64)
35 to <50	101	61 (60)	81	165.8 (148.51)
≥50	110	67 (61)	84	192.7 (189.95)
Gender				
Male	200	118 (59)	157	186.8 (165.96)
Female	72	45 (63)	56	255.2 (243.72)
Race¹				
White	185	103 (56)	137	209.5 (198.89)
Black, African American	60	41 (68)	51	203.7 (179.20)
Geographic Region¹				
North America	108	61 (56)	82	147.1 (159.86)
Europe	51	28 (55)	37	305.9 (259.51)
South America	105	67 (64)	89	211.0 (170.09)
BL Viral Load (copies/mL)				
<1,000	31	23 (74)	25	137.0 (202.37)
1,000 to <10,000	44	32 (73)	38	147.1 (190.38)
10,000 to <100,000	117	69 (59)	91	218.1 (181.11)
≥100,000	80	39 (49)	59	250.0 (190.40)
BL CD4+ (cells/μL)				
<20	72	33 (46)	54	239.8 (196.25)
20 to <50	25	14 (56)	17	200.9 (77.48)
50 to <100	39	21 (54)	26	198.8 (123.67)
100 to <200	63	41 (65)	52	172.3 (140.25)
≥200	73	54 (74)	64	205.0 (255.47)
Fully Active ARVs in Initial OBT				
ARV = 0 ²	16	3 (19%)	6	322.0 (304.87)
ARV = 1	142	92 (65%)	120	205.8 (177.91)
ARV = 2	114	68 (60%)	87	195.2 (189.85)

ΔBL (change from baseline), SD (standard deviation), ARV (antiretroviral)
¹ Subgroup categories with few subjects are not shown.
² The 16 participants with zero fully active ARVs in initial OBT include participants who (1) discontinued from the study during the blinded period and never started OBT, (2) were not treated with a fully active ARV in their initial OBT in spite of having a fully active ARV available at screening and (3) were inadvertently assigned by the investigator to the RC in spite of having no fully active ARV available at screening.

[Table 1. Virologic and Immunologic Response by Subgroup at Week 96 (Randomized Cohort)]

MOPEB235

Long-term outcomes in a large randomized trial of HIV Salvage therapy: 96-week final results of AIDS clinical trials group study A5241 (OPTIONS)

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BACKGROUND: Short-term results of the OPTIONS trial showed that NRTIs can be safely omitted from therapy as long as the regimen has cumulative activity of >2 active ARVs. The long-term durability of this approach and outcomes in persons with more-extensive resistance are uncertain.

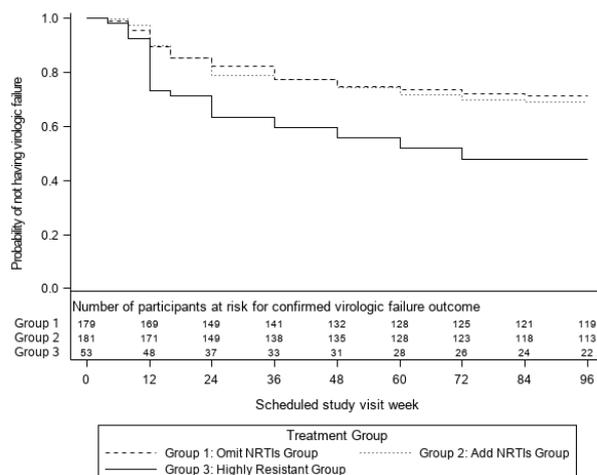
METHODS: Treatment-experienced participants with virologic failure and cumulative activity >2 active ARVs received an optimized regimen and were randomized to Omit or Add NRTIs. A third Highly-Resistant group (cumulative activity ≤2 active agents) received optimized regimen including NRTIs.

RESULTS: At week 96, ACTG 360 participants randomized to Omit (n=179) or Add NRTIs (n=181), 70% and 65% had VL < 200 copies/mL, respectively. In the Highly-Resistant group (n=53), 53% had VL < 200 copies/mL. Virologic failure was uncommon after week 48 (Figure 1). Younger age (≤46 vs. >46, OR=4.4 [95%CI 2.4, 8.2], p< 0.01) and starting fewer ARVs (1-2 vs. 4-6, 6.9 [2.0, 24.0]; 3 vs 4-6, 3.0[1.4, 6.5], p< 0.01) were associated with higher odds of virologic failure.

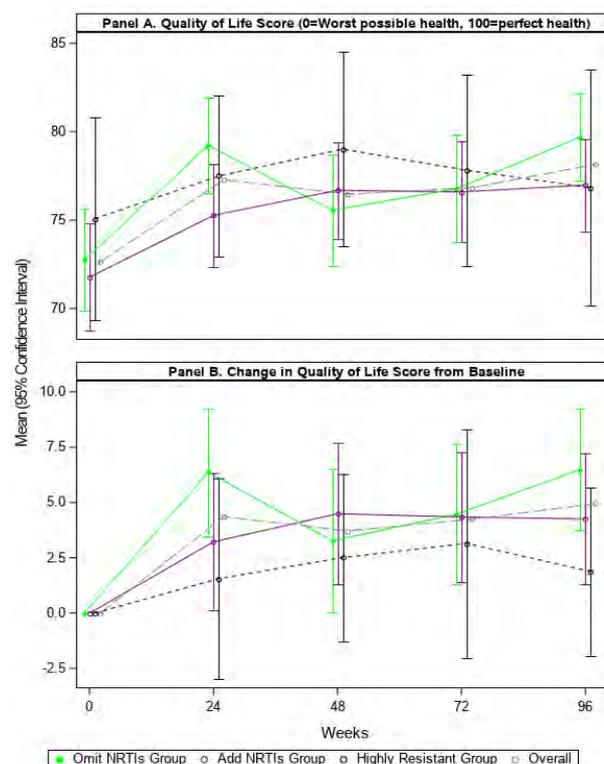
Among those with virologic failure (randomized groups), treatment-emergent phenotypic resistance occurred in 3.4% for darunavir and 16% for etravirine. Among those with virologic failure on raltegravir (overall population), major primary integrase resistance mutations emerged in 11%. Quality-of-life scores increased after regimen initiation. (Figure 2)

CONCLUSIONS: NRTIs can be safely omitted from HIV salvage therapy without compromising efficacy or durability of response as long as the new regimen has a cumulative activity of >2 active drugs. Younger people

and those receiving fewer new ARVs require careful monitoring. Even among individuals with more-extensive resistance, most achieve virologic suppression.



[Figure 1. Cumulative probability of virologic failure over time by treatment group.]



[Figure 2. Quality of life scores over time by treatment group.]

MOPEB236

Identifying heavily treatment-experienced patients in a large administrative claims database

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BACKGROUND: A subset of people living with HIV (PLHIV) are heavily treatment-experienced (HTE) and have limited remaining antiretroviral therapy (ART) options due to resistance, intolerance, and/or potential interactions with concomitant medications. It is important to describe the

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epidemiology of HTE patients to support development of new therapies for this population with complex needs.

METHODS: Using linked longitudinal prescription claims (LRx) and professional fee claims (Dx) data from the US, adult HIV+ patients with ≥ 1 office visit claim in 2017 were identified. From this population, prevalence of HTE was estimated using definitions based on a current ART regimen indicative of HTE, or a history of multiple ART regimen changes, defined as: a) ≥ 4 core agents, b) ≥ 10 ART agents, or c) ≥ 4 core agent classes. Antiretrovirals from non-NRTI classes were considered core agents. Point prevalence evaluated on 12/31/2017 and 95% confidence intervals (CI) were calculated, and patient clinical characteristics were described for each definition.

RESULTS: Of 129,208 PLHIV, 3.7% (95% CI: 3.6%-3.8%) were currently prescribed a regimen indicative of HTE. A total of 10,964 [8.5% (95% CI: 8.3%-8.6%)] met ≥ 1 criteria based on ART regimen history: 8.3% (95% CI: 8.1%-8.4%) had taken ≥ 4 core agents, 0.9% (95% CI: 0.9%-1.0%) had taken ≥ 10 total antiretrovirals, and 3.0% (95% CI: 2.9%-3.1%) had taken antiretrovirals from ≥ 4 core agent classes. Only 2,020 (1.6%) were HTE according to both current regimen and a history of multiple ART regimen switches. HTE patients identified by different definitions were similar in age (median: 54 years) and gender. Comorbidities and non-ART medications were common across definitions. [Table 1]

CONCLUSIONS: HTE prevalence varied by definition. Limited overlap of PLHIV identified as HTE by different criteria suggests multiple definitions may be required to fully capture the HTE population. Regardless of definition, HTE patients were older than the general HIV population and clinically complex.

		ART regimen indicative of HTE ¹ n=4,757	Multiple Treatment Switches ² n=10,964
Comorbidities³	Cardiovascular Disorders	2,103 (44%)	3,801 (35%)
	Diabetes	1,435 (30%)	2,594 (24%)
	Hepatic Disorders	861 (18%)	1,499 (14%)
	Hypertension	2,987 (63%)	5,574 (51%)
	Kidney Disorders	2,388 (50%)	4,207 (38%)
	Non-ART medications⁴	Cardiac Medications	2,218 (47%)
	Lipid Lowering Agents	2,472 (52%)	4,599 (42%)
	Proton Pump Inhibitors	2,147 (45%)	4,681 (43%)

¹Patient taking any of the following on 12/31/2017: dolutegravir, BIC; darunavir, BIC; enfuvirtide, etravirine + maraviroc; etravirine + dolutegravir; etravirine + darunavir; etravirine + enfuvirtide; or ≥ 2 core agents + ≥ 1 additional ART agents

²Includes patients taking any of the following over their reported treatment history: a) ≥ 4 core agents, b) ≥ 10 ART agents, or c) >3 core agent classes

³Diagnosed at any point prior to first meeting HTE definition criteria

⁴Prescribed at any point prior to first meeting HTE definition criteria

[Common comorbidities and non-ART medications among patients identified as HTE in the LR+Dx Database]

Regimen simplification and switch studies

MOPEB237

Impact of archived M184V/I mutations on the effectiveness of switching to coformulated elvitegravir/cobicistat/emtricitabine/tenofovir alafenamide among virologically suppressed HIV-positive patients

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BACKGROUND: Coformulated elvitegravir/cobicistat/emtricitabine/tenofovir alafenamide (E/C/F/TAF) has been shown to be effective in maintaining viral suppression among 37 HIV-positive patients with solely archived M184V/I mutations in a single-arm clinical trial. However, real-

world data of its effectiveness as a switch regimen among patients with M184V/I mutations with or without other thymidine analogue-associated mutations (TAMs) are lacking.

METHODS: HIV-positive patients with no known virological failure or resistance to integrase inhibitor who were switched to E/C/F/TAF after having achieved viral suppression (plasma HIV RNA load [PVL] < 200 copies/ml) were included in this study. Patients with archived M184V/I mutations (case patients) were matched to controls without previous M184V/I mutations by a 1:4 ratio. The primary end point was PVL < 50 copies/ml at week 48 of switch using FDA snapshot analysis.

RESULTS: In total, 74 case patients with known M184V/I mutations were identified, including 3 (4.1%) with K65R and 14 (18.9%) with at least 1 TAM, and were matched to 296 controls in terms of age (mean, 42 vs 41.4 years), gender (male, 98.6% vs 98.6%) and cumulative exposure duration to tenofovir disoproxil fumarate (median, 164 vs 158 weeks). Compared with controls, case patients were more likely to have received protease inhibitors (31.1% vs 10.5%, $p < 0.001$) or dolutegravir (52.7% vs 27.0%, $p < 0.001$). At week 24, the rate of virological non-success (PVL > 50 copies/ml) among case and control patients was 1.4% (1/74) and 2.4% (7/296), respectively, (difference, -1.0%; 95% CI, -3.7-5.0%), which met the 4% criteria of non-inferiority. The rate of virological success (PVL ≤ 50 copies/ml) was 77.0% vs 79.0% among the case and control patients, respectively. Discontinuations of E/C/F/TAF occurred in 5.4% ($n=4$) among the control patients due to adverse effects and missing scheduled blood testing occurred in 16.2% (12) at week 24, who continued to receive E/C/F/TAF, while the respective rate of discontinuations and missing blood testing was 5.1% (15) and 13.5% (40) among the control patients. The presence of K65R mutation or TAMs did not increase the risk of virological non-success in either group.

CONCLUSIONS: Among virally suppressed HIV-positive patients, E/C/F/TAF is effective in maintaining viral suppression at week 24 despite archived M184V/I mutations with or without TAMs.

MOPEB238

A Phase 3b, multicenter, open-label study switching from an Elvitegravir/Cobicistat/Emtricitabine/Tenofovir Alafenamide (E/C/F/TAF) or a Tenofovir disoproxil fumarate containing regimen to Bictegravir/Emtricitabine/Tenofovir Alafenamide (B/F/TAF) in virologically-suppressed, HIV-1 infected subjects aged ≥ 65 years

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BACKGROUND: As the proportion of older people living with HIV is increasing, it is important to study the long-term safety and efficacy of antiretroviral therapy in older individuals. B/F/TAF is a small single tablet regimen with few drug-drug interactions and a high barrier to resistance; it contains TAF resulting in less renal and bone toxicity than TDF-based regimens.

We evaluated the efficacy and safety of switching participants 65 years and older to B/F/TAF from E/C/F/TAF or a TDF-containing regimen at 24 weeks. This study will follow participants for a total of 96 weeks.

METHODS: Virologically suppressed (HIV-1 RNA < 50 copies/mL) participants ≥ 65 years old who were currently receiving either E/C/F/TAF or a TDF-based regimen were switched to open-label B/F/TAF. Primary end-point was HIV-1 RNA < 50 copies/mL at Week (W) 24 as defined by the Food and Drug Administration (FDA) Snapshot algorithm.

RESULTS: Of 86 participants, mean age was 70 years (range 65-80), 13% were female, and 99% were White; 91% (78/86) of participants were receiving E/C/F/TAF at baseline.

At W24, HIV RNA < 50 copies/mL was 98% for B/F/TAF; 2 participants had no virologic data in window and there were no virologic failures. No Grade 3-4 study-drug related adverse events(AEs) were observed. Three AEs led to premature study drug discontinuation; one was study-drug related(Table). There were no discontinuations of B/F/TAF due to a renal or bone AEs. Median change from baseline in total fasting cholesterol, LDL, HDL, triglycerides and total cholesterol:HDL were -14, -7, -3, -17 mg/dL and -0.1, respectively. Median change from baseline in eGFR was -4.5 mL/min. Median percent change in urine beta-2-microglobulin:creatinine and urine retinol binding protein:creatinine ratios were 20.8 and -15.6, respectively. **CONCLUSIONS:** Through W24, high rates of virologic suppression were maintained in older participants who switched to B/F/TAF. The safety and efficacy data support the switch to B/F/TAF in virologically suppressed HIV-infected individuals aged \geq 65 years.

Adverse Events	B/F/TAF (N=86), % (n)
Any Grades 3-4 Study Drug-Related AEs	0
Grades 3 or 4 Laboratory AEs	6% (5)
Any Study Drug-Related Serious AE	0
AEs Leading to Study Drug Discontinuation	3.5% (3)*
AEs Leading to Study Drug Discontinuation (drug-related)	1% (1)†

* 1) abdominal discomfort, 2) alcohol withdrawal, 3) benzodiazepine withdrawal
† abdominal discomfort (grade 2)

[Adverse Events]

Pharmacokinetics, pharmacodynamics, pharmacogenomics and therapeutic drug monitoring

MOPEB239

Discontinuation of long-term dolutegravir treatment is associated with *UGT1A1* gene polymorphisms

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BACKGROUND: Dolutegravir (DTG) is a potent HIV integrase inhibitor; its efficacy and safety have been demonstrated in clinical trials. Recently, neuropsychiatric adverse events following the use of DTG have become a concern. Additionally, DTG is metabolized mainly by *UGT1A1*, suggesting an increase in DTG exposure due to the presence of genetic variants of *UGT1A1*. In the present study, we aimed to explore the incidence of and factors associated with the discontinuation of long-term DTG treatment due to adverse events.

METHODS: Among the Japanese patients infected with HIV-1 aged 20 years or older who are visiting National Hospital Organization Osaka National Hospital, 169 patients to whom DTG was administered were included in this study. *UGT1A1* gene polymorphism were measured. We compared the relationships between patient factors and the discontinuation of DTG due to adverse events within 1 year after starting DTG, and at 1 to 4 years.

RESULTS: The median age of the 169 patients (of which 164 were male) was 43 years (interquartile range 37-49 years); 37 (22%) patients were administered with DTG as the first antiretroviral treatment. The remaining 132 (78%) patients were switched to DTG from other antiretroviral agents. DTG treatment was discontinued due to adverse events in 34 patients (20%); the median time until discontinuation was 407 days (interquartile range: 120-791 days).

The principal causes of discontinuation were headache [9 (26%)], musculoskeletal problems [8 (24%)], insomnia [7 (21%)], irritability [6 (18%)]. One to 4 years after starting DTG, the patients carrying of *UGT1A1**6, *UG-*

*T1A1**28, or both alleles showed a higher cumulative discontinuation rate of DTG than those carrying normal alleles ($p = 0.0218$). However, this was not observed within 1 year of initiating DTG ($p = 0.4173$). Furthermore, no association between age or abacavir plus lamivudine usage and the risk of discontinuation was evident.

CONCLUSIONS: These results suggest that a relationship may exist between *UGT1A1* genetic polymorphisms and the discontinuation of DTG after 1 year from initiating of the administration of DTG.

Drug interactions

MOPEB240

Prevalence and nature of potential drug-drug interactions among hospitalized HIV patients with suspected meningitis in Uganda

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BACKGROUND: Management of co-infections including cryptococcal meningitis, tuberculosis and other acute co-morbidities in HIV patients can lead to complex polypharmacotherapy, making patients susceptible to drug-drug interactions (DDIs). DDIs can often lead to altered therapeutic response and/or increased risk of adverse effects. The aim of this study was to characterize the frequency and types of potential DDIs (pDDIs) involving HIV patients presenting with suspected meningitis in a hospital setting in Uganda.

METHODS: This was a retrospective review of three HIV-positive cryptococcal meningitis cohorts between 2010 and 2017 in Uganda. Medications received over hospital stay (maximum 30 days) were documented and pDDIs pairs were assessed regardless of drug dose or start and stop dates. Micromedex® online drug reference system was used to describe potential interactions as either contraindicated, major, moderate and minor.

RESULTS: In 1218 patients with suspected meningitis, there was an average (range) 5.6 (0-23) drugs with interaction potential per patient. Of the 1218 patients, pDDIs were present in 704 (overall prevalence = 57.8%). In total, 365 unique interacting drug pairs were identified resulting in 3505 pDDI events. Each patient had a mean frequency of 4.9 pDDIs. 61.55% had 1-4 pDDIs, 27.7% had 5-10 pDDIs and 11% had greater than 10 pDDIs. For severity classification, 6.5% were contraindicated, 64.2% were major, 21.1% were moderate and 8.2% were minor interactions. Among pDDIs, most prevalent drugs were fluconazole (23% of pDDIs), co-trimoxazole (17.4% of pDDIs), efavirenz (16.3% of pDDIs), rifampin (13.4% of pDDIs) and haloperidol (12.3% of pDDIs). Interactions involving antiretrovirals were 34% of overall pDDIs in this study population. Forty-eight of the 229 contraindicated pDDIs (21%) and 693 of the 2249 major pDDIs (51.8%) involved antiretrovirals. Common consequences of pDDIs were increases or decreases in drug concentrations leading to adverse toxic events or loss of therapeutic efficacy, hepatotoxicity, QT interval prolongation and other cardiac adverse events.

CONCLUSIONS: There is a high potential for DDIs in hospitalized HIV patients presenting with co-infections in Uganda. With unavailability of frequent therapeutic drug monitoring (TDM) in this setting, understanding the prevalence of pDDIs and identifying likely drug pairs will aid in setting up standards for management of these specific pDDIs.

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Antiretroviral drug resistance

MOPEB241

Keeping the pressure on archived NRTI resistance: Switching to bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) triple therapy in study 4030

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BACKGROUND: Study 4030 is a phase 3, randomized, double-blinded study (n=565) of HIV-1 RNA suppressed participants switching to B/F/TAF or dolutegravir (DTG)+F/TAF from DTG+F/tenofovir disoproxil fumarate (TDF) or DTG+F/TAF. NRTI, NNRTI, and PI resistance (-R) was allowed, but INSTI-R was excluded. We present FDA Snapshot outcomes at Week 48 by pre-existing resistance.

METHODS: Historical plasma HIV-1 RNA genotypes and baseline proviral DNA genotypes (GenoSure Archive) were analyzed. Documented or suspected NRTI-R was grouped for stratification: 1) K65R/E/N or ≥3 TAMs including M41L or L210W (TAMs: D67N, K70R, L210W, T215F/Y, and K219Q/E/N/R) (±M184V/I), 2) M184V/I (if not in group 1), any other set of TAMs, K70E/G/M/Q/S/T, L74I/V, V75A/S/M/T, Y115F, T69D, or Q151M, or 3) no major NRTI-R mutations, and no suspected resistance. Resistance analyses were performed on samples with HIV-1 RNA ≥200 copies/mL at confirmed virologic failure, discontinuation, or Week 48, if participants did not resuppress HIV-1 RNA to < 50 copies/mL on study drug.

RESULTS: Historical genotypes were available from 285/565 participants. Retrospective analysis of archived mutations by HIV proviral DNA genotype were determined for 391/565 participants. In total, 83% (470/565) of participants had baseline genotypic data available with major NRTI-R detected in 24% (138/565), including 5% (30/565) with K65R/E/N or ≥3 TAMs and 19% (108/565) with other NRTI-R mutations. M184V/I was present in 14% (81/565). Preexisting major INSTI-R mutations were found in 4% (20/565) of participants. Primary NNRTI- and PI-R mutations were present in 21% (118/565) and 7% (38/565) of participants. High rates of viral suppression were maintained in all groups through Week 48 (Table 1). Three participants met criteria for resistance analysis (all in DTG+F/TAF arm); none developed treatment-emergent resistance to study drugs.

CONCLUSIONS: Participants with NRTI resistance, much of which was previously undocumented, maintained suppression 48 weeks after switching to B/F/TAF or DTG+F/TAF triple therapy. There were low rates of virologic failure using either drug regimen, with no treatment emergent resistance.

NRTI Resistance Category	B/F/TAF (n=284)		DTG+F/TAF (n=281)	
	Resistance Classification at Randomization	Final Resistance Classification (including proviral DNA genotype)	Resistance Classification at Randomization	Final Resistance Classification (including proviral DNA genotype)
All Participants	93% (265/284)		91% (256/281)	
Group 1: K65R or ≥3 TAMs	86% (6/7) ^a	94% (15/16) ^a	100% (8/8) ^a	100% (14/14) ^a
Group 2: Other NRTI-R	94% (30/32) ^a	93% (51/55) ^a	97% (30/31) ^a	96% (51/53) ^a
M184V/I (Groups 1 or 2)	N/A	89% (42/47) ^b	N/A	94% (32/34) ^b
Group 3: No NRTI-R or no R data	93% (229/245)	93% (199/213)	90% (218/242)	89% (191/214)

a. All participants had HIV-1 RNA < 50 copies/mL at Week 48 or their last visit.
b. M184V/I was seen by historical genotype in 22 and 18 participants in the B/F/TAF and DTG+F/TAF groups, respectively.
Previously undocumented M184V/I was uncovered after randomization by proviral DNA genotyping in 25 and 16 participants in the B/F/TAF and DTG+F/TAF groups, respectively.

[Table 1. HIV-1 RNA < 50 copies/mL at Week 48, by NRTI resistance category]

MOPEB242

Low-frequency resistance variants in ART-naïve participants do not affect bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) triple therapy treatment outcome

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BACKGROUND: The relevance of low-frequency resistance variants is unclear. Here, we present the largest detailed analysis of baseline PR, RT, and IN deep sequencing data from antiretroviral-naïve participants treated with guideline recommended INSTI+2 NRTI regimens, and investigate the impact of low-frequency variants on treatment outcome.

METHODS: Baseline deep sequencing of PR, RT, and IN was conducted for all participants in two randomized trials of antiretroviral-naïve participants initiating therapy on B/F/TAF, DTG/ABC/3TC, or DTG+F/TAF (Studies 1489+1490). The deepType HIV assay (Seq-IT, Germany) and Gilead analysis pipeline were used for sequencing. Virologic outcomes were assessed at Week 96 by FDA Snapshot.

RESULTS: Baseline deep sequencing data for PR, RT, and IN were available for 1270/1274 participants. Deep sequencing results at a ≥15% cutoff were similar to population Sanger sequencing. To establish appropriate cutoffs for resistant variant calling, deep sequencing was performed on HIV plasmid and virus controls, and analyses of mutation counts using different cutoffs of percent frequency, mutational viral load, and number of reads were performed. High confidence in calling mutations present at frequencies ≥2% was observed. Table 1 shows detailed results for M184V. Between 2%-15%, additional primary resistance mutations not detected by population sequencing were detected: 3.7% NRTI-R, 3.7% INSTI-R, 4.2% NNRTI-R, and 5.8% PI-R. Eleven participants had the exclusion mutation M184V/I at baseline (2.1% to 12.9%), and all 11 of these participants had HIV-1 RNA < 50 copies/mL at Week 96 (n=10) or study drug discontinuation (n=1). Overall, participants with low-frequency resistance mutations had HIV-1 RNA < 50 copies/mL at Week 96 at rates similar to the overall population of the study.

CONCLUSIONS: In Studies 1489+1490, primary resistance mutations were detected at low frequencies between 2%-15% in an additional 16% (204/1270) of ART-naïve participants. These resistance variants did not affect viral suppression or virologic failure for B/F/TAF or other INSTI+2 NRTI regimens.

M184V Detection by Deep Sequencing Using Different Methods							
Method 1: Mutation Frequency (percent of reads, %)							
	≥15	≥10	≥5	≥2	≥1	≥0.5	≥0.1
# of Participants with M184V	0	1	4	5	9	32	1124
Method 2: Mutational Viral Load (baseline viral load x percent of reads with mutation, copies/mL), independent of frequency cutoff							
	≥10000	≥5000	≥2000	≥1000	≥500	≥100	≥50
# of Participants with M184V	0	4	15	36	77	414	646
Method 3: Number of Reads, independent of frequency cutoff							
	≥2500	≥1000	≥200	≥100	≥50	≥25	≥10
# of Participants with M184V	0	2	5	18	124	586	1105

[Table 1. Detection of the RT M184V Mutation by Deep Sequencing in Baseline Samples from Studies 1489 and 1490 (n=1270)]

MOPEB243

Previously undocumented preexisting resistance and maintenance of virologic suppression in HIV-1 RNA-suppressed patients switching to Bictegravir/Emtricitabine/Tenofovir Alafenamide (B/F/TAF)

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BACKGROUND: Studies 1844 and 1878 demonstrated the non-inferior efficacy of switching suppressed HIV-1-infected adults to bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) versus continuing dolutegravir (DTG)- or boosted protease inhibitor (bPI)-containing triple therapy. After week 48, remaining participants in the DTG and bPI groups switched to B/F/TAF in an open-label extension (OLE) phase. Here, resistance analyses and virologic outcomes for these participants are described.

METHODS: Participants included in this analysis were randomized at baseline to continue their DTG- or bPI-based regimen, completed 48 weeks, and switched to B/F/TAF in the OLE. Preexisting HIV-1 drug resistance was assessed by historical genotypes (documented resistance to study drugs was excluded) and retrospective baseline proviral DNA genotyping (participants with resistance to study drugs detected post-OLE switch were allowed to remain on study). Virologic outcomes were based on last available HIV-1 RNA during B/F/TAF treatment.

RESULTS: Altogether, 510 participants switched to B/F/TAF in the OLE and were treated for a median of 60 weeks (IQR 48-72 weeks). Cumulative baseline reverse transcriptase genotypic data were available for 73% (373/510); integrase data were available for 49% (248/510). Primary NRTI resistance (-R) and INSTI-R substitutions preexisted in 11% (41/373) and 3.6% (9/248), respectively (Table 1). DNA genotyping detected previously undocumented M184V/I in 5.4% (20/373), and thymidine analog mutations (TAMs) were observed in 8.0% (30/373). Through the time of analysis, 99% (503/510) of participants had HIV-1 RNA < 50 copies/mL at last visit, including 95% (19/20) with archived M184V/I, 100% (30/30) with TAMs, and 100% (9/9) with INSTI-R. During the OLE 5 participants met criteria for resistance testing with no treatment-emergent resistance.

CONCLUSIONS: Among participants who switched to B/F/TAF in the OLE of studies 1844 and 1878, high rates of virologic suppression were maintained for >1 year of B/F/TAF treatment with no resistance development despite significant underlying preexisting resistance substitutions, such as M184V/I and TAMs. These findings indicate that B/F/TAF may have utility as a switch option in a broad range of patients, including those with certain preexisting resistance.

Drug Resistance	By Historical Genotype	By Proviral Genotype	Cumulative Genotype	HIV-1 RNA <50 copies/mL at Last Visit
Primary NRTI	3.3% (9/269)	15% (36/237)	11% (41/373)	98% (40/41)
M184V/I	0	8.4% (20/237)	5.4% (20/373)	95% (19/20)
TAMs	3.3% (9/269)	11% (25/237)	8.0% (30/373)	100% (30/30)
Primary INSTI	7.7% (1/13)	3.4% (8/237)	3.6% (9/248)	100% (9/9)

[Table 1. Baseline Resistance and B/F/TAF Efficacy in OLE Phase of Studies 1844 and 1878, % (n/N)]

MOPEB244

Impact of patient characteristics on integrase resistance

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BACKGROUND: Integrase strand transfer inhibitors (INI) are recommended as first line therapy in treatment-naïve people living with HIV (PLWH) and as alternatives for treatment-experienced. Wide-spread use of INIs is likely to increase prevalence of integrase resistance (INI-R) over time and patient characteristics associated with INI-R will require further delineation to guide resistance testing.

METHODS: HIV genotypes for PLWH followed at Henry Ford Hospital, Detroit, MI, were obtained as part of routine HIV care. Next generation sequencing (NGS) was performed for detection of HIV resistance associated mutations (RAMs) for major and accessory mutations as defined in the Stanford University HIV drug resistance database. Thresholds for RAMs were defined as ≥10% for majority populations and 1- < 10% for minority HIV variant populations. Both major and accessory INI mutations were combined for all INI-R analyses. Descriptive, parametric or non-parametric analyses were performed with a P-value < 0.05 used for statistical significance.

RESULTS: From 9/2015-12/2018, 760 NGS assays were performed. Prevalence of INI-R was not impacted by gender or race for both all major and all INI-R mutations (p=NS). PLWH with multiple HIV acquisition risk factors (MSM, HRH, IDU or others) had a higher frequency of both all major (8.3% vs. 3.2%, p=0.035) and all INI-R mutations (40.4% vs. 24.4%, p=0.002) compared to heterosexuals and MSM, respectively (8.3% vs. 4.4%, p=0.114; 40.4% vs 32.6%, p= 0.135). INI-R rates were not impacted by breakpoints for HIV viremia (100k copies/mL) or CD4 counts (200 cells/mm³) (all p=NS). Detection rates of all major INI mutations varied by agent exposure with raltegravir (2.8%), elvitegravir (7.8%), dolutegravir (6%), and multiple INI exposures (18.5%) (p< 0.001). Multiple INI exposure had higher rates for both all major and all INI-R mutations than raltegravir (p=0.007, 0.008) and dolutegravir (p=0.048, 0.03).

CONCLUSIONS: Detection INI-R mutations were similar by gender, race, HIV viremia and CD4 counts. PLWH with multiple risk factors for HIV acquisition and those exposed to multiple INI agents are more likely to have any INI-R detected. Certain PLWH populations have higher risk for INI-R and continued surveillance is justified.

MOPEB245

Pre-treatment and acquired HIV drug resistance in Vietnam: Results from a nationally representative survey

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BACKGROUND: Monitoring of HIV drug resistance is important for sustaining the effectiveness of the anti-retroviral therapy (ART). This study aims to evaluate the prevalence of viral load suppression and prevalence of HIV drug resistance (HIVDR) in patients initiated ART and patients on ART for 12 months and at least 48 months in Vietnam.

METHODS: The survey was conducted between September 2017 and March 2018 using WHO guidance for HIVDR surveillance. Thirty ART clinics among total 367 ART clinics in the country were randomly selected using probability proportional to proxy size sampling method. Eligible patients presenting to clinics for initiation of ART and receiving ART for 12±3 months (ADR12) or ≥ 48 months (ADR48) were consecutively enrolled until the required sample size met (405 for PDR, 435 for ADR12 and 725 for ADR48). Epidemiological information and blood specimens were collected. Viral load and HIVDR testing were conducted at WHO accreditation laboratories. HIVDR was defined by the Stanford University HIVDR algorithm.

RESULTS: For PDR, 409 patients were recruited. The prevalence of any HIVDR was 5.4% (22/409) and NNRTI resistance prevalence in this group was 3.7% (15/409). For ADR, 429 patients were recruited for ADR12 and 723 for ADR48. The median time on ART in PDR48 group was 85 months (IQR 64-106 months). The viral load suppression (defined as < 1000 copies/ml) in ADR12 and ADR48 groups were 95.6% (411/429) and 95.6% (691/723) respectively. The prevalence of any HIV drug resistance was 2.6% in ADR12 group and 3.3% in ADR48 group. The prevalence of NNRTI resistance in ADR12 and ADR48 was 2.6% (11/429) and 3.2% (24/723). There were no patients with any PI drug resistance in PDR group and 1/723 (0.7%) patient with any PI drug resistance in ADR48 group.

CONCLUSIONS: The nationally representative ADR survey found high level of viral suppression and a moderate prevalence of HIVDR among PDR, ADR12 and ADR48 patient groups. This indicates the effectiveness of the

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current first line ARV regimen. However, there was moderate prevalence of NNRTI resistance in PDR patients. Introduction of new ARV may be required especially for new patients in Vietnam.

MOPEB246

Prevalence of heavily treatment-experienced persons with HIV in the United States, 2000-2017

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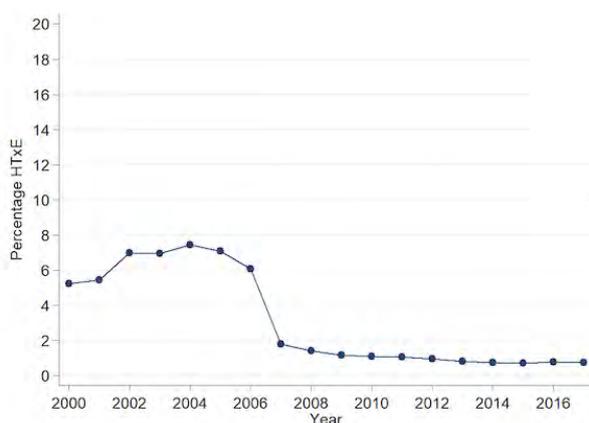
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BACKGROUND: Multi-drug antiretroviral (ARV) resistance in heavily treatment-experienced (HTxE) persons with HIV (PWH) results in limited treatment options. We evaluated the prevalence of HTxE among PWH in the modern antiretroviral treatment (ART) era.

METHODS: All ART-experienced adult PWH in care between 2000-2017 at 7 U.S. sites in the Centers for AIDS Research Network of Integrated Clinical Systems (CNICS) cohort were included. We computed the annual prevalence of HTxE in PWH defined as having ≤ 2 available classes with ≤ 2 active drugs per class based on genotypic mutation data interpreted using the Stanford HIV Drug Resistance Database. For each individual, mutations were carried forward to assess cumulative ARV resistance. Cox proportional hazards models were used to examine the adjusted hazard ratio (aHR) and 95% confidence interval (CI) of HTxE by 3-year calendar periods, adjusting for sex, age, race/ethnicity, site, ART-naïve at CNICS entry, prior single/dual NRTI treatment, baseline nadir CD4 and maximum viral load.

RESULTS: Among 26,495 ART-experienced PWH, resistance testing was performed in 8,723 persons with 900 PWH classified as HTxE, the majority of whom were male (85%), white (51%), men who have sex with men (54%), with median age 50 years and nadir CD4 72 cells/mm³. Prevalence of HTxE was 5.2-7.4% in 2000-06, decreasing significantly to 1.8% in 2007, and remained < 1% from 2012-17 (Figure 1). After accounting for population differences, participants entering care in 2012-14 had an 80% lower risk of HTxE compared with those entering in 2006-08 (aHR 0.20, 95% CI 0.09-0.45; $p < 0.001$).

CONCLUSIONS: HTxE prevalence defined by ARV resistance was stable early in the modern ART era (2000-06), dramatically decreased after 2006-08, and has remained < 1% in the contemporary ART era (2012-17), suggesting the decrease is due to the availability of more potent ARVs with a higher barrier to resistance. Other definitions of HTxE are being explored.



[Figure 1. Annual prevalence of heavily treatment-experienced persons with HIV, 2000 - 2017]

MOPEB247

Impaired genotypic resistance interpretation due to HIV-1 variant specific markers

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BACKGROUND: Several genotypic resistance online algorithms correlate genotypic drug resistance patterns with clinical or phenotypic data. HIV-1 variants can carry clade-specific amino acid related to drug-resistance (R-markers) fixed during viral evolution in the absence of ART. This study analyzes the impact of natural R-markers in antiretroviral resistance interpretation by 2 tools.

METHODS: From March to May 2018 we downloaded 68,653 HIV-1 GenBank *pol* sequences from ART naïve subjects. They corresponded to 73 HIV-1 variants: groups O, P, N and M, including 16 subtypes/sub-subtypes and 54CRF. Using an in-house bioinformatic tool, we identified all R-markers present in 75-100% of each variant's sequences coincident with 275 drug resistance changes to NRTI, NNRTI, PI and INSTI considered major/accessory/rare/infrequent/other in IAS-USA-2017 and HIV-Drug-Resistance-Stanford-Databasev8.5. We selected HIV-1 variants with the highest number of R-markers, comparing resistance interpretation and levels to 24 drugs by two tools: Stanford v8.4 (Stanford University) and Geno2Pheno v3.4 (Max Planck Institute).

RESULTS: We identified 14 HIV-1 variants (620sequences) carrying the largest number of R-markers. In PR, groups O, P, and group M subtype H, CRF 14_BG, CRF50_A1D and CRF63_02A had 5-9 R-markers. In RT for NRTI, group P carried 1 R-marker and for NNRTI, groups N, O, P and group M sub-subtype A1, CRF35_AD, CRF53_01B, CRF55_01B, CRF63_02A had 1-3 R-markers. In IN, group O and group M sub-subtype A6, CRF06_cpx, and CRF73_BG presented 1 R-marker each. Groups O and P carried the highest number of R-markers (9 in PR and 3 in RT), reporting resistance to PIs and to NNRTIs by both tools. We found discrepancies between tools, predicting resistance only by one or showing different resistance levels for the same variant and drug. We identified HIV-1 variants and R-markers leading to resistance to tipranavir, efavirenz, nevirapine, rilpivirine and etravirine according to at least one tool in non-M groups, so these providing intermediate resistance for some drugs.

CONCLUSIONS: Predicting *in vivo* drug activity from the same viral genotype can differ when using Stanford vs. geno2Pheno in HIV-1 variants carrying R-variant-markers, which could impact in resistance interpretation and clinical decisions. We strongly recommend the update of tools considering R-markers to reduce discrepancies across interpretation resistance algorithms.

MOPEB248

National survey of pre-treatment HIV drug resistance in Cuban patients

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BACKGROUND: The World Health Organization (WHO) recommends a method to estimate nationally representative pretreatment HIV drug resistance (PDR) in order to evaluate the effectiveness of first-line treatments. The objective of the present study was to determine the prevalence of PDR in Cuban adults infected with HIV-1.

METHODS: A cross-sectional study in Cuban adults infected with HIV-1 over 18 years was conducted. The probability proportional to size method for the selection of municipalities and patients without a prior history of antiretroviral treatment during the period from January 2017 to June 2017 was used. The plasma from 141 patients from 15 municipalities for the determination of viral subtype and HIV drug resistance was collected. Some clinical and epidemiological variables were evaluated.

RESULTS: 80.9% of the patients corresponded to the male sex and 76.3% were men who having sex with other men (MSM). The median CD4 count was 371 cells / mm³ and the median viral load was 68000 copies / mL. The predominant genetic variants were subtype B (26.9%), CRF19_cpx (24.1%), CRF 20, 23, 24_BG (23.4%) and CRF18_cpx (12%). Overall, the prevalence of PDR was 29.8% [95% CI 22.3-38.1]. The prevalence was 12.8% [95% CI 6.07-16.9] for any nucleoside reverse transcriptase inhibitor (NRTI), 23.4% [95% CI 16.7-31.3] for any non-reverse transcriptase inhibitor (NNRTI) and 1.4% [95% CI 0.17-5.03] for any protease inhibitor (PI). The most frequent mutations detected were K103N (12.9%), G190A (6.4%) and Y181C (4.8%).

CONCLUSIONS: The values above 10% in the prevalence of PDR to the NNRTI evidence the compromise of the first line of antiretroviral therapy used in Cuba and the need to look for new treatment options that contribute to therapeutic success and compliance with global goals 90-90-90 listed by UNAIDS.

MOPEB249

Differential detection of M184V/I between plasma historical HIV genotypes and proviral DNA from PBMCs

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BACKGROUND: A decreasing prevalence of HIV reverse transcriptase (RT) resistance-associated mutations (RAMs) has been observed recently, likely associated with increasingly potent triple-antiretroviral therapies (ART). The M184V/I RT mutation, which confers major resistance to lamivudine (3TC) and emtricitabine (FTC), is still quite frequent in people living with HIV. Of note, 17.9% of people tested for HIV viral resistance at Monogram Biosciences in 2010 had virus harboring M184V/I. The underlying presence of M184V/I may undermine virologic outcomes of ART, particularly in the context of treatment with 2-drug combinations including drugs affected by M184V/I, such as 3TC or FTC. In suppressed patients, resistance assays evaluating integrated viral DNA may help select a fully active switch regimen. Here we have analyzed the detection of M184V/I in a prospective study, and compared HIV historical genotypes (plasma) vs. integrated HIV DNA (PBMCs).

METHODS: Eligible participants from study GS-US-292-1824 were virologically suppressed (HIV-1 RNA < 50 copies/mL) for ≥ 6 consecutive months prior to screening. Plasma historical genotypic reports (plasma-HGR) were collected for all subjects, and presence of M184V/I was required for enrollment. Genotyping of the integrated virus was conducted at study entry using a PBMC-HIV-DNA assay (GenoSure Archive, Monogram Biosciences). Genotypic data at RT residue M184 obtained with the 2 methods were compared.

RESULTS: Eighty-four participants with both plasma-HGR and PBMC-HIV-DNA data were included. All had evidence of M184V/I in plasma-HGR. PBMC-HIV-DNA found the M184V/I in 40/84 participants (48%); in 38/84 participants the mutation was not detected (45%), and PBMC-HIV-DNA amplification failed for the remaining 6/84 participants (7%). Differences in detection of M184V/I between the 2 assays were neither associated with the time elapsed between the samples used in plasma-HGR vs. PBMC-HIV-DNA, the overall time on ART, nor the baseline CD4 cell counts/HIV-1 RNA levels.

CONCLUSIONS: We found a significant discrepancy in the detection of M184V/I, with PBMC-HIV-DNA missing the mutation in 52% of cases, indicating a failure of PBMC-HIV-DNA to pick up all cases of resistance. Clinicians should consider the possibility of undetected M184V/I when switching virologically suppressed patients to a new regimen, which may have particular implications when the new ART consists of 2-drug 3TC- or FTC-containing combinations.

MOPEB250

High level of HIV-1 drug resistance among first-line failures in three health facilities in Tete province and Maputo city, Mozambique

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BACKGROUND: Since 2013, Médecins sans Frontières (MSF) has supported viral load (VL) scale-up in Maputo and Tete, Mozambique where programmatic data showed high rate of HIV-1 virological failure (VF). Since the weight of acquired drug resistance (ADR) to first-line ART (antiretroviral therapy) is unclear in this phenomenon, a survey was done to estimate the proportion of suspected VF (VL ≥ 1000 copies/ml) and HIV drug resistance (DR) among patients receiving first-line ART for more than 6 months in both sites.

METHODS: A cross-sectional study was conducted between October 2017-July 2018 in 3 MSF-supported health centres in Mozambique: 2 in Tete and 1 in Maputo. Adults HIV-1 infected, on ART ≥ 6 months were enrolled. Venous blood for CD4 count and plasma HIV-1 VL were collected at entry. Specimens with VL ≥ 1000 copies/ml were subjected to HIV-1 DR genotyping using a validated in-house assay. DR interpretation was with the Stanford HIV-1 Drug Resistance Database v8.4. Intermediate and high resistance score were considered to report resistance. Patients with VL ≥ 1000 copies/ml received a follow up VL test.

RESULTS: In total, 1114 participants on first-line ART were included (57.5% in Maputo); most of them female (67.6%), median age 42 years (IQR 34-50). At study inclusion, the median CD4 count was 488 cells/μl (IQR: 344-660) and 97.3% of patients were in WHO clinical stage 1-2. The median time on ART was 47 months (IQR: 24-77) with 75.9% on ART since ≥ 24 months. Proportion with suspected VF was 11.3% [95% CI 9.5-13.3]: 8.25% in Maputo and 15.4% in Tete, (p < 0.0002). 96% of samples were HIV-1 subtype C; 89.6% had NNRTI resistance (89.6% NVP, 87.3% EFV), and the most common mutations were K103N (64.6%) and V106AM (34.4%). For NRTI resistance the most affected molecules were in the order 3TC, ABC, TDF and AZT and the most common mutations: M184V, K65R and K70E. 86% [95% CI 78.5-91.9] participants had dual-class resistance. 73.8% patients with suspected VF had a follow up VL, and most (73%, 95% CI 62.9-81.7) had VL > 1000 copies/ml.

CONCLUSIONS: Although a relative low VF rate (11.3%), NNRTI and NRTI resistance among those with viral failure was high leaving most on a failing regimen.

MOPEB251

Analysis of HIV type 1 subtypes C p6gag sequences for PTAP motif duplication and PYXE insertion

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BACKGROUND: HIV-1 p6gag late domains play important role in virus replication. PTAP motif duplication occurs more frequently in HIV-1 subtype C (HIV-1C) and confers advantage in viral replication. LYPXnL motif, second late domain is absent naturally in HIV-1C. However, PYXE insertion (where X is any amino acid) was reported at the LYPXnL motif from HIV-1C and

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found to restores the ALIX binding site for virus release. The study analyses the p6gag late domains from Indian HIV-1C sequences.

METHODS: HIV-1C p6gag sequences were retrieved from previous studies from National AIDS Research Institute, India. Briefly, the HIV-1 drug resistance genotyping uses a reverse primer (primer "F" for ViroSeq method and "2557R" primer for In-house method) for protease region sequencing, which also sequences the p6gag region. To recover p6gag sequences, the sequencing primer "F" or "2557R" were manually edited in SeqScapev2.6 software. In addition to this, the Los Alamos database was used to estimate the global frequency of p6gag PYXE insertion in HIV-1 subtypes.

RESULTS: A total of 775 HIV-1C p6 gag sequences were recovered. Among these, 49% (383/775) sequences were from ART-naïve and 51% (392/775) from ART-experienced patients. The PTAP duplication were detected in 19.58% (75/383) and 24.23% (95/392) sequences in ART-naïve and experienced patients, respectively. PYXE insertion was observed with significant increased frequency among ART experienced patients (3.12% vs 8.41%; $p < 0.01$). Only small portion of global HIV-1 p6 gag sequences has PYXE insertion (460/49807, 0.9%) and rare in case of subtype A, B, D, F, G, H. In contrast, 3.75% (409/10897) global HIV-1C sequences contained PYXE insertion. These observations certainly hints towards the preferential occurrence of PYXE insertion in HIV-1C p6gag compared to other subtypes.

CONCLUSIONS: The study observed absences of significant differences in the frequency of PTAP duplication between HIV-1C ART-naïve and ART-experienced patients. One key observation of the study was presence of PYXE insertion in HIV-1C p6gag and its association with the treatment failure. Further studies addressing the mechanistic details of emergence of PYXE insertion in HIV-1C may pinpoint its role in virus life cycle and drug resistance.

MOPEB252

Primary resistance to integrase inhibitors among recombinants in Kinshasa using DBS

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BACKGROUND: INSTI-based therapy is recommended as first-line regimen against HIV-1 in high-income countries. WHO guidelines recommend dolutegravir use where prevalence of pre-treatment NNRTI resistance is above 10%. As pre-treatment or transmitted NNRTI resistance is increasing in Sub-Saharan countries, such as the Democratic Republic of Congo (DRC), where HIV-1 diversity is remarkable, future treatment based on INSTI should become available.

Moreover, a resistance pathway through G118R mutation has been proposed, which can be facilitated by some natural polymorphisms (GGG/GGA) among non-B variants. We studied the presence of INSTI mutations among variants circulating in Kinshasa (DRC) together with the study of G118 codons.

METHODS: Between 2016 and 2017, 187 HIV-1 infected patients attending Monkole Hospital (Kinshasa, DRC) were screened for INSTI mutations. Samples collected on dried blood spots (DBS) were shipped to Spain for molecular testing, including viral quantification and genotyping. ANRS procedures were followed for integrase sequencing (aa 55-280). Major and accessory drug resistance mutations to INSTI (DRM-INSTI) were identified using Stanford HIV database v8.5 for sequence interpretation and subtyped by phylogeny or REGA v3.0 tool.

RESULTS: HIV-1 Integrase sequences could be recovered from 66 (35%) samples, mainly when viraemia was >5 log cp/mL, no specimen < 3 log could be amplified. Among the sequenced viruses, 25 (38%) belonged to up to eleven different non-B subtypes or circulating recombinant forms, and 41 (62%) were unique recombinant forms (URFs). Major DRM-INSTI were absent. However, 20 samples (30%) carried 1 (19 cases) or 2 (1 case) changes in accessory DRM-INSTI positions. The most frequent were L74I (11, 17%), E138D (3, 4.5%), E157K (2, 3%), and T66S, N155D, T97A, S153F, E157Q (1 case each). Of note, 2 out of 3 CRF45_cpx strains harboured L74I. Additionally, codons at G118 position were studied: 3 specimens (4.5%) displayed GGA/GGG (all URFs), while the remaining 95.5% samples carried GGT/GCC.

CONCLUSIONS: Non-detection of major DRM-INSTI among a diverse collection of HIV-1 strains with 62% of URFs support the effectiveness of INSTI-based therapy in DRC. However, the presence of changes at DRM-INSTI residues in 30% of circulating viruses could affect INSTI susceptibility in combination with other substitutions or modify resistance pathways.

MOPEB253

Archived HIV drug resistance in naïve, suppressed and non-suppressed Indian patients

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BACKGROUND: HIV-1 drug resistance (DR) archived in proviral DNA may differ from circulating RNA. Understanding the extent of DNA-DR and discordance with RNA in various patient groups, particularly in globally-prevalent subtype C, is limited, yet may impact DR testing, antiretroviral therapy (ART) suppression and DR transmission.

METHODS: We characterized DR archival in three groups of HIV-infected adults attending YRG CARE:

- (1) ART-naïve;
- (2) suppressed (viral load $< 1,000$ copies/mL); or
- (3) non-suppressed.

We detected reverse transcriptase DR in RNA and DNA and their discordance by sequencing and interpreted results by Stanford Database tools. Numbers of DNA-DR mutations in three groups were compared with Poisson regression, adjusting for treatment group, age, and gender. Numbers of discordant DNA/RNA mutations were compared with Poisson regression, fit with generalized estimating to account for two samples/patient. Rate ratios and 95% CIs are used for comparison.

RESULTS: All but 2/245 enrolled patients (50 naïve; 106 suppressed; 89 non-suppressed) had HIV-1 subtype C (2-subtype A), median age 35 years (IQR 16-70), 56% female. Of treated, median time on ART was 34 months (IQR 6-174), 163/195 (84%) on 1st-line and 32/195 (16%) on 2nd-line ART. DR was seen in 8% and 4% of naïves' RNA and DNA (2%/0%-NRTIs; 8%/4%-NNRTIs; 2%/0%-both); 95%/91% of non-suppressed (87%/79%-NRTIs; 95%/90%-NNRTIs; 87%/78%-both); and 17% of suppressed DNA (9%-NRTIs; 17%-NNRTIs; 9%-both). RNA-DNA DR concordance was in only 25% naïves and 45% non-suppressed. DR in DNA but not in RNA occurred in no naïves and 20% of non-suppressed. Non-suppressed patients had 1.5 times more mutations in RNA vs. DNA than vice versa (CI 1.2-1.9); 4.3 for NRTI mutations (CI 2.4-8.0); and 2.3 for NNRTI (CI 1.2-4.7). DR archival, adjusted for treatment, age and gender was higher in non-suppressed vs. naïves ($P < 0.001$). Among suppressed, DR archival was higher among those on 2nd-line vs. 1st-line ($P < 0.001$).

CONCLUSIONS: DNA archived DR with low concordance to RNA was seen in naïve and (at high levels) in non-suppressed patients, suggesting that DNA-DR testing could augment, but likely not replace, routine RNA genotyping. Though long-term impact evaluation is needed, the demonstrated archived DR in suppressed patients can lead to DR transmission upon ART failure, interruption/decreased adherence.

MOPEB254

Integrase strand transfer inhibitor (INSTI) transmitted drug resistance in the Philippines: Implications for the coming shift to first-line INSTI-based antiretroviral therapy

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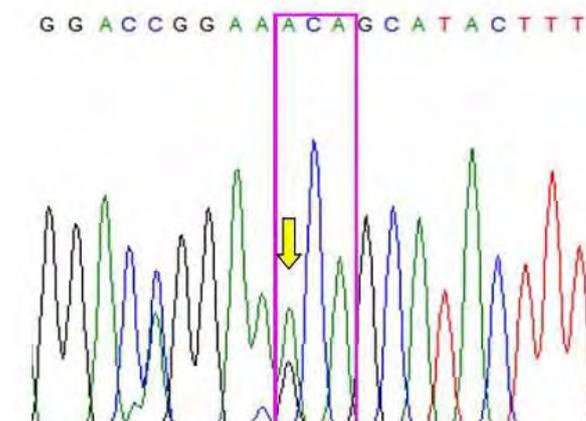
BACKGROUND: Integrase strand transfer inhibitors (INSTIs) have been a mainstay of first-line antiretrovirals (ARVs) since 2015, but are rarely used in resource-limited settings. WHO recommends tenofovir/lamivudine/efavirenz as the preferred ARV regimen worldwide, but NNRTI resistance is increasing, leading to a push for INSTI-based regimens. We report emerging INSTI transmitted-drug resistance (TDR) in the Philippines.

METHODS: This study was performed as part of an ethical board-approved TDR surveillance study at the Philippine General Hospital. Near whole-genome next-generation sequencing (NGS) was performed using Illumina HiSeq. Genotypes and drug-resistance mutations (DRMs) were analyzed and scored using the Stanford HIV Drug Resistance Database. INSTI Sanger-based sequencing (SBS) was performed on samples with INSTI DRMs $\geq 1\%$ on NGS.

RESULTS: 57/266 (21.4%) samples had INSTI DRMs as a minor variant in $\geq 1\%$ of the quasispaces. Subtype distribution was: A (1), B (32), C (1), CRF01_AE (199), CRF02_AG (2), and recombinants (31). DRMs are shown in Table 1. Two DRMs (E138K and R263K) affect all known INSTIs. No DRMs were seen on SBS, but a small peak was seen in the one T97A DRM with $>20\%$ minority variant (Figure 1).

SBS	Cumulative INSTI TDR (%)	Cumulative DRMs and Frequency*
	0(0)	none
NGS	$\geq 1\%$	H51Y(2), T66I(1), T66K(1), L74M(2), A128T(3), E138K(5), G140S(1), Y143H(1), Y143S(1), V151I(1), N155(1), E157Q(1), G163K(1), G163R(3), T97A(7), R263K(28)
	$\geq 2\%$	H51Y(1), L74M(2), A128T(3), E138K(2), V151I(1), N15 (1), E157Q(1), G163R(2), T97A(4), R263K(23)
	$\geq 5\%$	H51Y(1), L74M(1), V151I(1), G163R(1), T97A(3), R263 (3)
	$\geq 10\%$	T97A(3), R263K(1)
	$\geq 15\%$	T97A(2), R263K(1)
	$\geq 20\%$	T97A(2)

[INSTI TDR prevalence by SBS and NGS (N=266). *two samples with 2 INSTI DRMs]



[SBS of integrase gene with a double peak at amino acid position 97]

CONCLUSIONS: INSTI TDR is present in the Philippines, despite minimal use of INSTIs. This should be considered prior to switching to first-line INSTI-based regimens, and baseline NGS screening may be needed since SBS may be inadequate to detect INSTI TDR DRMs.

MOPEB255

High level of pre-treatment HIV-1 drug resistance in a rural and an urban settings in Mozambique

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BACKGROUND: Since 2002, Médecins sans Frontières (MSF) has been supporting antiretroviral treatment (ART) programs in rural and urban Mozambique where high levels of virological failures on first line were observed. To better understand this phenomenon, we estimated the level of HIV-1 pre-treatment drug resistance (PDR) among HIV patients initiating or re-initiating ART in these settings.

METHODS: A cross-sectional survey was conducted in Mozambique from October 2017 to October 2018. Eight MSF-supported health centres participated in the survey (1 in Maputo and 7 in Tete). ART-naïve/pre-exposed HIV-positive adults or those restarting first-line ART (at least 3 months interruption), were enrolled at testing/ART-initiation. DBS were used for HIV Viral Load (VL) measurement. Specimens with VL $>1,000$ copies/ml were tested for HIV drug resistance mutations (DRMs) using an in-house HIV-1 genotyping resistance test and the Stanford HIV-1 Drug Resistance Database v8.4 for interpretation. The primary outcome was the estimation of PDR to non-nucleoside reverse transcriptase inhibitors (NNRTIs), categorized as low, medium, or high level resistance to efavirenz/nevirapine.

RESULTS: In total, 617 participants had VL $\geq 1,000$ copies/ml (54.7 % female, median age 34 years (IQR: 26-42)). Seventy-nine (12.8%) ART-initiators reported previous ART exposure. Among 558 samples (90.4%) successfully genotyped, 98.9% contained HIV-1 subtype C. Overall, 147 (26.3%, 95% CI 22.7-30.2) had PDR to NNRTI of whom 43 (29.2%, 95% CI 22 - 37.3) reported ART pre-exposure and 104 (70.8 %, 95% CI 62.6 - 77.9) ART naïve ($p < 0.0001$). Nucleoside reverse transcriptase inhibitors mutations were present in 5.5% (95% CI 3.8-7.7) participants and only 2 (0.3%) reported any major PI mutations. In Tete, PDR levels (32.1%) were twice as high as in Maputo city (16.7%).

At least 1 Surveillance Drug Resistance Mutation (SDRM) was present in 25.7% of patients. 9.3% were found with ≥ 4 SDRMs and 3 of them reported a previous ART-exposure that could signify a transmission of a multi-resistant virus.

CONCLUSIONS: Our findings show worrying levels of PDR (26.3%) in the selected contexts. A surveillance at national level is urgently needed as well as non-NNRTI first-line ART for initiation.

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Long-acting agents and other drug delivery systems

MOPEB256

Interest in and preferences for multipurpose technology for combined contraception and antiretroviral therapy and non-oral antiretroviral therapy among women living with HIV in western Kenya

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BACKGROUND: Multipurpose technology (MPT) that combines contraception and antiretrovirals (ART) for HIV treatment and non-oral ART formulations are being developed and tested. Information on user preferences is critical to ensure uptake. Our objective was to determine interest in and preferences for MPT and non-oral ART among women living with HIV. **METHODS:** Between May 2015 and March 2016 we conducted a cross-sectional telephone survey that assessed interest in MPT, most/least preferred formulations, advantages/disadvantages, and motivations for use of MPT and non-oral ART within a longitudinal cohort of women enrolled in HIV care in western Kenya. Descriptive statistics were performed and multivariate logistic regression analysis was used to determine predictors for preference for specific formulations.

RESULTS: 1132 women of reproductive age and not sterilized completed the survey. Median age was 35 years, 56% were married/cohabitating and 69% were parous. Most (67%) reported interest in MPT. Preferred MPT formulations were injectables (50%) and implants (32%); least preferred formulations were intrauterine devices (31%) and pills (28%). Perceived advantages of MPT use included ease of use of one formulation for both purposes (26%), effect of pregnancy prevention (16%), and combined effect of HIV treatment and pregnancy prevention (15%). Perceived disadvantages included the need to stop/not use contraception while continuing ART (21%), risk of side effects (16%), and perceived lack of need for contraception (12%). Preferred non-oral ART formulations were injectables (54%) and implants (31%). Motivations for use of non-oral ART were non-daily dosing (47%) and saving time accessing ART (16%). In regression models, women who have used contraceptive implants were more likely to prefer implantables for non-oral ART formulation (aOR 1.8, 95% CI 1.06-3.06). However, use of contraceptive implants (aOR 2.59, 95% CI 0.57-11.86) or injectables (aOR 1.7, 95% CI 0.72 - 4.07) did not reach statistical significance in predicting preference for specific MPT formulations.

CONCLUSIONS: Most women living with HIV are interested in MPT for contraception and ART. Contraceptive implant use may predict interest in implantable ART. User information we generated should be considered during development and marketing of MPT and non-oral ART use among women living with HIV.

MOPEB257

Monthly long-acting cabotegravir and rilpivirine is non-inferior to oral ART as maintenance therapy for HIV-1 infection: Week 48 pooled analysis from the Phase 3 ATLAS and FLAIR studies

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BACKGROUND: Two randomized, open-label, international phase 3 studies (ATLAS and FLAIR), which evaluate switching to monthly intramuscular injections of long-acting formulations of cabotegravir (CAB-LA) and rilpivirine (RPV-LA) vs continuing oral combination antiretroviral therapy (CAR), have reached the week 48 primary endpoint analysis. Here we report a pooled and subgroup analysis of data from these studies.

METHODS: Virologically suppressed (HIV-1 RNA < 50 copies/mL) adult participants were randomized (1:1) to continue CAR or switch to the LA regimen. In the LA arm, participants initially received oral CAB 30mg + RPV 25mg once daily for 4 weeks to assess safety and tolerability, prior to starting monthly injectable therapy. The primary endpoint was antiviral efficacy at week 48 by FDA snapshot algorithm (noninferiority margin, 4% for HIV-1 RNA \geq 50 c/mL). Safety, tolerability, confirmed virologic failure (CVF; 2 consecutive HIV-1 RNA \geq 200 copies/mL) and health outcomes were secondary endpoints.

RESULTS: The pooled intention-to-treat-exposed (ITT-E) population included 591 participants in each treatment arm (28% female, 19% aged \geq 50 years). Noninferiority criteria at week 48 were met for the primary and key secondary (HIV-1 RNA < 50 copies/mL) endpoints (Table).

Outcome	LA, N=591	CAR, ¹ N=591	Adjusted difference, LA minus CAR (95% CI)
HIV-1 RNA \geq 50 copies/mL at week 48* (primary endpoint), n (%)	11 (1.9)	10 (1.7)	0.16 (-1.35, 1.67)
HIV-1 RNA <50 copies/mL at week 48* (key secondary endpoint), n (%)	550 (93.1)	558 (94.4)	-1.37 (-4.12, 1.39)
No virologic data in week 48 window, n (%)	30 (5.1)	23 (3.9)	-
Any adverse event excluding ISRs, n (%)	506 (85.6)	444 (75.1)	-
Grade 3-5 adverse events excluding ISRs, n (%)	44 (7.4)	35 (5.9)	-
Adverse events excluding ISRs leading to withdrawal, n (%)	17 (2.9)	9 (1.5)	-
Serious adverse events excluding ISRs, n (%)	24 (4.1)	25 (4.2)	-
HIV treatment satisfaction questionnaire score at weeks 24/44, change from baseline adjusted mean	4.2/3.9	0.3/0.5	3.9 (3.0, 4.8)/ 3.4 (2.5, 4.3)

*Per FDA Snapshot algorithm; 4% and -10% noninferiority margins prespecified for primary and key secondary endpoints, respectively. ¹In ATLAS, CAR = standard 3-drug oral ART regimen; in FLAIR, CAR = ABC/DTG/3TC. CI, confidence interval; ISR, injection site reaction.

[Primary and key secondary endpoints]

Seven individuals in each arm (1.2%) experienced CVF; 6/7 (LA) and 3/7 (CAR) had resistance mutations. The treatment effect on rates of HIV-1 RNA \geq 50 copies/mL (LA vs CAR) was similar across subgroups supporting the overall conclusion. Most LA recipients (83%) developed transient injection site reactions which decreased over time; 6 (1%) led to withdrawal. The serious adverse event rate was 4% in each group. LA recipients reported a significant increase in treatment satisfaction compared with their oral CAR therapy at weeks 24 and 44.

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CONCLUSIONS: This pooled analysis demonstrates that monthly injections of CAB-LA + RPV-LA were non-inferior to daily oral CAR for maintaining HIV-1 suppression, and provided improved treatment satisfaction.

MOPEB258

Patient reported outcomes on long-acting Cabotegravir + Rilpivirine as maintenance therapy: FLAIR 48 week results

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BACKGROUND: Building on results from the Phase 2b LATTE2 study, a planned patient reported outcomes (PROs) secondary analysis was performed for the long-acting (LA) regimen of Cabotegravir (CAB)+ Rilpivirine (RPV). FLAIR, is a phase 3, open-label study in ART-naïve participants that demonstrated switching to a monthly LA regimen is non-inferior to DTG/ABC/3TC. PROs include tolerability, satisfaction, and acceptability of the regimens.

METHODS: FLAIR participants received induction therapy with oral DTG/ABC/3TC for 20 weeks. Those with HIV-1 RNA < 50 c/mL at 16 weeks were eligible to enter the maintenance phase and be randomized (1:1) on day 1 to continue DTG/ABC/3TC or initiate LA injectable therapy following a daily oral CAB+ RPV lead-in for 4 weeks. The primary endpoint was HIV-1 RNA ≥ 50 c/mL at W48 using the FDA snapshot algorithm. Other endpoints include treatment satisfaction (HIV-Treatment Satisfaction Questionnaire, secondary) and preference (exploratory) for LA vs DTG/ABC/3TC at W48. Acceptability and tolerability of intramuscular injections (Perception of Injections (PIN)) were assessed in the LA arm only.

RESULTS: 566 participants were randomized with a median age of 34 (11% ≥50 yrs); 22% female and 74% white. While 76% of participants in the LA arm reported maximum Grade 1 or 2 injection site pain, the frequency decreased over time. Mean scores on the PIN (bother of injection site reactions, leg movement, sleep, and acceptance) improved over time. LA participants reported greater improvement in treatment satisfaction compared with the DTG/ABC/3TC group on HIV-TSQc (W48 adjusted mean 29.6 vs. 25.5 p< 0.001). A total of 95% of participants on LA compared with 81% on DTG/ABC/3TC were "highly or very satisfied" to continue their therapy at W44 (HIV-TSQs). Overall, in the LA arm, 99% of participants who responded at W48 preferred LA compared to DTG/ABC/3TC received during the Induction Phase.

CONCLUSIONS: The FLAIR study showed that LA ART is non-inferior to a daily oral therapy. The patients' perspective demonstrated a clear preference for monthly injectable ART compared to daily oral ART, despite demands of treatment including clinic visits for administration of LA injections. Overall, these results indicate an injectable LA ART regimen may become an important option for PLHIV.

Adherence measurement

MOPEB259

Characteristics and health service utilization of key populations living with HIV in Nigeria recruited through facility-based services versus outreach services

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BACKGROUND: Higher prevalence of sexually transmitted infections (STI) and undiagnosed HIV infections are markers of suboptimal access to clinically competent and appropriate health care services and have a direct impact on health outcomes. Prevalence of HIV and STI among key populations (KP) remain higher than general population. To inform service provision efforts, we assessed the characteristics of HIV-positive KPs who were recruited through facility-based "one-stop-shops" (OSSs) and through community outreach activities.

METHODS: Between January and July 2018, newly HIV diagnosed men who have sex with men (MSM) and female sex workers (FSWs) were recruited facility-based OSSs and community outreach activities in Lagos and Benue states. Baseline data on health service utilization and sexual risk behaviour were collected with the use of structured questionnaire and analyzed cross-sectionally. Proportions with chi-squared test was conducted to assess differences between categorical variables while logistic regression was used to assess associations with health service utilization.

RESULTS: A total of 263 MSM and 342 FSWs newly HIV diagnosed clients were recruited into the study with 59% recruited via OSS and 41% via outreaches. Median age was 24 years for OSS clients compared to 27 years outreach clients. Over 90% of OSS clients had at least secondary level education compared to 63% for outreach clients. More OSS clients (89% vs. 49%; p< 0.0001) used lubricants during anal sex. History of STIs in last 6 months (45% vs. 20%; p< 0.001) and treatment of last STI episode (77% vs. 61%; p=0.008) was also higher among OSS clients. Controlling for age, education, and location, OSS clients were five times more likely than outreach clients to use lubricants (AOR:5.32;95%CI:2.11-13.39), and two times more likely (AOR:1.86; 95%CI: 1.12 - 3.06) to report STIs and treat the last episode of STI (AOR:2.07;95%CI:1.03-4.16).

CONCLUSIONS: Key populations recruited through the OSS facilities were younger, more educated and reported higher use of lubricants and treatment of STI symptoms than KPs recruited via outreach modalities. It is recommended that outreach services provide strengthened HIV prevention and STI services to bridge the inequality in health care utilization among KPs.

MOPEB260

Real-time antiretroviral electronic adherence monitoring in young African American MSM: Information for intervention development

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BACKGROUND: Antiretroviral therapy adherence remains a challenge, particularly for young African-American men who have sex with men (YAAMSM). This study sought to develop an intervention using electronic adherence monitoring to trigger real-time text messages alerting in response to missed doses, sent to the user, a trusted social contact, or a healthcare worker, depending on the duration missed.

METHODS: YAAMSM living with HIV, age 18-34 years, and taking ART participated in a quantitative and qualitative study that included ART adherence monitoring with a Wisepill electronic monitoring device for up to 3 months. Adherence monitoring was performed during April 2017-December 2018. Adjudication of Wisepill-detected nonadherence occurred until it confirmed a Wisepill-detected miss for missed dose durations of 1 dose, 3 consecutive days, and 7 consecutive days. Each true event led to a qual-

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itative interview exploring reasons for missing doses and acceptability of the proposed responsive intervention that would text either the user, a trusted social contact, or a healthcare worker to help study participants avoid missed doses.

RESULTS: The median participant observation time was 91 days (interquartile range 89-92 days) (n=39 participants). Nine were lost to follow-up before 90 days. Circumstances of loss to follow-up included unresponsive after the initial interview (n=5), not wanting further research staff contact (n=3), and unreliable participation (n=1). Among those with at least 2 weeks follow-up and adjudication (n=30), 100% missed at least 1 day, < 90% and < 80% adherence occurred in 80% and 73% of these participants, respectively in at least one of their monitored months (n=86 monitored months). Among 27 with ≥90 days observed, 14 (52%) missed 3 consecutive days, 4 (15%) missed 7 consecutive days. The most common reported reason for missing 1 dose was forgetting (80%). No single reason accounted for the majority of 3 or 7 day misses, and none of those reasons were forgetting. Among 29 with a follow-up interview, 26 (90%) felt that the proposed responsive intervention would help them not miss doses.

CONCLUSIONS: Most YAAMSM living with HIV in this study had adherence below target thresholds of ≥90% and ≥80%. These data support further study of a triaged adherence intervention approach.

MOPEB261

Do clinic transfers lead to gaps in clinical care? Evidence from a large cohort of HIV-infected adults in South Africa

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BACKGROUND: Transferring from one clinic to another may adversely affect patient engagement in HIV care. However, the frequency of clinic transfers and their impact on gaps in clinical care has not been well quantified.

METHODS: We harmonized clinical, laboratory, pharmacy and vital status data for HIV-infected adults in care in a sub-district of Cape Town, South Africa from 2012-2016. Participants whose first HIV test occurred in 2012 or 2013 were followed until their last clinical encounter, they died, or were administratively censored in 2016. Clinic transfers were defined as any move from one clinic to another. We used Poisson regression to estimate incidence rates (IR) and ratios (IRR) for clinic transfers overall, by gender, HIV treatment era, and time since antiretroviral therapy (ART) initiation. We used generalized estimating equations to explore associations between transferring clinics and gaps in clinical care, defined as ≥120 days with no clinic visits.

RESULTS: We included 8,382 HIV-infected adults, of whom 4,178 (50%) initiated ART. Over a median of 32 months of follow-up, 22% of all visits included a clinic transfer (24% for women and 18% for men). Participants transferred a median of 2 times (range 0-65) and had a median of 20 days between their previous clinic visit and the transfer. Clinic transferring was less common among men (IRR 0.77; 95% CI 0.75, 0.79) and after test and treat was introduced in 2015 (IRR 0.88, 95% CI 0.86, 0.90). Among participants on ART, the rate of clinic transfers was highest within 3 months of starting ART (IR 26.1 per 100 visits; 95% CI 25.0, 27.3) and declined as time on ART increased (IR 17.8; 95% CI 17.2, 18.5 after 36 months). Overall, 63% of participants had a gap in clinical care; 84% of whom subsequently returned to HIV care. Participants who transferred clinics were more than twice as likely to have a gap in clinical care (IRR 2.34, 95% CI 2.26, 2.42).

CONCLUSIONS: In a large HIV treatment cohort in South Africa, clinic transfers were frequent, most common around the time of ART initiation, and strongly associated with gaps in clinical care of ≥120 days.

Adherence promotion

MOPEB262

High rates of viral load suppression among patients participating in a home-based, nurse-led ART adherence support intervention in Kazakhstan, Kyrgyzstan and Tajikistan

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BACKGROUND: The proportion of people living with HIV (PLHIV) on ART with viral load suppression (VLS) in Central Asia remains low. Historically, nurse engagement in antiretroviral therapy (ART) adherence support was limited to ad-hoc facility-based counseling. In 2018, ICAP launched a structured nurse-led intervention to improve adherence and retention of PLHIV on ART at 9 ART sites across Kazakhstan, Kyrgyzstan, and Tajikistan.

METHODS: Thirty-two nurses were trained to provide home-based services to PLHIV. The intervention focused on two adult (≥18 years) PLHIV populations, (1) those newly initiated/restarted on ART and (2) PLHIV on ART six months or more with viral load of 1,000 or more copies/mL. The intervention included up to eight home-visits and nine-twelve phone calls over a six-month period, in addition to the standard of care. ICAP used an online mobile application for program monitoring. Effectiveness of the intervention was assessed by analyzing the proportion of PLHIV with VLS (< 1000 copies/mL), measured at 180(±90) days after the first home visit. Descriptive analysis was conducted using the Chi-Square test.

RESULTS: By December 2018, 1,712 PLHIV (979 men and 733 women) agreed to participate in the program and had at least one home-visit by a nurse. The mean age was 38 years (IQR 31-43). Among them, 111 (6.5%) dropped out of the intervention for various reasons, 846 (49.4%) "graduated" from the intervention, and 755 (44.1%) were still enrolled. Of the 846 PLHIV (455 men and 39 women) who graduated from the program, 699 PLHIV (82.6%, 95%CI 79.9%-85.1%) achieved VLS. VLS outcomes did not differ by sex. PLHIV who newly initiated/restarted ART were more likely to achieve VLS than those who had been on ART six months or more and had unsuppressed viral load at the start of the intervention (93.0% vs 72.8%, p< 0.0001).

CONCLUSIONS: This nurse-led, home-based, structured intervention has been effective at ensuring improved ART adherence and high rates of VLS in Central Asia, among both ART-naïve patients and PLHIV on ART with virological failure. The Ministry of Health in Kazakhstan is considering national scale-up of the program and it has the potential to be effectively implemented in other similar settings.

MOPEB263

A pilot test of biometric fingerprint scanning to monitor engagement in HIV care for women in Option B+

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BACKGROUND: Sustained engagement in HIV care is critical to the success of Option B+ for HIV-infected pregnant women, but tracking women's engagement in care across clinics and over time is challenging. To address this issue, we assessed the feasibility and acceptability of biometric fingerprint scanning (BFS) to monitor HIV visits in a pilot study in two large antenatal clinics in Lilongwe, Malawi.

METHODS: Over a three-month period, we enrolled all HIV-infected pregnant women receiving HIV care who were ≥ 18 years of age and planned to remain in Lilongwe for at least three months at 2 clinics in Lilongwe. Consenting participants were enrolled using a handheld fingerprint scanner

and tablet; BFS information was uploaded to the cloud and synced across study sites daily via wireless internet. HIV-infected women typically present for care every 30-90 days during pregnancy. At subsequent HIV visits, women registered for their appointment by scanning their fingerprint. During the last month of the pilot, we conducted exit interviews with a sample of healthcare workers (HCWs) and all women who attended HIV visits. Information on scanner performance and syncing issues was collected weekly.

RESULTS: To date, of 418 women screened, 400 (96%) were eligible and 345 (86%) were enrolled. At enrollment, the median age was 29 and 75% of women were on antiretroviral therapy. We recorded 569 HIV visits (418 enrollment visits and 151 subsequent visits). At subsequent visits, 7% of women reported a different electronic medical record number, leading to a duplicate health record. Exit interviews were completed with 120 HIV-infected women who had visits in the final month (74%) and 43 HCWs (26%). Overall, 82% said they felt "comfortable" or "very comfortable" using BFS, and 87% reported needing little to no assistance using BFS. No major issues with data security, privacy, or scanner functionality were reported; intermittent internet connectivity occasionally affected the ability to sync data.

CONCLUSIONS: Among HIV-infected pregnant women engaged in HIV care, BFS is a feasible and acceptable way to register and monitor HIV visits. BFS should be evaluated as an intervention to support sustained engagement in HIV care during the perinatal period.

MOPEB264

Assessing the facilitators and barriers of antiretroviral therapy adherence among key populations (KP) in Mumbai, India: A way forward for designing KP-centric adherence interventions

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BACKGROUND: Treatment adherence, retention, and viral load (VL) suppression are critical for HIV prevention and positive health outcomes. In Mumbai, 21% of key population (KP) on antiretroviral therapy (ART) at government-supported ART centres are virally unsuppressed. Understanding the determinants of adherence is essential to the design of KP-tailored adherence interventions. We assessed facilitators and barriers associated with viral suppression, a surrogate marker for adherence, among KPs in Mumbai.

METHODS: Partnering with national program, LINKAGES/India conducted a cross-sectional assessment of first VL test results among KPs enrolled at government-supported ART centres in Mumbai. During April-July 2018, all KPs with unsuppressed VL (≥ 1000 copies) and a similar number of randomly selected KPs with suppressed VL answered a semi-structured questionnaire after providing voluntary consent. Questions addressed barriers and facilitators to ART adherence (including perceptions about ART; current health status; access to social support; experiences or perceptions of stigma; pill-intake practices, mental stress, and substance use). Demographic and VL data were collected from service registers. Logistic regression models were used to identify factors associated with viral suppression.

RESULTS: Of the 103 participants, 51 had suppressed and 52 had unsuppressed VL. Mean age was 37.6 years (Standard Deviation \pm 8.2) with no significant age and gender differences across the two groups. The common self-reported barriers to adherence across both groups were "forget medications after alcohol" (18%); "fear of losing business" (17%); "treatment interrupts daily life" (15%); "can't take medications life-long" (15%); "difficult to carry medications" (13%); and "health-care provider's attitude" (12%).

After adjusting for age, gender, and ART duration, viral-suppression was significantly lower in those who self-reported these factors: perception of stigma (Odds Ratio-0.18; 95% Confidence Intervals:0.05-0.71, $p=0.01$); mental stress (OR-0.07, 95% CI:0.01-0.81, $p=0.03$); and poor knowledge

of ART and side effects (OR-0.07, 95% CI:0.01-0.38, $p=0.002$). Reporting having "treatment buddy" was a significant predictor of adherence ($p<0.05$).

CONCLUSIONS: The findings on determinants of adherence in Mumbai will help to design KP-centric enhanced adherence counselling package. Strengthening treatment education, psycho-social and mental health counselling, and linkage to substance-use interventions; supporting disclosure and self-identification of treatment buddy; establishing community-based ART delivery; and sensitization of health care providers may enhance adherence among KP.

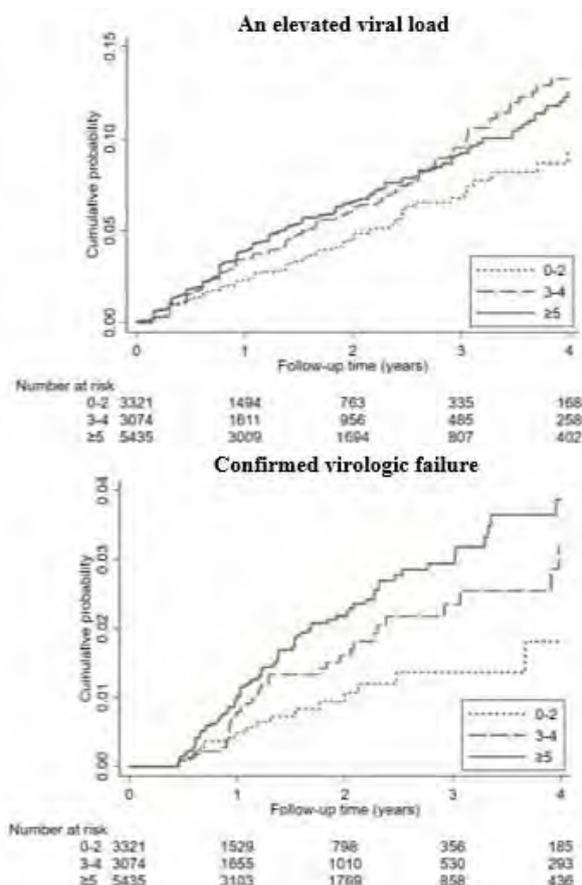
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Long-term virologic responses to antiretroviral therapy among patients entering adherence clubs in Khayelitsha, Cape Town, South Africa

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BACKGROUND: In South Africa, 3.39 million people were accessing antiretroviral therapy (ART) in 2015, which has increased due to the implementation of universal Test and Treat. Given the need for lifelong care for millions of individuals, differentiated models of care for ART services, such as adherence clubs (ACs) for stable patients, are required. In this study, we describe long-term virologic outcomes of patients who have ever entered ACs.

METHODS: Adult patients enrolled in ACs in Khayelitsha between January 2011 and June 2017 were eligible for inclusion. Time to, and risk factors for, an elevated viral load (first viral load >1000 copies/mL) and confirmed virologic failure (two consecutive viral loads >1000 copies/mL 2-9 months apart) were estimated using the Kaplan-Meier estimator and Cox proportional hazards models. Viral load completeness was assessed at 4, 16, 28, 40 and 52 months of follow-up.



[Figure. Cumulative probability by time on ART at AC entry, by each outcome]

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RESULTS: Of 11830 patients, 74% were female and 45% were aged 35-44 years at AC enrolment. The median duration on ART at enrolment was 4.7 years (interquartile range [IQR]:2.7-7.1). An elevated viral load was observed in 517 patients (4%), 141 (27%) of whom subsequently experienced confirmed virologic failure within a median time of 137 days (IQR:112-168). Risk of an elevated viral load and confirmed virologic failure was higher among patients with a longer duration on ART at club enrolment and lower among older patients.

The proportion of completed viral load tests ranged from 79% at 4 months to 75% at 52 months, with over 90% of patients remaining virologically suppressed (< 400 copies/mL) throughout.

CONCLUSIONS: This study demonstrates low rates of confirmed virologic failure among patients who entered ACs. Majority of patients remained stable despite the rapid expansion of ACs, supporting the continued expansion. Younger patients and those with longer duration on ART should be prioritised to ensure they remain stable after AC enrolment.

MOPEB266

Antiretroviral therapy adherence and viral suppression in HIV-infected population; A case study of Coast General Hospital, Mombasa County-Kenya

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BACKGROUND: Despite New HIV infections declining by 16% in 2017, 1.4 Million people died with AIDS related illnesses (UNAIDS 2017), 59% of all people living with HIV accessed treatment, of those only 47% were virally suppressed. In Kenya 77% PLHIV on ART achieved viral suppression with 28,200 AIDS related deaths (Kenya AIDS response progress report 2018), Maintaining optimal adherence to ART are essential to ensuring viral suppression and good health outcomes. Evidence-based strategies to improve adherence among PLHIV are critical part of the response to the epidemic.

METHODS: Through MOH Structures, Pathfinder International engaged an Adherence counselor at Coast General and referral Hospital from Jan 2018 to date, Trained, Mentored and supervised to provide adherence assessment, Alcohol, drug and depression screening of patients with suspected treatment Failure, Jointly develop an adherence plan focusing on psychological, emotional, and socio-economic factors, case managers assigned responsibilities to conduct home visits, discuss with the clients on direct observed therapy, Organizing patient reminders and Follow up on appointments fortnightly for three months, a repeat viral load is done at 3rd month to confirm the suppression status of the clients, Data from the facility was collected using standard government tools.

RESULTS:

# of Clients	Male	Female	Total
With High VL	84	169	253
With Completed 3 Adherence sessions	58	183	241
Enrolled into a support group	53	181	234
Screened for Depression	63	190	253
with VL <1000 Copies at 3rd Month	76	152	228
Died	3	4	7
Still following	12	6	18

[Jan 2018- Sept 2018]

253 (63m,190f) clients with high Viral Load above 1000 Copies were followed up, 95% Completed 3 adherence sessions, while 97% were enrolled to Unsuppressed Support groups, 94% of those completed adherence sessions were found to have low Viral Load after effective interventions.

CONCLUSIONS: Close follow up using ART adherence counselor at the facility has led to improved drug adherence and increased suppression rates, hence the project has scaled up this intervention to other high-vol-

ume ART sites, This strategy is recommended as a sustainable approach which has potential to promote ART adherence, retention, and a reduced HIV transmission rate achieving universal Viral Load Suppression.

New strategies (2DR, rapid start)

MOPEB267

Is DTG+3TC and DTG+RPV effective and safe in clinical practice? Evidence from real world data

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BACKGROUND: Recent RCT evidence suggests dolutegravir(DTG)+lamivudine(3TC) and DTG+rilpivirine(RPV) are efficacious and safe treatments for naive and treatment experienced HIV-infected patients, respectively. Several small observational studies have also concluded that they are effective in clinical practice. The objective of these analyses was to estimate effectiveness and safety of DTG+3TC and DTG+RPV separately using meta-analysis techniques, with real-world evidence (RWE) from clinical practice.

METHODS: A systematic literature review of PubMed and Embase along with 20 regional and international conferences was conducted between 2013-Dec 2018 to identify non-RCT studies of DTG+3TC or DTG+RPV in HIV-infected patients. Eligible published articles presenting outcomes of interest were identified and extracted. One-arm meta-analyses were conducted to estimate effect sizes for viral failure, viral suppression, and discontinuations for DTG+3TC and DTG+RPV separately. Meta-regression was used to estimate the effect of demographic and clinical characteristics on effectiveness and safety outcomes.

RESULTS: A total of 11 DTG+3TC studies (n=1,247) and 12 DTG+RPV studies (n=1,084) reported data on virologically suppressed HIV infected patients on outcomes of interest at different timepoints. Results showed that ≥97% patients maintained virological suppression with ≤2% viral failures up to 96 weeks in DTG+3TC and DTG+RPV (Table 1).

CONCLUSIONS: DTG+3TC and DTG+RPV are antiretroviral regimens that are effective and durable with low rates of discontinuation in clinical practice. Further data is needed to support their use in naïve patients in real-world settings.

	DTG+3TC			DTG+RPV		
	Viral Failure (n=645)	Virological suppression (n=462)	Discontinuati- ons (n=416)	Viral Failure (n=771)	Virological suppression (Wk48:n=619) (Wk96:n=332)	Discontinuati- ons (n=771)
Week 48	0.009 [0.001-0.016]	0.99 [0.98-1.00]	0.125 [0.093-0.156]	0.003 [0.00-0.007]	0.997 [0.992-1.00]	0.078 [0.015-0.142]
Week 96	0.016 [0.001-0.031]	0.97 [0.933-1.00]	0.178 [0.141-0.214]	Not available	0.987 [0.957-1.00]	Not available

[Table 1: Proportion of patients with viral failure, virological suppression and discontinuations]

MOPEB268

Seminal HIV-1 RNA and drug concentrations in DTG+3TC dual therapy (ANRS167 LAMIDOL)

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BACKGROUND: Intermittent HIV-1 RNA detection in seminal plasma may occur in patients with undetectable plasma viral load (pVL) on standard triple-drug therapy. Few data are available regarding HIV-1 RNA detection in seminal plasma samples from virologically-suppressed patients receiving a maintenance dual therapy, and DTG+3TC in particular.

METHODS: In this ANRS167 LAMIDOL sub-study, a non-comparative open-label, single arm, multicenter trial, semen samples were collected at DO and W24 of DTG+3TC. HIV-1 RNA was quantified in seminal plasma using COBAS[ ] TaqMan[ ] HIV-1 Test, v2.0 (limit of quantification [LOQ]=100 c/mL). Ultra-sensitive pVL (USpVL) was performed with centrifugation of the maximum volume of available plasma to reach a LOQ of 3 c/mL. The limit of detection (LOD) was defined as an undetected PCR signal. Plasma and seminal plasma drug concentrations (C_{min}) were measured using UPLC-MS/MS.

RESULTS: Among the 104 enrolled patients, seminal plasma samples were collected from 18 participants, including 16 paired samples at DO and W24 of DTG+3TC. Median (IQR 25-75%) total DTG blood plasma C_{min} and DTG seminal plasma C_{min} were 1880 ng/mL (1377-2337; n=29) and 198 ng/mL (94-239; n=34), respectively.

While the unbound/total DTG blood plasma C_{min} ratio was 0.21% (0.17-0.25%; n=29), the seminal plasma/blood plasma total DTG C_{min} ratio was 12% (8-15%; n=29), suggesting a DTG accumulation in the male genital tract. HIV-1 RNA was detected in seminal plasma of 3 patients: 1 at DO (5.9%, 95%CI: 0.1-28.6) and 2 other at W24 (11.8%, 95%CI: 1.5-36.4). All, except one, presented a DTG C_{min} in seminal plasma above the *in vitro* protein-binding adjusted IC_{50} values (64 ng/mL).

All these 3 patients had a concomitant undetectable USpVL, they did not experienced virological failure or plasma viral blip along the study and had no concomitant sexually transmitted infection.

CONCLUSIONS: No differences were observed regarding seminal plasma HIV-1 RNA detection in patients under triple therapy and at W24 of a maintenance DTG+3TC dual-drug therapy.

MOPEB269

A switch to dolutegravir in combination with boosted darunavir is safe and effective in suppressed patients with HIV - a subanalysis of the dualis study

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BACKGROUND: Dolutegravir (DTG) and boosted darunavir (bDRV) are known as potent antiretroviral drugs with a high resistance barrier and well characterized drug-drug-interaction (DDI) profile.

METHODS: DUALIS, a randomized, open-label, phase IIIb, non-inferiority clinical trial compared the switch to DTG+bDRV (2DR) versus continuation of therapy. PLWH with HIV-RNA < 50cps/mL on 2 NRTI+bDRV(3DR) for ≥ 24 weeks (one accepted blip < 200cps/mL) were randomized to switch to DTG 50mg+DRV 800mg (with 100mg Ritonavir or 150mg Cobicistat) or remain on 3DR. Primary endpoint (PE) was proportion of HIV-RNA < 50cps/mL at W48 (FDA snapshot, ITTe analysis set; change in NRTI-backbone was not classified as failure). Here we present a post-hoc subanalysis on PE, secondary endpoints and most frequent adverse events (AEs). Estimated sample size for analysis of PE was 292 ($\leq 10\%$ non-inferiority margin).

RESULTS: 263 subjects were randomized and treated (2DR n=131, 3DR n=132) after premature termination of recruitment due to slow recruitment; male 90.1%, Caucasian 89.7%, median age 48 years (IQR 39-54) and documented CDC stage C 29.7%. At W48, 86.3% (n=113/131) switching to 2DR and 87.9% (n=116/132) continuing on 3DR had HIV-RNA < 50cps/mL, difference -1.6% (95.48% confidence interval [CI, based on the adjusted alpha-level accounting for the interim analysis at week 24] -9.9+6.7%). At W48 [W24], 90.1% (n=118/131) [92.4%; 121/131] switching to 2DR and 91.7% (n=121/132) [92.4%; 122/132] continuing on 3DR had HIV-RNA < 200cps/mL [difference -1.6% 95%CI -8.6+5.4%; [-0.1%; -6.5+6.3%]]. Differences in PE within subgroups are shown in Table 1. The most frequent AEs (MedDRA SOC terms; in >10% of patients) were infections and infestations (2DR:49.6%, 3DR:50.4%), gastrointestinal (2DR:16.5%, 3DR:18.8%), musculoskeletal (2DR:15.8%, 3DR:15.0%), skin (2DR:12.8%, 3DR:9.8%) and nervous system (2DR:9.0%, 3DR: 12.0%) disorders.

	N	HIV-RNA <50cps/mL at W48 visit 2DR vs 3DR	Difference (95% CI)
Male	237	87.0 vs 87.7%	-0.7% (-9.2+7.7%)
Female	26	81.3 vs 90.0%	-8.8% (-35.4+17.9%)
Age ≤ 50 ys	168	85.5 vs 88.2%	-2.7% (-12.9+7.5%)
Age >50 ys	95	87.5 vs 87.2%	+0.3% (-13.1+13.6%)
CDC A/B	185	87.5 vs 85.4%	+2.1% (-7.8+12.0%)
CDC C	78	82.9 vs 93.0%	-10.2% (-24.8+4.5%)
CD4 nadir ≥ 200 cells/μl	115	91.2 vs 87.9%	+3.3% (-7.8+14.4%)
CD4 nadir <200 cells/μl	102	86.0 vs 88.5%	-2.5% (-15.4+10.5%)

[Table 1. Differences in HIV-RNA <50cps/ml at week 48 by subgroups]

CONCLUSIONS: Switching to 2DR (DTG plus bDRV) was non-inferior to continuing 3DR with high rates of maintained viral suppression and comparable rates of AEs even in subgroups.

MOPEB270

Improved case detection and management of advanced HIV disease through TB contact risk stratification and implementation of a package of interventions in a rural district of Mozambique

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BACKGROUND: One third of people living with HIV (PLHIV) present to care with advanced HIV disease (AHD) globally. Innovative strategies are needed to increase earlier HIV diagnosis and to improve outcomes, particularly in sub-Saharan Africa.

METHODS: An active tuberculosis (TB) case finding study was implemented in the Manhica district, Mozambique (population ~180,000). Community workers reached all household and community contacts of every new TB case reported during the study period. Participants were tested for HIV

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and for TB (Xpert® MTB/RIF Ultra in induced sputum). All PLHIV identified who were ART-naïve or had evidence of poor antiretroviral therapy (ART)-adherence were invited to be referred to the Manhiça Health Research Centre and screened for AHD. Patients with AHD (CD4 counts < 200 cells/mm³ or WHO stage 3 or 4), were offered a package of interventions recommended by the WHO including screening, treatment and/or prophylaxis for opportunistic infections, rapid ART initiation and adherence support.

RESULTS: Between June and December 2018, 589 adult TB-index cases and 2172 of their contacts were identified. HIV serology was positive in 653 participants, including 371/589 (63%) TB-cases and 282/2172 (13%) contacts.

Overall, 181/653 (28%) were either ART-naïve or had documented poor ART-adherence, and 154/181 (85%) accepted being tested for AHD (125 TB-cases and 29 contacts). 88/125 (70%) TB-cases had CD4 < 200 cells/mm³ and 6/29 (21%) contacts had AHD. Among the 92 patients with CD4 < 200 cells/mm³, plasma cryptococcal antigen was positive in 4.3% (4/92, 2 meningitis) and TB-lipoarabinomannan (TB-LAM), in 62% (57/92). TB-LAM was the only confirmatory TB test in 19/65 (29%) of LAM-positive cases. Secondary TB was found in 2/29 contacts (7%). 93% of asymptomatic, CrAg-negative, LAM-negative contacts (25/27) started ART during the first week, 23/25 within 48 hours.

Among the remainder, ART timing was tailored to the presence of TB and cryptococcosis. Mortality was 15% in the TB group and zero among contacts.

CONCLUSIONS: This innovative community strategy to identify AHD among contacts of notified TB cases was feasible in this rural district of Mozambique. The study resulted in a prompt identification of co-infections and a safe, timely ART initiation in the vast majority of participants.

MOPEB271

Engagement in care and viral suppression 2 years after home-based same-day ART initiation in Lesotho: 24-months outcomes of CASCADE trial

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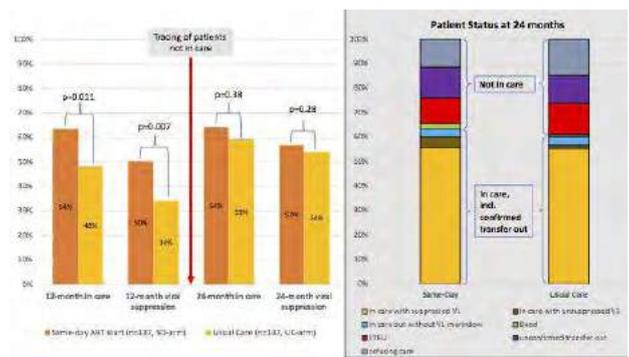
BACKGROUND: The CASCADE-trial was a randomized clinical trial that assigned HIV-infected individuals, ≥18 years, recruited during a home-based HIV testing campaign in rural Lesotho to either the offer of same-day antiretroviral therapy (ART) start (SD-arm) or referral to clinic for pre-ART visits (UC-arm).

The proportion of patients engaged in care with viral suppression was significantly higher in the SD-arm at 12-month follow-up (Labhardt et al. JAMA. 2018;319(11):1103). In both arms, patients not engaged in care at 12 months were traced, encouraged to access care, and the protocol was amended to allow for a 24-month follow-up.

METHODS: At 24 months (range: 22-28), the status of all patients was assessed at their clinic and if not in care (more than two months late for a refill), patients were traced by phone, through a village health worker, or the study team. Self-reported transfers to another clinic were followed up to confirm being in care, defined as documented proof of visit or laboratory report. Viral suppression was defined as < 100 copies/mL.

RESULTS: Figure 1 displays the status of all patients at 12-month and 24-month follow-up. At 24 months, a significant difference was no longer observed between the arms. Among those not in care at 12-month, 22% (11/50) in the SD-arm and 30% (21/71) in the UC-arm were in care at 24-month (p=0.35). Nearly half of these individuals, 36% (4/11) in SD-arm and 48% (10/21) in UC-arm, were confirmed transfers to another clinic in Lesotho or South Africa.

CONCLUSIONS: Two years after tested HIV-positive, the proportion of patients in care and virally suppressed was similar in the UC-arm and SD-arm. The reason is probably multifactorial: Natural course of patients linking >12 months post-diagnosis (especially in UC-arm), and the result of the 12-month tracing.



[Status of study patients at 12 months and 24 months, incl. detailed 24-month tracing outcomes]

Cure interventions

MOPEB272

The impact of vorinostat and AGS-004, a dendritic cell-based immunotherapy, on persistent HIV-1 Infection

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BACKGROUND: Approaches to deplete the reservoir of HIV infection are needed. We investigated the impact of the combination of the latency reversing agent vorinostat (VOR) and AGS-004, an autologous dendritic cell immunotherapeutic, on the HIV reservoir.

METHODS: 13 HIV+ individuals stably suppressed on antiretroviral therapy were screened for increased resting CD4+ T cell-associated HIV RNA (rca-RNA) after VOR exposure *in vitro*, and then after VOR dosing *in vivo*. AGS-004 was produced for 5 VOR responders using autologous dendritic cells co-electroporated with RNA expressing autologous HIV antigens and CD40 ligand. AGS-004 was administered every 3 weeks for 4 doses, followed by 10 oral doses of VOR 400 mg every 72 hours. Participants repeated the cycle of AGS-004 and VOR following a rest period. VOR exposure was validated by measuring expression of HDACi-responsive genes *in vivo*. HIV-specific T cell responses were measured by multiparameter flow cytometry and ELISPOT assays. Low-level HIV viremia was measured by a single-copy assay (SCA). rca-RNA and the frequency of resting CD4+ T-cell infection (RCI) was measured by quantitative viral outgrowth assay at baseline and after each cycle.

RESULTS: No serious treatment-related adverse events were observed. HDACi responsive genes increased (HF10 and IRGM) or decreased (PHF15, PRM10) with VOR dosing. rcaRNA decreased significantly two (VV01 and VV02) participants, and a significant decrease in SCA was observed in VV02. However, unlike other cohorts dosed with AGS-004 HIV-specific T cell responses to the AGS-004 antigen payload increased only in VV02. And no uniform increase was seen in *ex vivo* ELISPOT to AGS-004-delivered antigens. Finally, there was no reproducible decline of RCI of more than 50% in any participant.

CONCLUSIONS: The combination of AGS-004 and VOR was safe and well tolerated. Few participants showed a decrease in rca-HIV RNA, but no substantial impact on the replication competent reservoir was measured. Surprisingly, the induction of HIV-specific immune responses by AGS-004 was marginal and inconsistent across all participants. These results differ from what has been reported for AGS-004 elsewhere. It seems likely that more efficacious antiviral immune interventions and perhaps more effective latency reversal agents must be developed to allow clearance of persistent HIV infection.

MOPEB273

The FRESH acute HIV cohort: Optimized for an HIV cure interventionA. Moodley¹, K. Dong², M. Dong³, N. Ismail¹, M. Ghebremichael⁴, B. Walker⁴, T. Ndunugu¹¹HIV Pathogenesis Programme, Durban, South Africa, ²Ragon Institute of MGH, MIT and Harvard, Durban, South Africa, ³HPP, Durban, South Africa, ⁴Ragon Institute of MGH, MIT and Harvard, Cambridge, United States

BACKGROUND: HIV incidence among young women in sub-Saharan Africa remains high despite prevention efforts, making inclusion of this high-risk group in cure efforts imperative. Obstacles to cure include persistence of replication competent HIV in blood and tissue and durable persistence of the latent reservoir. We created a cohort of HIV-infected young women detected and initiated on immediate ART that is optimized for inclusion in HIV cure strategies.

METHODS: In December 2012, the FRESH study began enrolling young sexually active HIV-uninfected women, 18-23 yo, in KwaZulu-Natal, South Africa. Enrolled in groups of 30 and followed for 36-48 weeks, twice-weekly finger-prick for HIV-RNA testing and 3-monthly biological sampling was performed. HIV-RNA results were available within 24-hours and ART initiated immediately after detection.

RESULTS: 76 acute HIV infection were detected between 1-Dec 2012 and 31-Dec 2018 (incidence 8.2 per 100 person-years, 95% CI 5.9-11.1) of 1,767 who began surveillance. 76% (58/76) were detected during Fiebig I with a median initial VL of 3.64 log₁₀ copies/mL (IQR 2.80-4.73). 63 were offered and accepted immediate ART within a median of 1-day (1-1). Of 58 Fiebig I detections, median peak VL was 3.23 log₁₀ copies/mL (2.64-3.23) and CD4 nadir to 793 cells/μL (690-947). VL was suppressed (< 20 copies/mL) within a median of 16-days (11-21). 76% (55/72) of early treated acutes remain in follow-up; the majority (46/55) suppressed without viral blips for >24-months.

CONCLUSIONS: The FRESH approach enabled detection of hyperacute HIV infection (Fiebig I-V) and immediate suppressive ART, creating a cohort with very limited viremia.

While post-treatment control is infrequent and the mechanisms largely unknown, cure strategies will likely best work in individuals with low reservoir and immune activation due to early initiation of antiretroviral therapy, with a combination of agents such as broadly neutralizing antibodies (bNAbs) and latency reversal agents or immune adjuvants.

As of Dec 2018, FRESH has 46 women detected in Fiebig I - IV with sustained viral suppression for ≥24-months, ideal for cure research strategies.

MOPEB274

No evidence of neuroaxonal injury following latency reversal with vorinostat and HIV-1 specific vaccination in the RIVER trialJ. Alagaratnam^{1,2}, W. Stohr³, J. Toombes⁴, H. Zetterberg^{4,5}, S. Pett³, M. Nelson⁶, S. Kinloch⁷, A. Clarke⁸, N. Nwokolo⁶, M. Johnson⁷, J. Fox⁹, T. Hanke¹⁰, J. Kopycinski¹⁰, L. Dorrell¹⁰, A. Babiker³, J. Frater¹⁰, A. Winston^{1,2}, S. Fidler^{1,2}, RIVER Trial Investigators¹Imperial College, London, UK, London, United Kingdom, ²Imperial College Healthcare NHS Trust, London, United Kingdom, ³University College London, MRC Clinical Trials Unit, London, United Kingdom, ⁴University College London, London, United Kingdom, ⁵University of Gothenburg, Gothenburg, Sweden, ⁶Chelsea and Westminster Hospital, London, United Kingdom, ⁷Royal Free London NHS Foundation Trust, London, United Kingdom, ⁸Brighton & Sussex University Hospital, Brighton, United Kingdom, ⁹Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom, ¹⁰University of Oxford, Oxford, United Kingdom

BACKGROUND: HIV-cure strategies including latency reactivation and vaccination may induce central nervous system immunoinactivation and neuroinflammation, potentially causing neuronal injury. Plasma neurofilament light chain protein (NFL) is a marker of neuroaxonal injury and strongly correlates with cerebrospinal fluid NFL.

We investigated plasma NFL in RIVER, a trial assessing antiretroviral treatment (ART)-alone vs ART+vorinostat (latency reactivation)+ChAdV63. HIVconsv-prime and MVA. HIVconsv-boost T-cell vaccination (ART+V+V)

in HIV-positive adults starting ART ≤4weeks of primary infection. While RIVER showed no evidence of plasma viral transcription in ART+V+V, vaccination induced robust HIV-specific T-cell responses.

METHODS: Plasma NFL was measured using Single molecule array (Simoa) digital immunoassay at: baseline (≥22 weeks ART), week12 (before final vorinostat dose and 4 weeks post-vaccination in ART+V+V), and week18. HIVconsv-specific CD8+ and CD4+T-cell frequencies were measured by intracellular cytokine staining using multiparameter flow cytometry to detect IFN-γ,TNF-α,CD107a,IL-2 and CD154 expression at baseline and week12.

We analysed differences in plasma NFL between study arms at each time-point, changes in plasma NFL over time and associations with baseline clinical parameters using t-test, linear regression and mixed models. T-cell responses and their correlation with plasma NFL were analysed using rank statistics.

RESULTS: All 58 participants included were male, median age 32 years (IQR 28-40) and 40 (69%) white. At baseline, median ART duration was 26 weeks (IQR 24-35), median CD4+count was 696 cells/μL (IQR 566-785), and 57(98%) had HIV-1 RNA < 50 copies/mL. No significant differences in plasma NFL were observed between the timepoints (p=0.154), and by study arm for each timepoint (Table). While there was a significantly higher proportion of HIVconsv-specific T-cell responses at week 12 in ART+V+V (CD154+IFN-γ+CD4+cells,p< 0.001 and CD107a+IFN-γ+CD8+cells,p< 0.001), there was no correlation with plasma NFL concentration. In multi-variable analysis, higher plasma NFL at baseline was associated only with older age (p=0.004).

CONCLUSIONS: Reassuringly, we observed no significant change in plasma NFL in RIVER, despite significantly enhanced vaccine-induced HIV-specific T-cell responses in the ART+V+V arm.

Study week		Baseline	Week 12	Week 18
Plasma NFL, pg/mL, geometric mean (95% CI)	ART	7.4 (6.5 - 8.4)	8.0 (6.6 - 9.7)	7.1 (6.2 - 8.0)
Plasma NFL, pg/mL, geometric mean (95% CI)	ART+V+V	6.4 (5.4 - 7.6)	6.9 (5.8 - 8.1)	6.8 (5.7 - 8.1)
	p-value	0.160	0.218	0.742
% CD154+ IFN-γ+ CD4+ cells, median (IQR)	ART	0.010 (0.000, 0.024)	0.006 (0.000, 0.014)	
% CD154+ IFN-γ+ CD4+ cells, median (IQR)	ART+V+V	0.009 (0.000, 0.020)	0.112 (0.048, 0.216)	
% CD107a+ IFN-γ+ CD8+ cells, median (IQR)	ART	0.076 (0.000, 0.262)	0.063 (0.008, 0.110)	
% CD107a+ IFN-γ+ CD8+ cells, median (IQR)	ART+V+V	0.069 (0.009, 0.362)	0.274 (0.125, 0.668)	

[Table 1: Plasma NFL concentration and CD8+ and CD4+ T-cell responses]

Novel therapeutic approaches (including gene therapy)

MOPEB275

Clinical and economic impact of ibalizumab for patients with multidrug-resistant HIV in the United StatesL. Millham¹, J. Scott¹, P. Sax², F. Shebl¹, K. Reddy¹, E. Losina³, R. Walensky¹, K. Freedberg¹¹Massachusetts General Hospital, Medical Practice Evaluation Center, Department of Medicine, Boston, United States, ²Brigham and Women's Hospital, Division of Infectious Diseases, Boston, United States, ³Brigham and Women's Hospital, Department of Orthopedic Surgery, Boston, United States

BACKGROUND: Ibalizumab, the first FDA-approved monoclonal antibody to treat multidrug-resistant HIV, improves virologic suppression when combined with an optimized background regimen (OBR) of antiretroviral therapy. We projected long-term clinical outcomes, cost-effectiveness, and budget impact of ibalizumab plus OBR for people with multidrug-resistant HIV.

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METHODS: We used the Cost-Effectiveness of Preventing AIDS Complications (CEPAC) model to compare two treatment strategies for multidrug-resistant HIV:

1) *IBA+OBR*—ibalizumab plus OBR, and
2) *OBR*—OBR alone. Ibalizumab efficacy and patient characteristics were from phase 3 trial data. Mean age was 49y, 85% were male, and mean initial CD4 count was 150/μl. Viral suppression for *IBA+OBR* at 24 weeks was 50% and individuals incurred a one-time cost (\$10,500) for the ibalizumab loading dose and monthly costs (\$13,700/month) for OBR and subsequent ibalizumab injections. Those in *OBR* did not achieve viral suppression but incurred OBR costs (\$4,500/month). Model outcomes included 5-year survival, life expectancy in quality-adjusted life years (QALYs), transmissions/100 person-years (PYs), and lifetime care costs. The incremental cost-effectiveness ratio (ICER) was calculated using QALYs and costs and discounted 3%/year; ICERs ≤ \$100,000/QALY were considered cost-effective. We performed sensitivity analysis on key parameters. We also examined the health sector budget impact for the estimated 5,000 people with multidrug-resistant HIV in the US.

RESULTS: Five-year survival increased from 38% with *OBR* to 47% with *IBA+OBR*. Life expectancy increased from 3.74 QALYs with *OBR* to 5.12 QALYs with *IBA+OBR*. Lifetime costs were \$299,600/person with *OBR* and \$660,700/person with *IBA+OBR*; the ICER for *IBA+OBR* compared to *OBR* was \$260,300/QALY. *IBA+OBR* became cost-effective if the cost of ibalizumab was reduced by more than 88%. There was no efficacy threshold at which *IBA+OBR* became cost-effective. Five-year transmission rates decreased from 4.81/100PY with *OBR* to 3.51/100PY with *IBA+OBR*. For the 5,000 people with multidrug-resistant HIV, *IBA+OBR*, compared to *OBR*, increased costs by \$708 million over 5 years, ~0.6% of US HIV treatment costs over that time.

CONCLUSIONS: Ibalizumab will substantially increase survival for patients with multidrug-resistant HIV, a group currently lacking other treatment options. While *IBA+OBR* is not cost-effective, the small number of eligible patients makes the budget impact of adding ibalizumab to OBR relatively small in the US.

Nutrition

MOPEB276

Malnutrition treatment outcomes of patients receiving RUTF vs peanut butter and fortified blended flour in Mwanza, Tanzania

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BACKGROUND: High morbidity and mortality rates in Tanzanian children are in part due to deficiency of protein energy foods, causing severe acute malnutrition (SAM) and moderate acute malnutrition (MAM), especially in poor families. Ready to Use Therapeutic Food (RUTF) is defined by the World Health Organization (WHO) as the gold standard in dietary supplementation for the management of children with SAM and MAM. At Baylor Center of Excellence in Mwanza, Tanzania, due to a shortage of RUTF, peanut butter (PB) and fortified blended flour (FBF) are used as substitutes in the management of children with malnutrition. This study aims to compare treatment outcomes of children receiving RUTF versus those receiving PB and FBF.

METHODS: This was a retrospective cohort study. Data were obtained from the electronic medical record (EMR) and malnutrition database and analyzed with the Chi-Square test. The study period was from May 2015 to May 2017. Children between 6 months and 18 years who were treated for SAM or MAM were included.

RESULTS: A total of 169 children (46.7% females) were included, of which, 119 clients were discharged after reaching targeted weight. Seventy-three (61.3%) received RUTF and 46 (38.7%) received PB and FBF. Those receiving RUTF took an average of 7.7 weeks to reach targeted weight vs. 7.3 weeks for those receiving PB and FBF (p=0.48).

There were no significant differences in the rates of TB, HIV status, gender, initial weight, or age between groups. There was a significant relationship between the distribution of patient nutrition status and nutritional support type (p=0.002, Table 1).

CONCLUSIONS: Time taken for clients to reach target weight among those using RUTF or PB/FBF was not statistically significant. In the absence or shortage of RUTF, PB/FBF may be an effective alternative to manage children with malnutrition even if they have TB or HIV. We recommend a study with larger sample size across multiple Centers of Excellence to further evaluate the use of PB/FBF in the management of malnutrition in the absence of RUTF.

	PB + FBF (n - 65)	RUTF (n - 104)
Nutritional status		
MAM SAM:	25(38.5%)	39(37.5%)
Marasmus SAM:	35(53.8%)	33(31.7%)
Marasmus & Kwashiorkor SAM:	1(1.5%)	8(7.7%)
Kwashiorkor	4(6.2%)	24(23.1%)
		P=0.002
HIV status		
Positive	39(60.0%)	71(68.2%)
Negative	9(13.9%)	9(8.7%)
Exposed	17(26.1%)	24(23.1%)
		P=0.452
TB status		
Positive	19(29.2%)	33(31.8%)
Negative	46(70.8%)	71(68.2%)
		P=0.732

[Distribution of clients taking therapeutic food in relation to Health status]

MOPEB277

Household food insecurity and nutritional status of HIV-positive individuals on ART in Lesotho

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BACKGROUND: Lesotho has a high adult HIV prevalence (25.6%), and in recent years has experienced drought and subsequent food insecurity. We assessed the prevalence of malnutrition among HIV-positive adults and children, the proportion of households with food insecurity, and factors associated with food insecurity and malnutrition in 5 districts with high HIV prevalence.

METHODS: This cross-sectional study was conducted in 30 health facilities randomly sampled from 188 health facilities that offer HIV care in the 5 districts of Berea, Leribe, Mafeteng, Maseru, and Mohale's Hoek. Trained nutrition officers took age-appropriate anthropometric measurements from HIV-positive individuals who visited health facilities in March/April 2018. For children 6-59 months of age, weight-for-height (WHZ), height-for-age (HAZ) and weight-for-age (WAZ) z-scores were computed based on WHO reference standards. Body mass index (BMI) for age was collected for children 5-17 years of age and BMI was computed for adults. Household food insecurity was assessed through the administration of a questionnaire to one adult member of a household. The responses were graded based on the Consolidated Approach for Reporting Indicators (CARI) of food security score. Univariate and multivariate logistic regression models were fitted to identify factors associated with food insecurity and malnutrition.

RESULTS: Of 1,348 participants enrolled for nutrition assessment, 38.7% were male. 6% of children 6-59 months of age were wasted, 43% were stunted and 15% of adults were undernourished. (Table 1) Of 671 households surveyed, 16.4% were food insecure. Factors significantly associated with food insecurity among HIV/AIDS patients on ART were residing in Mohale's Hoek district and relying on remittances/gifts for livelihood. There was no association between malnutrition and food insecurity.

Age Category	Nutrition Status	Total (%)	Sex			Location		
			Male (%)	Female (%)	P Value	Urban (%)	Rural (%)	P Value
6-59 months: WHZ-score (n=249; missing=3)	>= -2 SD : < -2 SD	231(94%) 15(6%)	113(93%) 8(7%)	118(94%) 7(6%)	0.740	115(92%) 10(8%)	116(96%) 5(4%)	0.205
6-59 months: HAZ-score (n=249, missing= 11)	>= -2 SD : < -2 SD	135(57%) 103(43%)	63(53%) 56(47%)	72(61%) 47(39%)	0.239	67(56%) 53(44%)	68(58%) 50(42%)	0.780
6-59 months: WAZ-score (n=249; missing= 7)	< -2 SD : >= -2 SD	47(19%) 195(81%)	22(18%) 98(82%)	25(20%) 97(80%)	0.671	31(25%) 93(75%)	16(14%) 102(86%)	0.025
5-17 years: BMI-for-age (n=153; missing=1)	< -2 SD : >= -2 SD	8(5%) 144(95%)	3(4%) 72(96%)	5 (6%) 72(94%)	0.719	3(6%) 45(94%)	5(5%) 99(95%)	0.708
> 18 Years (not pregnant or breastfeeding): BMI (n=858)	<= 18.4 : > 18.4	129(15%) 729(85%)	74(23%) 248(77%)	55(10%) 481(90%)	<0.001	40(15%) 220(85%)	89(15%) 509(85%)	0.850
Pregnant / Breastfeeding women (n=88)	MUAC <= 23 : MUAC > 23	12(14%) 76(86%)				7(20%) 28(80%)	5(9%) 48(91%)	0.208

[Nutritional Status of Children, Adolescents and Adults Living with HIV in Lesotho]

CONCLUSIONS: There is high prevalence of stunting and underweight among children living with HIV in Lesotho and nearly 1 in 7 adults is under-nourished; however, there is no association between the observed under-nutrition and household food insecurity.

Complementary and traditional medicines

MOPEB278

The effects of aerobic exercises on inflammatory markers and depression in people living with HIV undergoing the highly active antiretroviral therapy: A systematic review with meta-analysis

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BACKGROUND: HIV infection and use of highly active antiretroviral therapy are associated with increased expression of pro-inflammatory biomarkers and major affective disorder. There is a growing research interest in aerobic exercise as an adjunct therapy on inflammatory outcomes and depression in people living with HIV (PLHIV) who are undergoing antiretroviral therapy. Synthesizing and appraising available evidence may be essential to guide practice and future research on exercise intervention to this population. This review evaluated the effects of aerobic exercises on serum levels of high-sensitivity C-reactive protein (hs-CRP) and depressive symptoms in PLHIV.

METHODS: We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines in conducting this review. A systematic search was conducted in seven relevant databases until February 2018. In addition, the reference lists of identified studies were also searched. We included clinical trials that investigated the effects of aerobic exercises on hs-CRP and/or depression in PLHIV. Two reviewers independently screened all the articles for eligibility ($\kappa=0.89$) and also

evaluated the risk of bias using the Cochrane Collaboration risk of bias assessment tool ($\alpha=0.84$). Data were extracted and meta-analyses conducted using Review Manager (RevMan 5.3) software.

RESULTS: Six studies comprising of 261 participants (41% females) within the age of 18 years and above met the inclusion criteria and were included in the review. Only two out of the six included clinical trials were appraised as high quality, culminating to low-GRADE evidence. A meta-analysis of four homogenous studies that reported depression outcome was conducted. The result showed a significant decrease in depression scores ($p<0.0002$, standardized mean difference= -0.71, CI: -1.07 to -0.34) following aerobic exercise interventions. The two studies that reported on hs-CRP outcome, found no significant effect of aerobic exercise on hs-CRP.

CONCLUSIONS: Aerobic exercise interventions of frequency: 3-5 sessions/week; Intensity: 55-75% of age-predicted maximal heart rate, 60-80% of VO_2 max, 50-80% of heart rate reserve; Time: 24-60 minutes and Type: continuous or interval, appear beneficial in reducing depressive symptoms in PLHIV. There was no observed significant effect on hs-CRP. However, further homogeneous, high-quality trials with enough "power" are necessary for a conclusive estimate of effects.

Epidemiology of HIV in the general population

MOPEC317

Effect of strategic Index case testing on HIV case detection in Nigeria: APIN experience

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BACKGROUND: Despite significant advances towards achieving the UN-AIDS 90:90:90 target by 2020, many people living with HIV (PLHIV) remain undiagnosed. To bridge this gap, Index Case Testing (ICT) was recommended as a strategy to identify persons living with HIV and link them to treatment and Care. The objective of this study was to assess the uptake of ICT among PLHIV and testing outcomes in a CDC funded HIV program in Nigeria.

METHODS: This is a retrospective analysis of program data on ICT strategy between Oct 2017 and Sept 2018. Data were sourced from health medical record at 170 health facilities across 8 states in Nigeria. Newly diagnosed HIV positive patients and those previously diagnosed and enrolled on ART were identified for ICT. Trained ICT providers counselled index clients to name their sexual partners and were tested either through client self-referral or assisted by the providers. Data were analyzed using descriptive and summary statistics.

RESULTS: A total of 13,351 newly identified HIV positive and 27,613 old clients on treatment were offered ICT. Out of these 6,950 (50%) new and 27,613 (100%) previously diagnosed patients consented to ICT. Partners' elicitation ratio for new patients and those previously diagnosed were 1:2 (6950/10,679) and 1:1.9 (27,613/35,294) respectively.

Of the 10,679 partners of newly identified PLHIV, 84% (9,011) were traced and offered HTS. 7,930 (88%) of them accepted HTS and 1,227 (15%) tested HIV positive. For partners of index patients previously diagnosed and on ART, 84% (29,708/35,294) of them were traced and offered HTS. Of the 25,090 (84%) who accepted to get tested, 1,305 were HIV positive (5% yield).

The total HIV positive yield from ICT was 7.6% (2,532/33,020) and higher compared to the national HIV prevalence of 3.2%. 99% (2,509/2,532) of the positive clients were linked to ART.

CONCLUSIONS: The study revealed that ICT is an effective strategy to identify more PLHIV compared to other HTS delivery models. We recommend scale up of ICT as a strategy to achieving UNAIDS 90:90:90 target and prioritizing newly diagnosed HIV patients for ICT.

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MOPEC318

HIV care in Turkey: How far is the UNAIDS 90-90-90 goals?

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BACKGROUND: Human immunodeficiency virus (HIV) infection is a global healthcare problem. HIV infection prevalence is low but it is steadily increasing in Turkey. According to the Turkish Ministry of Health, there were 16233 cases of HIV infection and 1651 cases of AIDS in 2017. The prevalence is highest in the age groups of 25-35 years and more than half are late-presenters. Aiming to end the AIDS epidemic by 2030, the Joint United Nations Programme on HIV/AIDS proposed the 90-90-90 targets; at least 90% all patients living with HIV/AIDS (PLWH) should be diagnosed, at least 90% diagnosed should be on ART and at least 90% those on ART should be virologically suppressed.

METHODS: In the current study we aimed to summarize the preliminary results of the largest HIV Cohort in Turkey and assess the status of HIV infection management with the proposed 90-90-90 targets. Modeling tool of European Center for Diseases Control (ECDC) was used for estimation.

RESULTS: The cohort included 2382 patients (2082 male, 300 female, mean age was 36.3 ±11.3 years). Mean CD4 count was 398.5 /mm³ and HIV-RNA level was 576,235 copies/mL. According to the modeling by ECDC Software, 69% of all HIV patients have been diagnosed in 2016. Among 2382 patients, 2191 (92%) were under treatment. The third goal of virally suppressing 90% of the patients on treatment was searched among 1218 (51.1%) of the patients and at treatment week 48, 85% of the patients had lower than 200 copies/mL. Based on observed data and ECDC modeling, we estimate that only 53% of PLWH (68% × 92% × 85%), in Turkey have achieved HIV viral suppression 48 weeks after ART initiation.

CONCLUSIONS: Current study suggested that only half of the PLWH have reached to diagnosis and effective treatment of HIV care. The diagnostic rate was the lowest figure in the HIV care cascade. The fraction of undiagnosed should be targeted to sustain greater access to HIV testing. Efforts should continue to surpass the goals of 90-90-90 and should primarily focus on the detection of undiagnosed ones in Turkey that has an increasing burden of PLWH.

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MOPEC320

Inference of time interval between HIV-1 infection and diagnosis during 2005-2015 in Greece: Implications for testing and control of HIV-1

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BACKGROUND: Late diagnosis is a major hurdle for the management and prevention of HIV. Our aim was to investigate the time interval between HIV infection and diagnosis during 2005-2015 in Greece, using molecular epidemiology.

METHODS: Our analysis included 1,777 (28.4%) and 2,589 (41.3%) sequences of the subtype A1 and B from 6,268 people living with HIV (PLHIV), respectively, collected during 1999-2015 in Greece. The infection date was based on molecular clock calculations for 3,127 sequences from PLHIV infected within monophyletic clusters. The time lag was inferred only for treatment-naïve patients. The date of the first available sample was used as a proxy for the HIV diagnosis date. Multivariate linear regression analysis was performed.

RESULTS: The estimated median time interval between infection and diagnosis for 2,195 treatment-naïve PLHIV with available sample between 2005 and 2015 was 1.88 years (IQR: 0.89-3.84). For 630 (28.7%) PLHIV the time lag was less than a year. The estimated median time interval between diagnosis and infection was 2.82 years (IQR: 1.44-5.87) for heterosexuals, 1.87 years (IQR: 0.95-3.65) for men who have sex with men (MSM), and 0.80 years (IQR: 0.42-1.58) for people who inject drugs (PWID). Regression analysis showed that the time lag was 70.3% (95% CI: 63.6%-75.8%; p < 0.001) and 28.6% (95% CI: 16.3%-39.1%; p < 0.001) lower for PWID and MSM compared to heterosexuals, respectively. For a 10-year increase in age a 17.2% (95% CI: 12.5%-21.9%; p < 0.001) increase in time lag was estimated. Additionally, PWID diagnosed in 2014 and 2015 had 2.93 (95% CI: 1.19-7.24; p=0.001) times higher time lag than PWID diagnosed previously. For MSM and heterosexuals no time trend was observed.

CONCLUSIONS: Our analysis shows that heterosexuals and older PLHIV are diagnosed later. Diagnosis occurred close to infection date among PWID, due to interventions delivered in this population during the evolving outbreak in Athens. However, there was an increasing trend in the time lag for the last two years in PWID, probably due to the attenuation of testing after 2013. Our analysis highlights that additional effort is needed to improve HIV diagnosis especially in some populations that are at higher risk for being diagnosed late.

MOPEC321

Mortality and loss to follow-up in HIV-positive patients starting ART in rural northern Mozambique: The impact of incorporating tracing outcomes on estimates of incidence and associations

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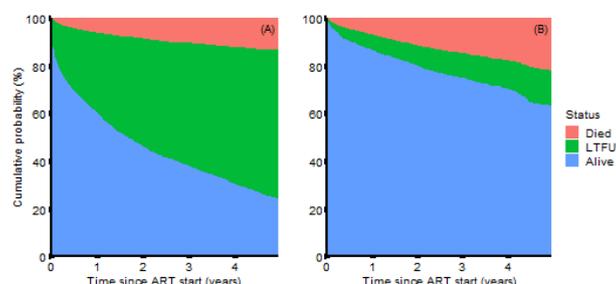
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BACKGROUND: ART-programmes face a substantial proportion of patients lost to follow-up (LTFU), with generally higher mortality. This should be accounted in programme-level mortality estimation to avoid biases. Using data from rural northern Mozambique we aimed to; (1) estimate mortality and LTFU in HIV-positive patients, (2) determine risk factors, and (3) compare estimates with and without correcting for true outcomes in patients LTFU.

METHODS: We used clinical and tracing data from Ancuabe District, Mozambique. Outcomes of interest were time from ART start to either death or LTFU. Missing patient characteristics were addressed by multiple imputation. We used cumulative incidence functions to estimate cumulative probability of death and LTFU after starting ART. We fitted cause-specific and sub-distribution hazard models to estimate associations with baseline characteristics. To correct for true outcomes in patients LTFU, we used revised outcomes from tracing data and a weighing approach based on logistic regression models.

RESULTS: Analyses included 4929 patients; 493 had died, 2375 were LTFU. Tracing of 752 patients LTFU showed that 557 were alive, 46 had died and 149 could not be found.

Four years after starting ART, cumulative probability of dying was 12.2% (95%-CI 11.1-13.3%) and increased to 17.8% (15.9-20.0%) when corrected for true LTFU outcomes. Cumulative probability of being alive was 30.5% (28.8-32.2%) and increased to 70.3% (67.5-73.3%) when corrected for true LTFU outcomes (Figure).



[Figure. Cumulative incidence of mortality and LTFU uncorrected (A) and corrected (B) for true LTFU outcomes]

Male sex, lower CD4 counts and advanced clinical stages were associated with higher hazards of death. Less advanced clinical stages and younger ages were associated with increased hazards of LTFU. Estimated associations changed on average by 16% (range 0-50%) after correcting for LTFU. **CONCLUSIONS:** Incorporating true LTFU outcomes provides more reliable estimates of mortality incidence and associations, underlining the importance of routine tracing. Also, clinics should pay special attention to young and healthier patients who are at increased risk of getting LTFU.

MOPEC322

Gender features of HIV care cascade in 7 countries of Eastern Europe and Central Asia

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BACKGROUND: Social, cultural and economic differences, as well as gender and behavioral attitudes in Eastern Europe and Central Asia (EECA) cause an uneven distribution of HIV infection in the region, differences in the virus transmission routes, and possibly unequal coverage of health services and treatment for men and women.

Our objective was to study gender characteristics of the care cascade for people living with HIV (PLHIV) in 7 EECA countries.

METHODS: The data based on surveys from Azerbaijan, Armenia, Belarus, Kyrgyzstan, Tajikistan, Uzbekistan and Russia in 2015 was extracted from the countries reports during the study "Portrait of the Patient in EECA region".

RESULTS: The majority of PLHIV in the region were male (57-73%). Patients with intravenous drug use history were prevalent in Russia, Azerbaijan and Kyrgyzstan, while most of PLHIV in Armenia and Belarus were infected via sexual intercourse. The main route for HIV transmission among women in all countries was through sexual contact (75-98%).

Among diagnosed PLHIV on average 83% (70-100%) were linked to care: 81% (67-100%) men, and 91% (75-100%) women. The maximum coverage of PLHIV by antiretroviral therapy (ART) was in Armenia and Tajikistan (55% and 53% of all identified PLHIV, respectively).

In all countries the percentage of women receiving ART (an average 55% of diagnosed) was higher than in men (an average 45%). HIV RNA < 1000 copies/ml after 1 year on ART was reached in 17% (2-31%) of all registered PLHIV and 39% (6-85%) of PLHIV on ART in average in all surveyed countries.

Women more often achieved viral suppression (37% of women receiving ART) than men (29% of men receiving ART).

CONCLUSIONS: There was high adherence of PLHIV to care in the most of countries, but a very low percentage of patients achieved effective virus suppression on ART. Women were more adherent to care and treatment than men because men use drug more frequently. Advanced control of adherence and ART efficiency are needed to improve effectiveness of health services in the region.

Epidemiology of HIV in paediatric and adolescent populations

MOPEC323

Where do we stand after 4 years of option B+? Community HIV-prevalence and mortality in HIV-exposed children under 4 years in rural southern Mozambique

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BACKGROUND: UNAIDS estimates that rates of mother-to-child transmission (MTCT) and of AIDS-related mortality in children have decreased by half between 2010-2017 in African countries. In Mozambique we sought to complement clinic-based assessments with community estimations of HIV-prevalence and mortality among children born to HIV-infected mothers.

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METHODS: From October 2017 to April 2018 a cross-sectional household-survey was conducted within the Manhiça Health Demographic Surveillance System, southern Mozambique. Live births in the previous 48-months were randomly selected and mother and child HIV-status was ascertained through documentation or age-appropriate testing. If the mother was not available, the survey was performed with child's caregiver. Fine and Gray model was applied to retrospectively estimate the cumulative mortality and identify risk factors in the cohort over the 48-months preceding the study visit. Hazard ratio of the sub-distribution (sHR) and the corresponding 95% CI were used as a measure of association.

RESULTS: Among 5000 selected mother-child pairs, 4826 were under 48-months of age at time of visit. Of those, 3487 (72.2%) mother/caregiver-child pairs (MCCP) were found and consented to participate and mother and child HIV-status was assessed. Community HIV-prevalence among mothers was 27.7% [95% CI 26.2-29.2] and 4.7% [95% CI 3.4-6.2] among HIV-exposed children. In children under 18-months of age, HIV-prevalence was 3.6% (95% CI 1.8-6.4) whereas in children older than 18-months, was 5.1% (95% CI 3.6-7.1). Child mortality rate in the cohort (n=4826) was 30.9 deaths per 1000 live births in the 48-months prior to the survey. The crude cumulative mortality in children born of mothers with known serostatus was associated with the death of the mother and with her absence in the household.

A multivariate adjusted survival analysis in children showed that been HIV-infected (asHR:4.58 [95% CI 2.15-9.76], $p < 0.0001$) was associated with increased mortality while breastfed during the previous 2 months decreased mortality (asHR:0.40 [95% CI 0.20-0.82], $p=0.012$).

CONCLUSIONS: Community-based assessment of the progress towards the elimination of MTCT is needed to complement clinic-based estimates. Despite an apparent 4.7% HIV-prevalence in exposed children, lower than the 14% estimated in the Spectrum in 2017, mortality in these children shows their continued vulnerability even as MTCT is reduced.

MOPEC324

Incidence rate and predictors of HIV incidence among adolescent girls and young women in Lilongwe, Malawi

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BACKGROUND: Some Adolescent Girls and Young Women (AGYW) in Sub-Saharan Africa have high risk of acquiring HIV, whereas others do not. To minimize new HIV infections among AGYW, targeted HIV prevention interventions are needed. We sought to understand which AGYW were at highest risk of acquiring HIV.

METHODS: We conducted a multisite prospective cohort study in Lilongwe, Malawi. We followed 1000 AGYW aged 15-24 years for one year between February 2016 and August 2017. HIV incidence was defined as being HIV-uninfected at baseline and either testing or reporting being HIV-positive at follow-up. We assessed association between 20 baseline characteristics and HIV incidence, with p-value of < 0.15 as a threshold for association. Poisson regression was used to estimate HIV incidence and incidence rate ratios (IRR) and 95% confidence intervals (CIs).

RESULTS: Of the 1000 AGYW enrolled, 33 were HIV-infected at baseline, 795 contributed to HIV incidence calculations, and 172 had insufficient data. There were 14 seroconversions over 668 person-years (IRR: 2.09/100 person-years, CI: 1.24-3.54). Eight baseline factors were associated with HIV incidence: age 20-24 years, being separated or divorced, >2 sexual partners, recent STI symptom, past pregnancy, transactional sex, partner sleeping away ≥ 3 nights, and partner potentially having other partners. AGYW having ≥ 3 of these factors (n=298/795) had an HIV-incidence rate of 4.97/100 person-years, 10.6 times higher than having < 3 of these factors.

CONCLUSIONS: New HIV infections persist among AGYW but risk is not uniform. High risk AGYW are identifiable and need targeted interventions, such as pre-exposure prophylaxis.

Baseline Characteristics		Incident rate per 100 person years	Incidence rate ratio	p-value
Age	15-19 years	1.24 (0.52, 2.98)	Ref	
	20-24 years	3.40 (1.77, 6.53)	2.74 (0.92, 8.18)	0.071
Marital status	Married	1.37 (0.34, 5.47)	Ref	
	Single	1.86 (0.97, 3.58)	1.36 (0.29, 6.30)	0.693
	Separated/Divorced	7.75 (2.50, 24.04)	5.66(0.95, 33.90)	0.057
STI symptoms	No	1.20 (0.54, 2.68)	Ref	
	Yes	4.71 (2.36, 9.42)	3.91 (1.36, 11.28)	0.012
Pregnancy	Never pregnant	0.75 (0.24, 2.33)	Ref	
	Ever pregnant	4.13 (2.29, 7.46)	5.5 (1.53, 19.72)	0.009

[Table 1. HIV Incidence and Incidence Rate Ratios]

Number of sexual partners during the past year	<2	1.68 (0.87, 3.22)	Ref	
	≥ 2	3.91 (1.63, 9.40)	2.33 (0.78, 6.97)	0.128
Number of nights partner slept away during the past year	<3	0	Ref	
	≥ 3	4.25 (1.06, 17.00)	Non-convergence	0.126
Transactional sex	No	1.49 (0.74, 2.98)	Ref	
	Yes	4.54 (2.04, 10.11)	3.04 (1.06, 8.77)	0.039
Partner with other partners	No	1.06 (0.34, 3.27)	Ref	
	Yes / Unknown	2.88 (1.50, 5.53)	2.72 (0.74, 10.06)	0.133
Total combination of above factors	≤ 2	0.47 (0.12, 1.87)	Ref	
	≥ 3	4.97 (2.82, 8.74)	10.60 (2.37, 47.35)	0.002

[Table 1_CONT. HIV Incidence and Incidence Rate Ratios]

MOPEC325

Developmental trajectories of transactional sex and age-disparate relationships during adolescence: An HPTN 068 analysis

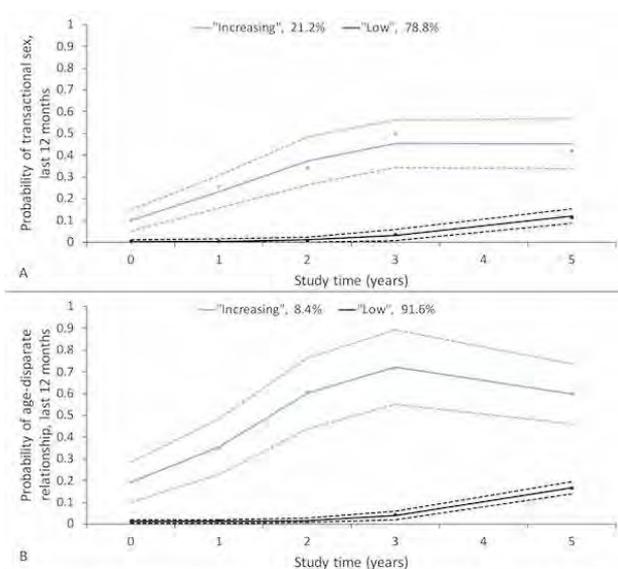
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BACKGROUND: Transactional sex and sexual relationships with older partners both affect HIV risk in adolescent girls and young women (AGYW), yet little is known about how these behaviors co-evolve across individuals over time. We characterize temporal patterns of transactional sex and age-disparate relationships among adolescent girls in South Africa.

METHODS: Data in this analysis are from a randomized controlled trial of school-aged AGYW in Mpumalanga province (HPTN 068). We included girls enrolled in grades 8-9 at baseline (2011-2012) who completed at least three annual self-administered sexual behavior surveys over follow-up (n=1208); girls testing positive for HIV at baseline were excluded. We used group-based trajectory modeling to identify latent groups (trajectories) for both transactional sex (any in the last 12 months) and age-disparate relationships (having a partner ≥ 5 years older in the last 12 months). For each outcome, baseline characteristics of girls in each trajectory group were compared.

RESULTS: At baseline, median age was 14 years (IQR 14,15) and 14.5% of girls were already sexually active; transactional sex and having a partner ≥ 5 years older were low (2.2% and 2.7%, respectively). Over a median of 5 years of follow-up (IQR 5, 6), we identified two distinct trajectories for transactional sex (labeled "low" [experienced by 78.8% of girls] and "increasing" [21.2%]), and two for age-disparate relationships ("low" [91.6%] and "increasing" [8.4%]) (Figure).



A) Predicted trajectories (solid lines) and 95% confidence intervals (dashed lines) for the model estimated for transactional sex; points represent the observed proportion of girls reporting transactional sex for each group. **B)** Predicted trajectories (solid lines) and 95% confidence intervals (dashed lines) for the model estimated for age-disparate relationships; points represent the observed proportion of girls reporting an age-disparate relationship for each group.

[Transactional sex and age-disparate relationship trajectories among adolescent girls in South Africa]

Baseline reporting of condomless sex, prior pregnancy, intimate partner violence, and food insecurity were higher among girls assigned to increasing trajectories (compared to low trajectories) for each outcome ($p < 0.01$ for each comparison).

CONCLUSIONS: Developmental patterns of transactional sex and age-disparate relationships varied, with most girls estimated to experience a low probability of either that persisted over adolescence. Targeting girls who are at high-risk for transactional sex or an age-disparate relationship early in adolescence could maximize effectiveness of behavioral and biomedical HIV prevention efforts.

MOPEC326

Vertically-infected adolescents have poor viral suppression compared to horizontally-infected youth

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BACKGROUND: Sustained viral suppression in adolescents and young adults (AYA) is necessary to optimize benefits of antiretroviral therapy (ART). Kenya is among the first African countries to launch routine viral load (VL) testing. Using program data, we examined correlates of viral suppression among AYA in HIV care.

METHODS: We abstracted electronic medical record and VL data from AYA ages 10-24 at 24 HIV clinics in Kenya from a 15-month period. VLs retrieved from a national database were linked with individual-level data. Viral suppression was defined as last VL < 1000 copies/ml (c/ml) among AYA on ART ≥ 6 months. Vertical infection was defined as age at HIV diagnosis < 15 years. Log-binomial regression estimated adjusted risk ratios (aRRs) and 95% Confidence Intervals (CIs) between correlates and VL suppression at last measure, accounting for clustering by facility. Correlates of sustained VL suppression, defined as any two consecutive results < 1000 c/ml, were compared to AYA with suspected virologic failure, or two consecutive results ≥ 1000 c/ml.

RESULTS: Of 4,335 AYA on ART ≥ 6 months, 2,085 (48.1%) had VL results; 30.1% were ages 10-14, 23.6% 15-19, and 46.3% 20-24 at first VL. Most were female (70.3%), had vertically acquired HIV (59.7%), initiated ART before age 10 (33.7%) or at ages 20-24 (30.3%), and were on 1st-line regimens (96.4%). Overall, 76.0% were virally suppressed. In multivariable models adjusted for gender, age, time on ART, and pregnancy, horizontally acquired HIV was associated with higher prevalence of viral suppression compared to vertical acquisition (aRR 1.36, 95%CI: 1.20-1.54). Older age at ART initiation was associated with higher prevalence of VL suppression vs. initiation at < 10 years (20-24 aRR 1.16, 95%CI: 1.03-1.31; 15-19 aRR 1.11, 95%CI: 1.00-1.23). Among 525 AYA with 2+ VLs, 63.8% had sustained suppression, 14.9% had 1 suppression, while 21.3% had suspected VL failure. In adjusted regression models, horizontal acquisition remained associated with sustained VL suppression (aRR 1.77, 95% CI 1.17-2.67).

CONCLUSIONS: Nearly 25% of AYA had unsuppressed VL in this programmatic analysis. Vertically infected adolescents had the lowest likelihood of sustained VL suppression. Targeted treatment approaches and improved VL monitoring are critical to achieve 95 percent viral suppression among AYA.

Epidemiology of HIV in men who have sex with men

MOPEC327

Divergent HIV diagnosis rates among Australian- and Asian-born men who have sex with men: Evidence of inequitable access to HIV prevention?

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BACKGROUND: In Australia, approximately 75% of HIV diagnoses are among men reporting sex with men (MSM). Despite improved access to early treatment and scale-up of PrEP, concerns remain regarding equitable access to HIV clinical and prevention services, especially among migrants.

We describe HIV diagnosis trends among Australian and Asian-born MSM in Victoria, Australia, and characterise Asian and Australian-born MSM presenting for HIV testing.

METHODS: We describe the annual number and rate (per 1000 population (/1000PY)) of new diagnoses among Australian- and Asian-born MSM notified to the Victorian Department of Health. HIV testing and behavioural data among Australian- and Asian-born MSM attending a peer-led HIV testing service that sees a disproportionately high number of recent migrants were extracted from 15 Aug 2013 (service opening) to 31 Dec 2017. We explore correlates of Asian versus Australian-born diagnoses and characterise differences between Australian- and Asian-born MSM testing for HIV at the peer-testing service.

RESULTS: From 2006-2017 there were 2123 HIV diagnoses among Australian- (n=1714) and Asian-born (n=409) MSM and annual diagnoses declined among Australian-born MSM (2006:163, 0.13/1000PY 2017:118 0.07/1000PY) and increased among Asian-born MSM (2006:11, 0.07/1000PY, 2017:60, 0.15/1000PY). Asian-born MSM were diagnosed younger (OR:2.60, 95%CI:1.95-3.45) and were less likely to report any (OR:0.68, 95%CI:0.53-0.88) or recent (< 12 months) HIV testing (OR:0.63, 95%CI:0.45-0.87). 29% of diagnoses among Asian-born MSM occurred among those residing in Australia for < 3 years (n=118), these MSM were younger (OR:9.3, 95%CI:3.80-22.81) and fewer reported previous HIV testing (OR:2.35, 95%CI:1.44-3.87) compared to HIV diagnosed Asian-born MSM residing in Australia ≥ 3 years.

Asian-born MSM testing for HIV were younger (OR:2.49, 95%CI:2.08-2.99), and less likely to report previously testing for HIV (OR:0.58, 95%CI:0.48-0.69), >10 sex partners in six months (OR:0.50, 95%CI:0.40-

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0.63), condomless sex with casual partners (OR:0.55, 95%CI:0.78-0.62), group sex (OR:0.46, 95%CI:0.40-0.53) or drug use before/during sex (OR:0.56, 95%CI 0.49-0.64), yet were more likely to be diagnosed with HIV (OR:3.83, 95%CI:1.76-8.37).

CONCLUSIONS: Rising HIV diagnoses among Asian-born MSM in Victoria is off-setting declines seen among Australian-born MSM. Barriers to testing and prevention services and high risk sexual networks may be driving HIV transmission among Asian-born MSM. HIV prevention programs must include equitable access for local and migrant MSM.

MOPEC328

Profile and HIV prevalence among young men who have sex with men in India: Findings from a large-scale multi-centric cross-sectional surveillance survey

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BACKGROUND: HIV epidemic in India is concentrated in nature with overall low prevalence in general population but high prevalence among certain population groups. Men having sex with men (MSM) are one of the key population group with relatively HIV prevalence, 12 times than that of general population. We aim to present the profile and current state of the HIV epidemic among young MSM in India.

METHODS: India implements periodical cross-sectional multi-centric site venue-based HIV Sentinel Surveillance among various risk groups including MSM. The case definition of MSM includes 15-49 years old men who had anal or oral sex with a male partner in last 12 months. We analysed data for 15-24 years old MSM recruited in 2017 round of HSS.

RESULTS: Overall, 21579 MSM were recruited in HSS 2017, 14% of them were young MSM. The mean age of young MSM was 22.2 years (Std. Dev 1.6); 7% were from age group of 15-19 years. Most (59%) primarily identified themselves as receptive partner while one third (33%) reported to be double-decker. 14% were bisexual. Almost 60% of young MSM, including 66% of 15-19 years old, reported to engage in sex work. HIV prevalence in the young MSM was 1.8% (2.0% in 15-19 years and 1.8% in 20-24 years). Only 43% HIV-positive young MSM knew they were infected with HIV; 30% were receiving medical Anti-retroviral drug therapy for HIV.

CONCLUSIONS: HIV prevalence among young MSM is very high. HIV prevalence among 15-19 years age group is taken as a proxy for incidence which translates into almost 20 new infections per 1000 uninfected MSM; the global target is to achieve less than 1 new infections per 1000 to achieve end of AIDS thus highlighting the vulnerability of young MSM. Clearly, there is an urgent need to intensify prevention efforts for young MSM as well as promote HIV testing and augment the linkages with treatment facilities to achieve end of AIDS as a public health threat by 2030.

Indicator	15-24 years (N=2935)	25+ years (N=18644)	p value
MSM who had a female sexual partner (%)	18.3	36.0	<0.05
MSM engaged in selling sex (%)	62.0	56.1	<0.05
HIV Prevalence among MSM (%)	1.8	2.9	<0.05
HIV positive MSM who are aware of their HIV Status (%)	42.6	60.0	<0.05

[Background profile, HIV Prevalence and HIV Testing uptake among MSM, HSS 2017]

MOPEC329

HIV prevalence and incidence among men who have sex with men (MSM) attending HIV testing and counselling at a community health care center, Kuala Lumpur, Malaysia 2014-2017

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BACKGROUND: Little is known about HIV prevalence and incidence among MSM in Malaysia. This information is essential to understand the HIV epidemic and inform and implement targeted behavioral and biomedical interventions in this population.

METHODS: Pink Triangle Foundation operates a community health care center (CHCC) providing HIV/STI testing, counseling and treatment services for key populations in Kuala Lumpur, Malaysia. Testing is provided free-of charge. Blood specimens are collected by venipuncture and evaluated for the presence of HIV infection using 4th Generation EIA Test. Men testing HIV infected are referred for publicly funded antiretroviral treatment in designated hospitals. Condoms, lubricants and risk behavior counseling are provided every visit. Here we report the HIV prevalence among first-time testers and HIV incidence among those returning for retesting (testing HIV uninfected previously) from 2014 to 2017.

RESULTS: From 2014 to 2017, CHCC newly tested 3,979 MSM, of whom 417 were found HIV-infected. The number of newly tested men declined from 1,126 in 2014 to 776 in 2017. Of the retest population (654.4-person years [PY] of follow-up), 33 seroconverted for HIV infection. Overall HIV prevalence during the observation period was 10.5%. HIV prevalence increased from 9.5% in 2014 to 13.1% in 2017 (table). HIV prevalence inclined with age: from 7.3% in 15 to 20-year olds, 9.9% in those 21 to 30 years to 11.0% in men 31 years and older. The number of HIV seroconversions among re-testers increased from 4 in 2014 to 12 in 2017, but HIV incidence density declined from 10.1 in 2014 to 4.3 per 100 PY in 2017. The overall HIV incidence density was 5.0 per 100 PY. HIV incidence density was 8.1 in 15 to 20-year olds, 9.1 in those 21 to 30 years and 3.8 per 100 PY in those of 31 years and older.

CONCLUSIONS: HIV prevalence and incidence are high among MSM attending HIV testing and counseling services at CHCC. HIV incidence was highest among younger MSM. Increased behavioral and biomedical interventions, including HIV pre-exposure prophylaxis, are urgently needed for MSM.

MOPEC330

HIV testing practices and reasons for never-testing among men who have sex with men (MSM) in Malaysia

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BACKGROUND: Despite the evidence of rising HIV epidemic among men who have sex with men (MSM) in Malaysia - where sex between men is illegal and highly stigmatized - very little is known about the HIV testing practices among Malaysian MSM.

This study aimed to characterize the HIV testing behaviors of Malaysian MSM, to characterize MSM who never tested for HIV, and to elucidate perceived reasons for never-testing (NT).

METHODS: A cross-sectional online survey was conducted between July and November 2017 to assess HIV testing practices in 622 Malaysian MSM. Participants were recruited via MSM networking mobile apps (e.g., Grindr). In addition to HIV testing practices, participants' socio-de-

mographic, behavioral, and psychosocial factors were assessed using an anonymous online survey. Logistic regression was used to determine factors associated with NT for HIV.

RESULTS: A total of 239 MSM (38.4%) reported having never been tested for HIV and 277 (44.5%) reported having an HIV test in the past 12 months. Self-reported risk behaviors were highly prevalent: inconsistent condom use (54.3%), group sex (41.0%), and 'chemsex' (24.8%). Using multivariable logistic regression, being younger (aOR: 1.119; 95% CI: 1.063, 1.177) and not knowing partner's HIV status (aOR: 5.072; 95% CI: 2.706, 9.506) were positively associated with NT, whereas searching for HIV information online (aOR: 0.469; 95% CI: 0.244, 0.930) was negatively associated with NT. The predominant reasons for NT included fear of positive HIV test result (50.6%), fear of being discovered to be homosexual (43.1%), fear of breach of confidentiality (41.8%), and not knowing the location of testing sites (38.1%).

CONCLUSIONS: The present study demonstrated that the HIV testing rate among Malaysian MSM is low while risk-taking behaviors are high. These results suggest an urgent need for innovative approaches - based on the identified correlates with NT - to optimize the safe and effective provision and uptake of HIV testing services.

Epidemiology of HIV in transgender people

MOPEC331

Neglected population? HIV and other STIs burden among transgender people in Nairobi, Kenya

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BACKGROUND: Evidence suggests that transgender persons (TG) are disproportionately affected by HIV and other STIs, including victimisation that may inhibit access to prevention and treatment. In African research, sexual and gender identities are often conflated within sexual health studies of gay, bisexual and other men who have sex with men (GBMSM), hampering sexual health responses specific to TGs.

METHODS: The TRANSFORM study enrolled TG and GBMSM via respondent-driven sampling in Nairobi during 2017/18. Eligibility: age 18+, male gender at birth/currently, Nairobi residence and consensual oral or anal intercourse with a man during the last year. Participants completed a computer-assisted survey including sexual risk behaviour and HIV/STI testing and treatment history. Gender identity was elicited using a piloted two-step method distinguishing natal and current identity. Participants tested for HIV and anogenital gonorrhoea (NG) and chlamydia. Frequency and association measures were weighted using the RDS-II method.

RESULTS: Among 618 recruits, 84.5% identified as cisgender men, 13.9% trans-feminine and 0.7% trans-masculine (6/618 missing). Compared to cisgender GBMSM, trans-feminine and trans-masculine participants were similar in age, education level, employment and country of birth, yet reported a lower monthly income (USD 60 vs 83, $p=0.006$).

TGs were more likely to be HIV positive (39.9 v 24.6%: $p=0.009$), to have rectal NG (23.6 v 11.8%) and to have current symptoms of a rectal STI (18.6 v 7.0%: $p=0.003$). TG were more likely never to have tested for HIV (6.9 v 15.0%: $p=0.035$). Among HIV negative participants, TG were more likely to report condomless receptive anal intercourse (46.6 v 20.6%, $p<0.001$), transactional sex (53.0 v 44.7%, $p=0.330$) and >3 male sex partners (27.6 v 22.8%, $p=0.479$) in the last three months. Among HIV positive participants, 90-90-90 indicators were weaker for TG (63-81-82) than cisgender GBMSM (73-84-83) but differences weren't statistically significant ($p=0.333$).

CONCLUSIONS: TG persons in Nairobi have a higher burden of HIV and rectal STIs, higher sexual risk behaviours and lower uptake of HIV testing than GBMSM in the same setting. Future research needs to describe wider sexual and reproductive health needs specific to this population. Providers should consider the acceptability and appropriateness of existing service models to TGs.

MOPEC332

Characterizing the HIV treatment cascade among transgender women in Kigali, Rwanda

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BACKGROUND: Across sub-Saharan Africa (SSA), transgender women (TGW) and cisgender men who have sex with men (MSM) face an elevated HIV burden and poorer outcomes along the HIV treatment cascade. Disparities exist within this heterogeneous group, with TGW bearing the highest HIV burden in a number of SSA countries. However, the epidemiologic categories of TGW and MSM are often blurred, and research on gender identity measurement across Africa is lacking. In this context, we sought to understand HIV treatment cascade outcomes by gender identity and expression among TGW and MSM in Rwanda.

METHODS: Between March-July 2018, a bio-behavioral survey was conducted in Kigali, Rwanda, using respondent-driven sampling (RDS). Eligible participants were assigned the male sex at birth, ≥ 18 , and reported anal sex with a man in the previous year. Participants completed an interviewer-administered questionnaire and biological assessment for HIV infection and viral load. Crude and RDS-adjusted frequencies were calculated.

RESULTS: Of 736 participants, 17.7% (n=130) identified as female and/or as TGW (RDS-adjusted: 13.0%, 95% CI: 5.8-22.2). There was considerable divergence between female and TGW identities, corresponding to variation in gender presentation; for example, identifying as female but not TGW was associated with less feminine gender expression. HIV prevalence did not vary by gender; 10.1% of MSM (61/606) and 10.0% of transgender persons (TGP) (13/130) tested HIV-positive. HIV burden among TGP and MSM remained similar after RDS and age adjustment and did not differ by gender expression. Among TGP living with HIV, 84.6% (11/13) were previously aware of their status, all of whom were on ART. Among those on ART, 63.9% of TGP (7/11) were virally suppressed. There were no significant differences between TGW and MSM at any stage of the cascade, although viral suppression was somewhat lower among TGW.

CONCLUSIONS: The observed discordance between TGW identity, female identity, and gender expression indicates need to optimize gender identity measurement in diverse SSA contexts. Contrary to findings from other countries in SSA, TGP and cisgender MSM fared similarly across the treatment cascade. These findings underscore the need for country-specific data collection and analysis with transgender persons.

MOPEC333

Evaluating differential HIV prevention and treatment outcomes between transgender women and cisgender men who have sex with men in urban centres across Cameroon

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BACKGROUND: In Cameroon men who have sex with men (MSM) are disproportionately burdened by HIV, though there are limited data for transgender women. In other Sub-Saharan African settings, gender diversity

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has been independently associated with HIV risk. We assessed HIV prevalence, risk and structural drivers of infection among transgender persons compared to cisgender MSM.

METHODS: People assigned male sex at birth and reporting sex with men in the past year were recruited from 5 Cameroonian cities using respondent-driven-sampling(RDS), December 2015-October 2016. Trained researchers administered a behavioural questionnaire and HIV and syphilis testing. Gender identity was categorised as cis-MSM (male-identifying) and transgender (female or other identity). Prevalence of HIV, behavioural and structural risks were compared between cis-MSM and transgender participants using chi-square-test-of-proportions.

RESULTS: Among 1,323 participants (median age:23 years), self-identified gender was male(68%), female(28%), other(3%) and don't know(3%). Common other responses (e.g.:“versatile”) indicate that gender identity may have been interpreted as sexual positioning or gender expression. RDS-adjusted HIV prevalence was higher among transgender participants(27.1%, 95%CI:19.8%-38.1%) than cis-MSM(13.9%, 95%CI:10.2%-19.3%). Previous diagnosis and HIV testing history were similar between groups. More transgender participants(38%) than cis-MSM(22%) reported experiencing STI symptoms in the past year.

More transgender participants than cis-MSM reported any receptive anal sex (95% vs. 32%). Fewer transgender participants(28%) than cis-MSM(37%) reported consistent condom use with all male partners. Harmful alcohol consumption was more common among transgender participants than cis-MSM.

Experiences of stigma, violence and depressive symptoms were high and more commonly reported by transgender participants.

	cis-MSM		Transgender		p-value
	n	%	n	%	
Total	899		424		
Sexual orientation					
Homosexual	271	30.3	253	59.8	
Bisexual	624	69.6	166	39.2	<0.01
Heterosexual	1	0.1	4	1.0	
HIV/STI prevalence and history					
HIV positive (unadjusted)	133	14.9	139	33.1	<0.01
Previously diagnosed	62/133	46.6	53/139	38.1	0.16
Initiated ART	37/62	59.7	39/53	73.6	0.12
Syphilis positive	26	2.9	10	2.4	0.58
Self-report STI symptoms in past year	201	22.4	159	37.7	<0.01
Ever tested for HIV	648	72.1	311	73.3	0.63
Sexual experience and risk					
Sexual positioning with men (lifetime)					
Insertive anal sex only	604	68.2	20	4.8	
Receptive anal sex only	45	5.1	174	42.3	<0.01
Both insertive/receptive anal sex	237	26.7	217	52.8	
Consistent condom use all male partners	308/825	37.3	111/399	27.8	<0.01
Number of male sex partners past month					
One or less	462	51.4	192	45.3	
2 to 5	374	41.6	191	45	0.06
6+	63	7.0	41	9.7	
Alcohol and drug use					
Consumes 6+ drinks at a time weekly or more	267	29.8	165	38.9	<0.01
Experiences memory loss after drinking monthly or more	88	9.8	110	26.3	<0.01
Ever used illicit drugs	199	22.2	98	23.3	0.66
Stigma and violence					
Ever arrested in relation to homosexuality	37	4.1	29	6.8	0.03
Experiences any social stigma	109	12.1	113	26.7	<0.01
Experiences and healthcare-related stigma	142	15.8	141	33.3	<0.01
Ever been physically harassed or hurt	57	6.3	81	19.1	<0.01
Ever been verbally harassed or blackmailed	256	28.5	181	42.7	<0.01
Ever forced to have sex against will	120	13.4	101	23.9	<0.01
Mental health					
Moderate-severe depressive symptoms	68	7.9	98	24.3	<0.01

[HIV and STI prevalence and related risks among cis-MSM and transgender participants]

CONCLUSIONS: Burden of HIV and structural drivers of HIV risk are disproportionately high among transgender individuals. High stigma affecting transgender people are barriers to safe, effective and human rights-affirming provision of HIV services. Both research and programs need to address gender diversity to foster a supportive environment for HIV prevention for individuals of all gender identities and sexual orientation.

Epidemiology of HIV in people who use drugs

MOPEC334

A highly-connected risk network position was associated with recent HIV infection approximately three years after the large HIV outbreak began among people who inject drugs (PWID) in Athens

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BACKGROUND: Risk networks (sexual or injection) carry HIV infections through communities. Network positions where HIV transmission occurs may differ by epidemic phase. Using recent HIV infections as a proxy for current HIV transmission, we study the rate of recent infections by network position as HIV incidence rates leveled off in the Athens outbreak. No studies of network positions of current HIV transmission have previously been reported.

METHODS: HIV+ index persons (seeds) were recruited from ARISTOTLE, an allied research project. Participants for this analysis were members of seeds' risk networks and of network members' extended risk networks recruited in 2013 - 2015. Recent infection (within last 6 months) was determined using Limiting Antigen Avidity Assay, dates of recent seronegative tests, and viral load. (Seeds were excluded from analyses to prevent bias, since all seeds were HIV+.)

K-cores are network subsets whose members are each linked to k or more subset members. Network position equals k if a participant is in the Sedman k-core of the largest connected risk network component in this study, which included 200 of 236 eligible participants. The higher the k, the more connected the individual is to other network members, so the more individuals are at risk once one k-core member becomes infected. HIV should initially spread faster in high-k k-cores, but transmission rates in k-cores may later decline if high-k cores become saturated. We hypothesized that higher-k k-core positions soon after the outbreak began would be associated with recent infection in the extended risk networks of seeds. Chi-squared and Fisher's exact test determined p-values.

RESULTS: 9.8% (5) of 51 higher-level core members (k = 4 or 5) had recent infection as compared with 2.0% (3) of 147 participants in lower-level cores (exact p = 0.028) (Gender was not significantly associated with k-core level or recent infection).

CONCLUSIONS: Being in a more-connected part of the risk network was associated with recent infection as the outbreak began to level off. Future research should study where in the network transmission occurs at other epidemic phases. These results support contact tracing of the networks of the recently-infected (at least during new outbreaks).

MOPEC335

HCV, HIV/HCV co-infection among people injecting drugs in Tanzania: A hidden epidemic

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BACKGROUND: Of the 15.6 million people who inject drugs (PWID) globally, 52% are infected with hepatitis C virus (HCV). Chronic HCV infection causes substantial morbidity and mortality and, in co-infection with HIV, may result in immunological and virological failure following antiretroviral treatment. Estimates of HCV /HIV/HCV- co-infection and associated risk practices among PWID are scarce and highly needed to inform programming in Tanzania. This study therefore aimed at estimating the prevalence of HCV, HIV/HCV co-infection and associated risk factors among PWID in the largest metropolitan city in Tanzania.

METHODS: An integrated bio-behavioral survey using respondent driven sampling was used to recruit PWID residing in Dar es Salaam, Tanzania. Following face-to-face interviews, blood samples were collected for HIV and HCV testing. Weighted Modified Poisson regression modeling with robust standard errors was used in the analysis.

RESULTS: A total of 611 PWID with a median age of 34 years were recruited through 4 to 8 waves. The majority of participants (94.3%) were males, and the median age at first injection was 24 years. Only 6.55% of participants reported to have been enrolled in opioid treatment programs (OTP). The weighted prevalence of HCV infection was 16.2% (95%CI: 13.0-20.1). The corresponding prevalence of HIV infection was 8.7% (95%CI: 6.4-11.8). Of the 51 PWID who were infected with HIV, 22 (43.1%) were HCV seropositive. Lack of access to clean needles (Adjusted Prevalence Ratio [APR], 1.76, 95%CI: 1.44; 12.74), sharing a needle past month (APR, 1.72, 95%CI: 1.02; 3.00), not cleaning the needle the last time shared (APR, 2.29, 95%CI: 1.00; 6.37), and having unprotected transactional sex (APR, 1.87, 95%CI: 1.00; 3.61) were associated with increased risk of HCV infection. On the other hand, not being on OTP was associated with 60% lower likelihood of infection.

CONCLUSIONS: The prevalence of HCV and HIV/HCV co-infection among PWID were high and may indicate a hidden epidemic. HIV-injecting behaviors and unprotected sex played a major role in HCV infection. Improving access to safe injection equipment, promoting safer injecting practices and protected sex should be the focus of prevention programming. Screening for HIV/HCV co-infection should be intensified in all point of care for PWID.

Epidemiology of HIV in sex workers

MOPEC336

HIV prevalence, HIV testing and unrecognized infection among young female sex workers in India: Findings from a large-scale multi-centric cross-sectional surveillance survey

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BACKGROUND: HIV epidemic in India is concentrated in nature with overall low prevalence in general population but high prevalence among certain population groups. Female Sex Workers (FSW) are one of key population group with relatively HIV prevalence, 7 times of general population. We aim to present the profile and current state of the HIV epidemic among young FSW in India.

METHODS: India implements periodical cross-sectional multi-centric site venue-based HIV Sentinel Surveillance among various risk groups including FSW. The case definition of FSW includes 15-49 years old women who

engaged in consensual sex for money or payment in kind, as a means of livelihood in the last six months preceding the surveillance survey. We analysed data for 15-24 years old FSW recruited in 2017 round of HSS.

RESULTS: Overall, 58391 FSW were recruited in HSS 2017, 10% of them were young. Mean age of young FSW was 22 years (Std. Dev 1.8); 11% were from age group of 15-19 years. Almost one fourth (23%) were in sex work for >5 years. One fifth (22%) were engaged in sex work before attaining the age of 18 years; three fourth were sexually active before attaining the age of 21 years. Most (83%) were completely dependent on sex work as source of income. HIV prevalence in the young FSW was 1.0% (1.6% in 15-19 years and 1.0% in 20-24 years). Almost two-third of HIV-positive young FSW knew they were infected with HIV; 40% were receiving Anti-retroviral drug therapy for HIV.

CONCLUSIONS: HIV prevalence among 15-19 years age group is a proxy for incidence which translates into almost 16 new infections per 1000 uninfected FSW. The global target is to achieve less than 1 new infections per 1000 to achieve end of AIDS thus highlighting the vulnerability of young FSW. Many of young FSW are debuting in sex work at quite an early age which further increase their vulnerability. Clearly, there is an urgent need to integrate and intensify prevention efforts for young FSW as well as promote HIV testing and augment the linkages with treatment facilities to achieve end of AIDS as a public health threat by 2030.

MOPEC337

Progress toward UNAIDS 90-90-90: Experiences from female sex workers in Nigeria

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BACKGROUND: Recent studies show that Female Sex Workers (FSW) living with HIV in sub-Saharan Africa have a poor engagement to HIV care and treatment cascade. We investigated progress towards UNAIDS 90-90-90 targets among FSW in Nigeria, who bear a disproportionate burden of HIV.

METHODS: We describe the national HIV treatment cascade from diagnosis to viral load (VL) suppression (< 1,000 copies/mL) for adult FSW receiving HIV services across seven prioritized states (Lagos, Nasarawa, Akwa Ibom, Cross Rivers, Rivers, Benue, and the FCT) between Oct 1, 2016 and Sept 30, 2018. Data on patient's HIV test results, treatment status, and viral load test were extracted from national registers. We used Cox model to assess predictors of attrition (patients either lost to follow-up (LTFU), discontinued treatment, transferred out or dead). Covariates include; age, study area and multi-month prescription.

RESULTS: Over a 2-year period, a total of 383,870 FSW with the median age of 30 years (IQR: 25-35) were offered a package of HIV prevention interventions. Among the 306,658 (80%) first-time testers, 19,502 (6.4%) tested HIV positive, and 13,538 (69%) were newly initiated on ART. The outcome analysis used a subset of 7,256 ART patient records during 2016 - 2018. Within 6 months of commencing ART, 25% of patients was LTFU, 11% transferred out, 7% discontinued ART, and 2% dead. Retention was 55% (95%CI: 0.53-0.56) at 6 months and 71% (95%CI: 0.62-0.72) at 12 months of follow-up. 87% of the FSW had viral load (VL) < 1,000 copies/mL at 12 months. Age (aHR 0.99; 95%CI: 0.98-1.00) and multi-month prescription (aHR 0.21; 95%CI: 0.19-0.23) were associated with attrition.

CONCLUSIONS: In this study, attrition was highest within first 6 months of commencement of ART and declined over time. HIV prevalence among FSW in Nigeria is higher than in the general population, whereas HIV diagnosis, ART initiation and VL suppression rates are below UNAIDS targets and should be prioritized for improvement.

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Epidemiology of HIV in other vulnerable populations

MOPEC338

HIV risk behavior and testing among people living with sensory disabilities in the United States

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BACKGROUND: Sixty-one million adults are estimated to be living with a disability in the U.S. While the majority of the literature on HIV testing among people with disabilities in the U.S. has focused on mental health and mobility disabilities, there is dearth of evidence on those with sensory disabilities. In this study, we assessed HIV risk behavior and testing among people with visual or hearing impairments in the U.S.

METHODS: This study was a secondary data analysis of the 2016 Behavioral Risk Factor Surveillance System. We included data on respondents who reported: i) blind or having serious difficulty seeing even when wearing glasses, and ii) deaf or having serious difficulty hearing. HIV risk behavior was defined as any of the following in the past year: use of intravenous drugs, treatment for a sexually transmitted disease, given or received money or drugs in exchange for sex, anal sex without a condom, or four or more sex partners. We conducted weighted descriptive analysis, and logistic regression analyses to determine the association between HIV testing and the following factors (sex, age, race/ethnicity, education, marital status, income, employment, health insurance, personal doctor, and HIV risk). Factors significant in the bivariate analyses were included in the adjusted models. Data analysis was performed with SAS software Version 9.4, SAS Institute Inc., Cary, NC, USA.

RESULTS: Among those with visual impairment only, 27% (95%CI=16-37%) reported HIV risk behavior, while 61% (95%CI=54-67%) had ever tested for HIV. In the multivariate analyses, 25-44 years (aOR=4.0, 95%CI=1.2-13.8%), non-Hispanic Black (aOR=4.3, 95%CI=1.5-13.1), income of \$25,000-\$49,999 (aOR=3.4, 95%CI=1.2-9.8) and HIV risk behavior (aOR=11.0, 95%CI=3.6-33.9) had significant higher odds of having had HIV test. Among those with hearing impairment only, 10% (95%CI=6.6-14.3%) reported HIV risk behavior, while 40% (95%CI=34-46%) had ever tested for HIV. In the multivariate analyses, only those with HIV risk behavior had significant higher odds of having had HIV test (aOR=8.1, 95%CI=2.9-22.5). **CONCLUSIONS:** Though HIV testing is infrequent among people with visual or hearing disabilities in the U.S., it is higher among those at risk of HIV. Interventions are needed to improve access to HIV prevention and testing services among people with sensory disabilities.

MOPEC339

HIV epidemiology among the Fisherfolk in the Islands of Lake Victoria in Western Kenya: 2017-2018

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BACKGROUND: Fisherfolk working around Lake Victoria are a priority population for HIV prevention and treatment in Kenya. Studies among fisherfolk residing in mainland communities have found HIV prevalence ranging between 25-35% against 4.8% nationally. We aimed to characterize the HIV epidemic in the often more isolated island beaches.

METHODS: A cross-sectional household survey of fisherfolk aged 15-64 years residing within sampled island beaches on Lake Victoria in western Kenya was conducted in 2017/2018. Data on demographics and behavior were collected and home-based HIV rapid testing and viral load for HIV

positive persons were conducted. Those reporting known HIV-positive status showed clinic cards or drugs for verification. To estimate HIV prevalence, we weighted the sampled participants per number of beaches included and participants interviewed among those mapped. We used logistic regression to investigate variables associated with HIV positivity. Viral suppression was defined as VL< 1,000 copies/mL.

RESULTS: A total of 1696 participants were enrolled in the study, of whom 930 (55%) were females; 1651 (97%) reported previously testing for HIV and 1148 (70%) had tested within the last year. The overall weighted HIV prevalence was 33.7% [95% confidence interval (CI) 31.0-36.4%], with females at 40.6% (95%CI 36.9-44.4) and males 25.1% (95%CI 21.5-28.7). Knowledge of HIV positivity status was 82.6% (95%CI 79.0-86.3). Anti-retroviral therapy (ART) uptake among those with self-reported positive status was 98.3% (95%CI 97.1-99.5). Viral suppression among those on ART was 71.2% (95%CI 65.6-76.9). Factors associated with HIV positivity were (adjusted odds ratio, 95%CI) being female (2.1, 1.6-2.7), age 35-39 years (5.0, 2.5-10.1), widows/widowers (6.9, 3.6-13.1), having primary/lower versus higher education (2.1, 1.4-3.1), being married to fisherman (1.7, 1.3-2.2) and drinking alcohol versus no drinking reported (2.0, 1.5-2.7).

CONCLUSIONS: Our results confirm high HIV prevalence among island fisherfolk, equal to high estimates for mainland fisherfolk. Knowledge of positive status is below the national target of 90%. While ART uptake among those self-reporting HIV positive was nearly universal, viral suppression among those on ART was sub-optimal. Prevention and control interventions among the wider fisherfolk community should continue, with focus to reach women, 35 to 39 year-olds, widows and those with limited education.

Risk factors for acquisition, infectivity and transmission of HIV

MOPEC340

Crystal amphetamine use is common and is associated with HIV infection among MSM and TGW in Bangkok, Thailand

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BACKGROUND: Use of amphetamine type stimulants (ATS) is common among men who have sex with men (MSM) and transgender women (TGW) in many locations, and can be associated with high-risk behavior for HIV infection. We report on a cross-sectional survey of ATS use in the MSM/TGW population of Bangkok, Thailand.

METHODS: MSM/TGW who presented to the Thai Red Cross Anonymous Clinic (TRCAC) for HIV testing volunteered to participate in a survey that collected information on substance use (alcohol, tobacco, and illicit drugs), sexual risk behavior, and HIV status. ATS use included crystal methamphetamine, ecstasy or oral amphetamine tablets. Problem alcohol use was defined by an AUDIT-C score ≥ 4 . All participants provided informed consent and the study was approved by the IRB at Chulalongkorn University.

RESULTS: 679 MSM and 59 TGW participated in the survey. Median age was 27 years (IQR 23-34), 68% had university education, and 96% were either employed or students. Substance use included tobacco (18.5%), problem alcohol use (25.6%), and ATS (16.8%, including crystal methamphetamine (16.1%), ecstasy (3.5%), and oral amphetamines (1.9%)). Injection of crystal methamphetamine was reported by 7%. ATS use was higher in HIV-positive participants (27.1%) than in the HIV-uninfected (14.6%) ($p=0.001$).

The most common illicit drugs reported were poppers (36.7%) and sildenafil (24.9%), with fewer reporting use of marijuana (4.9%), ketamine (3.7%), and cocaine (1.5%). On multivariable analysis, factors independently associated with ATS use were age ≥ 25 years (adjusted odds ratio (aOR) 2.10, 95% CI 1.14-3.84), sex work (aOR 2.22, 1.09-4.51), having group sex (aOR 3.58, 2.17-5.92), tobacco use (aOR 2.91, 1.73-4.90), problem alcohol use (aOR 2.04, 1.24-3.34), and HIV infection (aOR 2.09, 1.19-3.65).

CONCLUSIONS: ATS use is relatively common among MSM and TGW in Bangkok and is associated with increased risk for HIV infection. Other substance use (tobacco, alcohol) and specific sexual practices (selling sex, group sex) are associated with ATS use, and should prompt careful screening for use of amphetamines. Harm-reduction interventions are necessary to counter the increased risk for HIV infection, and better screening and treatment methods are needed to address issues of addiction and problem ATS use in this population.

MOPEC341

Determinants of mother to child transmission of HIV among women on the PMTCT programme in Mwenezi district of Masvingo province, Zimbabwe

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BACKGROUND: In Zimbabwe, the national objective of the elimination of mother to child transmission of HIV is to have transmission rates below 5%. In Mwenezi district however, transmission rates as high as 13% were recorded in 2017. The study therefore sought to establish determinants for such high rates in the district.

METHODS: The study used the case-control method, whereas cases were defined as any baby testing HIV positive at birth and in neo-natal care; controls were babies born HIV negative at birth and in neo-natal care. Cases and controls were matched on the basis of demographic variables, knowledge about eMTCT, attitude towards eMTCT, health seeking behaviour, and practices during pregnancy and eMTCT. The respondents were HIV positive mothers whose babies tested HIV positive or negative after 6 weeks of birth. Of the 600 questionnaires received, 97% were considered for analysis as they were more than 80% complete. Using bi-variate analysis, all factors with p-value less than 0.05 and those that had an odd ratio (OR) confidence interval which did not include 1, were statistically significant.

RESULTS: All the demographic variables that were included for analysis were statistically insignificant as they had a p-value >0.05, except residence (p-value=0.034), ethnic group (p-value=0.05) and marital status (p-value=0.001). Of those included for analysis 40.3% transmitted the virus to the child whilst 59.7% did not transmit the virus. The odds of transmitting the virus to those who had booked for ANC were 84% less likely compared to those who did not book for ANC. Those who were tested during pregnancy were 78% less likely to transmit the virus compared to those tested after pregnancy. Those who delivered at home were 3.5 times likely to transmit the virus compared to those delivered at the clinic. Babies who received prophylaxis had 90% less chances of being infected compared to those who did not.

CONCLUSIONS: The study concluded that mother to child transmission of HIV in Mwenezi district is a result of enrolling late for ANC, failure to get tested for prophylaxis by both mothers and babies, failure to get tested for STIs before and during pregnancy, delivering at home, and non adherence to exclusive breastfeeding in neo-natal care.

MOPEC342

Intimate partner violence and incident HIV among adolescent girls and young women in rural South Africa: HPTN 068

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BACKGROUND: South African adolescent girls and young women (AGYW) are at very high risk for HIV acquisition, and intimate partner violence (IPV) may increase this risk. Only one longitudinal study exists globally with sufficient sample size to explore the IPV-HIV relationship during this critical period of development, finding an association. In our study, we add to this evidence by examining the longitudinal relationship between IPV and incident HIV infection among AGYW in rural South Africa.

METHODS: Data came from HPTN 068, an RCT conducted from 2011 through 2017 among AGYW aged 13-20 years in Mpumalanga Province, South Africa. To estimate the association between lifetime IPV (measured at baseline) and incident HIV over six years of follow-up, we ran multivariable Poisson regression models with an offset of person-time. To estimate the longitudinal association between past-year IPV and incident HIV over the next 12 months, we used generalized estimating equations with a binomial distribution, logit link, and exchangeable correlation matrix. Sexual, physical, and any (sexual or physical) IPV were examined.

RESULTS: There were 2366 AGYW (baseline median age 15) in the analytic sample. Any lifetime (sexual or physical) IPV as of baseline was associated with HIV acquisition during follow-up [adjusted Incident Rate Ratio (aIRR): 1.41, 95% CI: (1.00, 1.99)], as were any lifetime sexual IPV alone at baseline (aIRR: 1.87, 95% CI: 1.05, 3.33), and any lifetime physical IPV alone at baseline (aIRR: 1.32, 95% CI: 0.93, 1.87). In adjusted longitudinal analyses, we did not find strong associations between past-year sexual or physical IPV and odds of HIV acquisition over the subsequent year.

CONCLUSIONS: Although lifetime experience of IPV measured at baseline was associated with incident HIV among AGYW in rural South Africa, more proximate, time-varying measures of IPV were not associated with HIV incidence in longitudinal analyses. These findings suggest that the relationship between IPV and HIV incidence is complex, and that additional longitudinal analyses should explore the mechanism by which more distal experiences of IPV impact HIV acquisition.

MOPEC343

The connection between drug use and risk-taking attitudes and behaviors in the context of HIV/STI Epidemic in China - findings from a 2018 Survey of MSM in China

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BACKGROUND: It is emphasized in literature that risk-taking propensity may simultaneously predispose individuals to drug use and high-risk sex. Using recent data collected among men who have sex with men (MSM) in China, this study attempts to disentangle the connection between drug use, risk-taking attitudes, and HIV/STI risk.

METHODS: We conducted a cross-sectional online survey in July/August 2018 among men who aged above 16 years old and reported having ever had anal or oral sex with another man. Participants completed a struc-

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tured questionnaire which covered a wide range of information on demographics, risk-taking attitude, drug use, HIV-related sexual behaviors, and HIV and syphilis testing and status. Risk-taking attitude is measured with the Risk Aversion Scale (RAS), a 10-point Likert which assesses individuals' willingness to take risks in six domains. We applied bivariable and multivariable logistic regression to examine associations between drug/stimulant before or during sex and HIV related behavioral and health outcomes (including sexual behaviors, HIV and syphilis testing and status) adjusting for RAS and other confounding covariates.

RESULTS: A total of 699 MSM participated in the survey, with an average age of 27.7 years (\pm 6.4). 50.8% ever used drug/stimulants before or during sex in the past three months. Drug users on average had higher RAS score than non-drug users (mean: 4.70 vs. 4.11, $P < 0.00$). Drug/stimulant use was associated with increased odds of high-risk sexual behaviors, including group sex (AOR 5.02 95% CI 3.32-7.58), selling sex (AOR 4.66, 95% CI 2.91-7.47) and buying sex (AOR 5.85, 95% CI 3.45-9.90), having multiple male sex partner (AOR 2.20 95% CI 1.61-3.00), inconsistent condom use (AOR 2.68, 95% CI 1.91-3.76) with male partners, having HIV (AOR 2.67, 95% CI 1.39-5.13) and syphilis (AOR 2.56, 95% CI 1.25-5.25) infection. The magnitude of association between drug/stimulant use and HIV/STI related behavioral and health outcomes was reduced, but remained significant, after adjusting for RAS and background characteristics.

CONCLUSIONS: The study revealed an increased likelihood of sexual risk-taking behaviors and elevated risks for HIV and syphilis infection associated with drug/stimulant use, independent of individuals' risk-taking tendency. Findings highlight the need to integrate risk reduction into STI prevention efforts targeting MSM in China.

MOPEC344

Male partner age and HIV infection among young women in cohabitating partnerships in five countries in southern Africa

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BACKGROUND: Age-disparate relationships exacerbate the HIV epidemic in sub-Saharan African adolescent girls and young women (AGYW) aged 15-24 years, whereby significantly older partners may increase their risk of HIV acquisition. To assess associations between partner age and AGYW HIV infection, we used AGYW and cohabitating partner data from Population-based HIV Impact Assessments (PHIAs), nationally-representative household surveys in Zimbabwe, Zambia, Malawi, Eswatini and Lesotho (2015-2017).

METHODS: HIV-positive samples were tested for recency (LAG avidity), antiretrovirals (ARVs), and viral load (VL) suppression (HIV RNA < 1000 copies/ml). LAG < 1.5 ODn, VL > 1000 copies/ml and no detectable ARVs indicated recent infection. VL > 1000 copies/ml denoted viremia, regardless of serostatus. Pooled analyses were done using logistic regression adjusted for AGYW age incorporating survey weights with jackknife estimates of variance for each country. Multivariable analysis assessed determinants between partner age and HIV infection and were further adjusted for country, condom use at last sex, and AGYW past-year sexual partners.

RESULTS: Of 15,982 AGYW tested for HIV, 4,111 (26%) AGYW had partner data, with 2,791 (17%) partners tested for HIV. Median partner age was 27 (Interquartile range [IQR] 24-30) and median age difference was 5 years (IQR 3-8). Viremia was highest in partners aged 35-44 (Table). In the 4,111 AGYW, HIV prevalence was 6.0% (95%CI 5.2-6.9), with almost doubled odds of infection with partners 25-34 (odds ratio [OR]= 1.77, 95%CI 1.12-2.80) and 5 times the odds if partners were 35-44 (OR=4.82, 95%CI 2.84-8.19) or > 45 (OR=5.23, 95%CI 2.08-13.42), compared to same age band partners. The odds of recent AGYW infection increased 8% with each additional year of partner age difference (OR=1.08, 95%CI 1.05-1.11). In multi-

variable analysis, partner serostatus was the strongest predictor of AGYW serostatus (adjusted OR [aOR]=55.19, 95%CI 32.46-93.81, $p < 0.001$); age was no longer a significant predictor suggesting that the direct effect of male age is as a result of their higher likelihood of HIV infection.

CONCLUSIONS: Older cohabitating partners were significantly associated with higher AGYW HIV prevalence and recent infection, likely mediated by their higher HIV prevalence and viremia. Improving ARV coverage and viral suppression in key male age groups may advance AGYW HIV prevention interventions.

MOPEC345

A systematic review of risk factors for HIV acquisition during pregnancy and breastfeeding in sub-Saharan Africa

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BACKGROUND: Numerous studies have reported high HIV incidence rates during pregnancy and breastfeeding in sub-Saharan Africa. Understanding factors affecting HIV acquisition risk in this population could inform targeted HIV prevention strategies. However, individual studies of potential risk factors often have limited statistical power and uncertain generalizability. Considering the evidence-base as a whole is therefore important. **METHODS:** We systematically searched four electronic databases and relevant conferences from January 1980 to December 2018 for studies that examined risk factors for HIV acquisition during pregnancy and breastfeeding in sub-Saharan Africa. Two reviewers independently assessed studies for inclusion and abstracted data into standardized forms; disagreements were resolved with a third reviewer. As heterogeneity was observed in the types and definitions of risk factors, results are narratively synthesized.

RESULTS: Of 5,182 citations identified, 33 met our inclusion criteria. In these, 69 different risk factors were assessed. Most studies were implemented in southern and eastern Africa ($n=31$). Increasing maternal age was inversely associated with incident HIV in 16 of 23 studies. These studies typically distinguished between adolescent girls, young women, and women ≥ 25 years. Relationship status was also frequently associated with HIV acquisition, with 12 of 15 studies reporting a lower incidence of HIV among married compared to non-married women. Eleven of 12 studies reported an association between incident HIV infection and a current or previous sexually transmitted infection (STI). An increased risk of HIV acquisition persisted irrespective of causative agent and measurement approach. All nine studies that measured number of sex partners reported an increased risk of HIV associated with multiple partners. While knowledge of partner's HIV status was inconsistently associated with HIV seroconversion, known HIV serodiscordancy was associated with increased risk of incident HIV (three of three studies). Finally, reported associations between condom use and HIV seroconversion were mixed; three studies reported lower risk while six studies observed an increased risk of seroconversion associated with condom use.

CONCLUSIONS: Despite inherent variability between studies, several factors routinely assessed during antenatal and postpartum care were associated with incident maternal HIV infection. These factors should be incorporated into risk assessments to identify and prioritize high-risk women for HIV prevention intervention.

Epidemiology of non-AIDS infections and communicable diseases (e.g., viral hepatitis, STIs)

MOPEC346

Analysis of HCV co-infections among newly diagnosed HIV cases in Germany

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BACKGROUND: Molecular analysis of HCV co-infections in newly diagnosed HIV cases provides valuable public health information about the dynamics of circulating HCV-genotypes in this subgroup, enhanced identification of at-risk populations to better target prevention and control interventions. Direct Acting Antivirals (DAA) provide excellent treatment, but continuous monitoring of resistance associated substitutions (RAS) is required to minimize impaired treatment response. We analyzed HCV genotype distribution, transmission risk factors, and RAS among newly diagnosed HIV co-infected individuals in Germany.

METHODS: Between the years 2016 and 2017, HIV-diagnostic laboratories in Germany sent filter dried serum spots (DSS) representing 60% of newly diagnosed HIV-cases along with anonymous report to the Robert Koch Institute. HCV-ELISA was performed using Monolisa HCV Ag/Ab Ultra V2 (Bio-Rad) on the DSS and reactive samples were further screened by an in-house qPCR (5'UTR region) and Western blot analysis to identify active (RNA-positive) and resolved (RNA-negative) infections. Genotyping (NS5B region) and RAS identification (NS5B, NS5A, and NS3 regions) were carried out by nested-PCR and Sanger/Next-Generation sequencing.

RESULTS: Among the total 3974 DSS tested, 255 were HCV-ELISA positive (6.4%). Of these, 169 (4.3%) and 80 (2.0%) were identified as active and resolved infections, respectively. Among all risk groups the highest proportion of active infection was found in Intravenous Drug Users (IDUs) (55.3%, n=73/101). HCV-subtypes (St)-1a, St-3a, and St-1b were predominant with 35.8% (n=57/169), 31.4% (n=50/159), and 23.3% (n=37/159), respectively. RAS due to second generation DAAs were observed in a high proportion in the NS3 region of St-1a and St-1b (34.6%, n=18/52 and 39.4% n=13/33, respectively). Furthermore, in St-1a RAS were detected in NS5A region (5.9%, n=3/51), in St-1b in NS5A (6.3%, n=2/32), and NS5B (35.7%, n=10/28) regions. In St-3a RAS were only observed in the NS5A region (4.8%, n=2/42).

CONCLUSIONS: In Germany, the proportion of HCV-coinfections among newly diagnosed HIV cases is similar to the global co-infection prevalence (6.2%) reported by the WHO (2017). In IDUs, the high proportion of HCV co-infection indicates that more efforts are needed to prevent the transmission of HCV among this group. For special drug combinations, RAS analysis may be beneficial to ensure effective treatment especially in genotype 1 HCV-infections.

MOPEC347

Knowledge and attitudes around syphilis and syphilis pre-exposure prophylaxis (PrEP) among men who have sex with men in Vancouver, Canada: A qualitative study

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BACKGROUND: In British Columbia, Canada - much like many other jurisdictions - syphilis is at record-high rates, with over 80% of cases in 2017 seen in gay, bisexual, and other men who have sex with men (GBM). The

epidemic is of particular concern for those living with HIV, since syphilis may lead to more serious complications in this population. We sought to inductively explore syphilis-related knowledge, and attitudes around biomedical prevention options for syphilis in an age of HIV pre-exposure prophylaxis (PrEP), with the goal of informing effective strategies to address the syphilis epidemic.

METHODS: We conducted in-depth, semi-structured individual interviews with a heterogeneous sample of GBM in Vancouver from December 2016 to June 2017, including men living with HIV and/or with a history of syphilis. Our interviews focused on participants' knowledge around syphilis and perceptions regarding the use of a daily antibiotic as chemoprophylaxis (or syphilis PrEP). Interviews were audio-recorded, transcribed verbatim, and analyzed using Grounded Theory.

RESULTS: Twenty-five GBM were interviewed (64% white; median age: 43 years). Four overarching themes emerged regarding men's views about syphilis. First, syphilis-related knowledge differed according to HIV and syphilis serostatus. Second, competing ideas emerged regarding men's concerns about syphilis. While our participants expressed concern about getting syphilis, they also described the importance of sexual intimacy and pleasure. Third, many participants said that syphilis and other sexually transmitted infections (STIs) were not perceived to be particularly alarming; preventing HIV infection remained a primary concern for many. Finally, although syphilis PrEP was appealing to those living with HIV and with a prior syphilis diagnosis, HIV-negative participants who had never been diagnosed with syphilis were concerned about antibiotic resistance, cost, and side effects.

CONCLUSIONS: Concern for syphilis appeared low among GBM. Our participants tended to organize their safer sex strategies around HIV, not syphilis. Although syphilis-related knowledge was relatively high among GBM living with HIV and those with a prior syphilis diagnosis, this knowledge did not appear to be associated with safer sexual practices, such as increased condom use. This work highlights the importance of examining other potential acceptable prevention solutions, such as syphilis PrEP.

Describing the spread of HIV through molecular epidemiology

MOPEC348

Genetic network analysis to assess the risk of HIV transmission among MSM seeking partners on the internet

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BACKGROUND: Online partner seeking (OPS) among men who have sex with men (MSM) is increasing and has been associated with increased risk behavior including frequency of unprotected anal intercourse, number of partners and incidence of sexually transmitted infections (STIs). However, the impact on transmission of HIV is uncertain.

METHODS: MSM diagnosed with acute and early HIV infection were recruited from the Primary Infection Resource Consortium. HIV transmission events in the year following infection were inferred using genetic network analysis with linked sequences defined as ≤ 0.015 sequences/site difference in the HIV-1 *pol* coding region. Participants completed a detailed baseline questionnaire including reported methods of meeting sexual partners, including OPS, in the prior 3 months and regression was performed with inferred transmission as the outcome.

RESULTS: From 147 MSM, with acute or early HIV who completed the questionnaire, 87 (59.2%) were found to be part of existing genetic clusters with an associated 20 inferred HIV transmissions in the subsequent year. Reported methods for meeting sexual partners included online (68.7%), bar/club (33.3%), friend's residence (29.9%) and bathhouse sex clubs (15.0%). No association between OPS and inferred transmission was found (OR 0.64, 95% CI 0.24 - 1.69, p=0.37) though individuals who reported OPS were more likely to have reported a greater number of partners

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($p=0.003$) and prior STIs ($p=0.002$). Geospatial analysis did not indicate that OPS was associated with increased geographical reach of the user ($p=0.68$).

CONCLUSIONS: In our study, we did not find an association between OPS and inferred HIV-1 transmission in the year following infection using genetic linkage analysis, despite an increased reported risk behavior. The influence of OPS on transmission of HIV-1 is likely to be multifactorial with some increase in sexual risk behaviors though potentially some risk-mitigating factors including sero-disclosure, serosorting, condom negotiation, sexual practices negotiation and user risk-assessment. Further research needs to focus on specific factors of Internet use (eg. geo-spatial applications, dating websites, chat-rooms, user habits) that increase or mitigate HIV transmission risk. Potential benefits in terms of population HIV prevalence are large.

MOPEC349

Detecting outbreak cases in men who have sex with men of a specific age group in Japan by the Search Program of HIV Nation-wide Cluster using Sequence (SPHNCS)

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BACKGROUND: Since HIV-1 follows a transmission network pattern in any key population, cluster information estimated from viral sequences is useful for its prevention. In order to conveniently identify a transmission cluster (TC) spreading domestically, we are developing a web-based search program of HIV nation-wide cluster using sequence data (SPHNCS). SPHNCS can classify newly diagnosed cases to any TC with a higher specificity (0.952) compared with the conventional phylogenetic-based method.

METHODS: SPHNCS exhaustively estimates the number of base substitutions per site in the protease-reverse transcriptase region (HBX2:2253-3260) between a query sequence and 5,305 Japanese reference sequences with TC information, and identifies the TC of the query as that of the most closely linked neighbor reference (distance of $< 1.5\%$). We investigated the SPHNCS data belonging to TCs of the 327 and 116 HIV-1 subtype B infected cases diagnosed in the Tokai and Kyushu administrative regions of Japan, respectively, from 2013 to 2016. Using Bayesian tree inferences, we then analyzed the phylogenetic relationship and estimated the transmission time of the system-detected outbreak cases. This is a group of 5 or more patients diagnosed within 3 years, linked by a distance of $< 1\%$ in SPHNCS.

RESULTS: Using SPHNCS, 258/327 (78.9%) Tokai and 111/116 (95.7%) Kyushu cases were linked to at least one of the 113 identified TCs. The system detected 10 outbreak cases within 10 TCs, which were confirmed to form very close monophyletic groups by Bayesian phylogenetic analysis. They had common ancestors observed at least 5 years before the first patient was diagnosed. Interestingly, many outbreak cases were composed of specific age groups. Two of them have spread rapidly among >10 MSMs of 10-20s and 50-70s in the same area, respectively.

CONCLUSIONS: We demonstrated that HIV-1 transmission networks of Japanese MSMs were episodic, spread in the young population as well as among the elderly depending on their social relation. Prevention strategies against HIV-1 transmission to local MSM population should be implemented in these groups. The results suggest that SPHNCS provides valid information for detecting ongoing HIV transmission depending on their social background by medical staff working at the site of the diagnosis.

MOPEC350

Characterizing the changing circulating HIV-1 strains in the Philippines to better understand the ongoing epidemic

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BACKGROUND: The Philippines is among few countries with cases of new HIV-1 infections still rapidly rising, such that 33 new cases are diagnosed every day. Early studies in 2000s showed that subtype B was the most prevalent HIV-1 strains (70%), followed by CRF01_AE (20%). A recent 2017 study showed that CRF01_AE has become predominant (77%) while the proportion of subtype B has decreased (22%). All previous molecular epidemic surveys used only small fragment analysis of *gag*, *pol* or *env* genes. To best understand the changes in circulating HIV-1 we analyzed near full length genome (NFLG) sequences of the viruses from newly infected patients from the Philippines.

METHODS: 23 newly HIV-1 infected individuals consulting at The Medical City, Philippines were invited to participate. All were single Filipino males ages 22-42 years. All were treatment naive. 78% had homosexual transmission. None were IV drug users. Mean CD4 count: 294 cells/ml. All consented to send plasma samples to Duke University for NFLG sequencing, molecular evolution clock analysis & drug resistance mutations.

RESULTS: Of 23 samples, 3 were collected in Fiebig Stage IV, 2 in Fiebig Stage V, 18 in Fiebig Stage VI. Phylogenetic analysis of 23 NFLG sequences showed that 20 newly characterized sequences clustered closely to the CRF01_AE, while 3 other sequences clustered closely to subtype B. Further recombination analysis showed that 5 (22%) were CRF01/B recombinants and 1 (4%) CRF01/CRF07/B recombinant, while 14 (61%) were CRF01_AE and 3 (13%) were subtype B. Interestingly, the 14 CRF01_AE samples formed a tight cluster suggestive of a common ancestor.

In contrast the divergent new subtype B viruses were derived from multiple ancestors. Phylogenetic trees have been constructed. Detailed recombination analysis showed high percentage (26%) were recombinants, and extensive recombination was ongoing between viruses. Generating the maximum clade credibility (MCC) tree, CRF01 viruses were introduced in the Philippines only recently in 1995 [95% Highest posterior density (HPD): 1992-1998], much later than in Asia & Africa; and has since then evolved into unique subpopulations. 4 patients had drug resistance mutations.

CONCLUSIONS: NFLG sequences from 23 HIV-1-infected Filipinos confirmed that CRF01_AE was now the most predominant (61%), while subtype B down to 13%. High percentage (26%) of ongoing recombination was detected. Understanding dramatic shifts among HIV-1 subtypes is important for better control of the Philippine epidemic.

MOPEC351

Analysis of molecular transmission clusters among newly diagnosed HIV patients in Republic of Panama 2016-2018

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BACKGROUND: Dynamics of HIV transmission changes constantly, which hinder the ability of appropriate interventions to reduce transmission among population at risk. We conducted an epidemiological surveillance study to infer the presence of molecular transmission cluster among the population and to assess the factors associated with their formation.

METHODS: A prospective study was performed surveying 830 newly diagnosed HIV subjects from 2016 to 2018 in the Republic of Panama. HIV *pol* gene sequences were obtained by an in-house sequencing method. To infer HIV cluster a genetic-distance based method was applied (HIV-TRACE). Potential transmission partner was defined by two sequences with a genetic distance less than 1.5%. Our study focuses on risk factors

as risk behavior (MSM, Heterosexual), region (Western, Eastern, Central and Panama Center) and ethnicity. They were grouped by observed cluster and analyzed by multivariate logistic regression.

RESULTS: Analysis showed that 327 (45%) of 732 sequenced samples of this study grouped in 104 transmission clusters composed of 2 or more individuals. There were 327 identified nodes and 452 edges. Eight cluster had more than 8 sequences linked. These clusters were mainly from Western (34/81) and Panama Center (45/81). Being from indigenous ethnicity and from Western regions of the country which was associated with an Odds ratio of 2.41 and 3.1 respectively.

CONCLUSIONS: The analysis confirmed that there are transmission clusters with more than 8 sequences in Panama; these clusters were associated with urban areas of the country and with a countryside region. They were also associated with indigenous population, a group that has a high level of multidimensional poverty. These results suggest a dual focus of the resources to stop transmission for both urban and countryside regions. An active HIV molecular surveillance and the analysis of transmission network will contribute to recognize preferred regions to intervene to improve care outcomes and prevent new infections.

Study designs in prevention research

MOPEC352

Occupational PrEP for young men who have sex with men and transgender women who exchange sex: Development and implementation of an effectiveness and adherence support open-label study in Bangkok, Thailand

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BACKGROUND: Pre-exposure prophylaxis (PrEP) with sufficient adherence prevents HIV infection. Challenges to appropriate PrEP use include low uptake, poor adherence, and early discontinuation. The community-based Combination Prevention Effectiveness (COPE) study aims to address these challenges for HIV-uninfected young (18-26) men who have sex with men (MSM) and transgender women (TGW) who exchange sex in urban Thailand. We describe the unique implementation protocol and analytic plan for this open-label, non-randomized, community-based intervention

METHODS: YMSM and TGW in Bangkok, Thailand who self-report selling/exchanging sex in the previous 12 months are recruited through peer referral and convenience sampling in venues and online. In-person surveys and biologic testing occur at baseline and every 3 months, and all participants receive brief weekly behavioral SMS surveys. Participants have the option to start PrEP or stop PrEP at any time during the course of the study. During periods of PrEP use, participants pick up pills on a monthly basis, may opt-in to receiving SMS reminders, and receive weekly SMS adherence surveys. HIV incidence during time on-PrEP and time off-PrEP are compared to estimate the intervention effect. Marginal structural models are used for statistical analysis to adjust the estimate for time-varying confounders.

RESULTS: To date (January, 2019), 290 participants have contributed approximately 116 person-years with 94% retention. A total of 272 participants (94%) initiated PrEP at baseline, 26 initiated after baseline, and 10 discontinued PrEP use. Self-reported adherence is high, with 81% taking 7 pills and 17% taking 4-6 pills in the last 7 days. Adherence will be measured through tenofovir diphosphate in dried blood spots. Monitoring of unexpected events has identified some social harms, predominantly related to unintentional participant disclosure of PrEP use and peer stigmatization of PrEP and HIV.

CONCLUSIONS: The vast majority of MSM and TGW who exchange sex and participate in this study are interested in PrEP, report taking sufficient PrEP, and stay on PrEP, though additional efforts are needed to address

community misinformation and stigma. This novel open-label study design and analytic plan will allow evaluation of the effectiveness and cost-effectiveness of combination prevention intervention in the context of organized sex work and exchange sex.

MOPEC353

Alternative RCT designs for microbicides and on-demand HIV prevention products

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BACKGROUND: On-demand products for the prevention of HIV infection, like microbicides, can be an important component of a well round up approach to HIV prevention. However, characteristics of the target populations, in particular their high heterogeneity, along with the foreseeable uptake of effective Pre-exposure prophylaxis, make it challenging to design adequately powered trials with reasonable sample sizes. In this presentation, we will explore two alternatives to the traditional parallel design: the cross-over and the re-randomization designs. We propose implementing these designs, which have only been evaluated for fixed follow-up periods, using event-driven rules.

METHODS: In a cross-over design, participants are randomized to one of two sequences of the interventions (active vs. control). In HIV prevention, as for other absorbing endpoints, only participants who have not been infected are followed up in the next period. Using event-driven rules, the timing of the cross-over and stopping are determined when a certain number of events has been observed. In the re-randomization design, participants are repeatedly randomized to receive the active intervention or control, with the trial stopping when a pre-defined number of events has been observed and the frequency of re-randomization as a design parameter that we investigate. We evaluate the performance of these designs through a microsimulation study. Participants in a hypothetical Phase III trial are simulated with heterogeneity introduced by varying frequency of sex acts and risk of infection at each act. We compare operating characteristics (type I error rate, power, coverage probability, duration of trial) of the different designs under different scenarios, including varying rates of PrEP uptake and discontinuation, loss of follow-up and carry-over effects.

RESULTS: Our simulations show that for populations with high heterogeneity in exposures the cross-over design allows for better estimation and higher power than the traditional parallel arms design. Similar results are observed for the re-randomization design, with designs with short periods between randomization performing better.

CONCLUSIONS: Cross-over and re-randomizations designs are a statistically sound alternative for future RCTs testing microbicides and other products with short wash-out times. Their implementation in Phase 2b/3 trials, along with the practical and ethical challenges that it would entail, deserves careful consideration.

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Ethical and human rights issues in prevention research

MOPEC354

Privacy, confidentiality, and informed consent for HIV phylogenetic research: A case study of urban individuals living with HIV approached for enrollment in an HIV study

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BACKGROUND: Phylogenetic analysis has become an important tool for understanding the HIV epidemic with the potential to enhance existing prevention and treatment strategies. Country and state-level differences in HIV criminalization and disclosure laws and advances in next generation sequencing which could make it possible to reliably determine the direction of infection are factors which could impact the perceived individual-level risks for participation in this type of research. To date, few studies have documented opt-out rates or reasons for opting out of HIV research involving phylogenetic analyses.

METHODS: To address this gap, we present case findings from a study conducted in Boston, Massachusetts between June 2017 and August 2018.

RESULTS: Of 90 patients approached to participate in an epidemiologic study involving phylogenetic analysis, only 45 consented to participate. The following were reasons listed for not wanting to participate: privacy/confidentiality concerns, unwillingness to discuss their HIV status, disinterest in being included in research, and lack of time to participate.

CONCLUSIONS: Given the high proportion of individuals who decided not to participate in this study and concerns specifically related to privacy, confidentiality, and HIV disclosure, questions remain regarding (1) whether informed consent should be required for all phylogenetic analyses, including de-identified and surveillance data, (2) what additional steps researchers can take to protect the privacy of individuals, particularly in contexts where HIV is criminalized or there have been civil or criminal cases investigating HIV transmission? and (3) what role community members can play in this process to minimize the potential risks, particularly for those who are most marginalized. These questions require input from both researchers and community members living with HIV/AIDS. We propose involving key stakeholders in the development of recruitment, informed consent, data use, and storage procedures to ensure that the risks and potential societal benefits are both clearly presented to potential participants and that the concerns of those involved as research participants are adequately addressed.

MOPEC355

Conflicting ethical and legal obligations in adolescents HIV prevention research in low resource settings: Medical Research Council of Zimbabwe Ethics Committee Experiences

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BACKGROUND: Conflicting legal and ethical obligations remains a thorny issue encountered by ethics committees when reviewing HIV protocols involving adolescents. As a result, additional protection and special considerations need to be exercised during review of such protocols for research to remain ethical. Laws often are seen as unjust and ethics committees need to act ethically in order not to be found wanting. The belief being that "ethics supersedes the law" and takes center stage.

METHODS: Full Board Reviews were done for HIV prevention protocols involving adolescents. The committee upholds the fundamental principles of research ethics, respecting participants, doing good and doing no harm, and justice. Decisions taken are not cast in stone, not uniform and at times

members use their own discretion. Special consideration is given to age versus legal age to consent, autonomy versus parental permission and assent, community culture versus individual rights and research subject matter versus community support and acceptability. Inclusion of adolescent orphans and street adolescents is also advocated for.

RESULTS: During the year 2018, a total of 13 HIV-prevention research proposals involving adolescents were reviewed. Commonly occurring scenarios where there were conflicting legal and ethical obligations include confidentiality issues between child and parent, informed consent and assent, acting in the best interest of individual adolescents contrary to the law, wavering parental informed when law stipulates that minors need parental consent.

CONCLUSIONS: Ethics Committees need to work hand in glove with communities as one voice so that they can advocate for change of laws that are unjust. It is necessary for researchers to keep abreast with laws and their professional codes in relation to adolescent research.

Modelling the HIV epidemic

MOPEC356

Beyond U=U: Reducing AIDS mortality further accelerates declines in HIV incidence

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BACKGROUND: Declining HIV incidence in countries with high ART coverage has mainly been attributed to the direct effect of viral load suppression (VLS) on infectiousness. The survival benefit of ART could also contribute to epidemic control through multiple mechanisms, such as postponing or eliminating the high-viremia late stage of HIV disease. For seroconcordant HIV-positive couples, survival of both partners makes a long-lasting relationship possible, helping to avoid exposure of new sexual partners. On the other hand, survival could counteract incidence reductions when individuals interrupt treatment or become lost-to-follow-up (LTFU) and experience viral rebound.

METHODS: EMOD-HIV, an individual-based network HIV transmission and care continuum model, was calibrated to the HIV epidemic in eSwatini, where incidence has declined concurrently with ART scale-up to meet the 90-90-90 goals. To disaggregate the direct effect of VLS on incidence from the indirect effect of improved survival on incidence, the model was run with ART influencing survival but not infectiousness, or with ART influencing infectiousness but not survival. Importantly, the model included CD4 reconstitution on ART, realistic retention/LTFU, and viral rebound after ART interruption - aspects of ART that could increase HIV transmission.

RESULTS: The survival benefit of ART also helped to reduce HIV incidence. The effect of ART over 2002-2019 consisted of 73.0% (95% CI:67.1-77.5%) direct transmission reduction due to VLS, 13.8% (95% CI 9.0-19.5%) effect of ART-associated survival on transmission, and 13.4% (95% CI 6.3-21.4%) incidence reduction that could come from either VLS or ART-associated survival, due to redundant effects of both attributes of ART acting simultaneously.

CONCLUSIONS: The direct effect of VLS on transmission accounts for most of the observed incidence decline driven by ART scale-up. However, the survival effect of ART is also net beneficial at reducing HIV incidence, with the benefits of stabilizing seroconcordant couples and postponing or avoiding AIDS-associated viremia outweighing the risks of transmission during treatment interruptions and LTFU. Viral load suppression surveys may underestimate the transmission benefits of ART. Limitations of the study include using a mathematical model rather than direct measurement, and not accounting for less-well-understood factors such as funeral practices and risk disinhibition.

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MOPEC357

Potential utility of routine programmatic data in monitoring national and state-level HIV epidemic in Nigeria: Data triangulation analysis

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BACKGROUND: Nigeria relies on data from periodic resource-intensive surveys such as antenatal HIV seroprevalence sentinel surveys (ANC-HSS) and population-based National AIDS and Reproductive Health Surveys (NARHS) for its HIV control efforts. Nigeria has not explored the use of readily available routine programmatic data (RPD) to easily inform and monitor epidemic control efforts at local settings. This study aimed to determine the usefulness of RPDs (Prevention of Mother-To-Child Transmission [PMTCT] and HIV Testing and Counseling [HTC]) as proxies for monitoring HIV epidemic in Nigeria. The study question was: to what extent are RPDs correlated with national survey data?

METHODS: Using the World Health Organization's 12-step-triangulation procedures, we compared state-level HIV seropositivity data from PMTCT and HTC programs to HIV prevalence data from NARHS and ANC-HSS reports from 2010 to 2014 in Nigeria. We abstracted relevant data from PEPFAR Nigeria data sources and published national survey reports. The study population were pregnant women and the general population. We compared visual (lines and geographic distribution) patterns and trends, and performed Pearson correlation and univariate linear regression models of the estimates for best matched/contiguous years for which data were available.

RESULTS: Median national HIV prevalence estimates were 4.1 and 3.0 for ANC-HSS2010 and 2014; 1.62 and 1.28 for PMTCT2013 and 2014; 4.2 and 2.0 for HTC 2013 and 2014; and 2.3 for NARHS2012. Correlation between PMTCT2014 and ANC-HSS2014 was positive and significant ($R=0.7$, $p<0.001$). ANC-HSS2014 and HTC2014 were slightly correlated ($R=0.4$, $p<0.05$). Significant correlation was observed between ANC-HSS2010 and PMTCT2013 ($R=0.8$, $p<0.001$) and between ANC-HSS2010 and HTC2013 ($R=0.6$, $p<0.001$). All RPD sources and the ANC-HSS indicated a decreasing trend in national HIV prevalence in Nigeria. PMTCT2014 data showed strong capability of predicting HIV prevalence in ANC-HSS2014 in the regression model ($B=2.09$, $p<0.0001$).

CONCLUSIONS: Use of routine PMTCT data in monitoring HIV prevalence among women of reproductive age could be more valid and reliable in local settings than use of HTC data. Use of RPD to monitor national and sub-national-level HIV epidemic in between national surveys in Nigeria could maximize program resources, and promote a more responsive and efficient actions toward epidemic control.

MOPEC358

Impact of targeted pre-exposure prophylaxis uptake among male sex workers on HIV incidence among men who have sex with men: An agent-based modeling study

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BACKGROUND: Despite high vulnerability to HIV infection, pre-exposure prophylaxis (PrEP use) is limited among male sex workers (MSWs). In this study, we estimated the impact of targeted PrEP uptake among MSWs on HIV incidence among the total population of men who have sex with men (MSM).

METHODS: We used an agent-based model representing all adult MSM in Rhode Island, United States ($n = 25,000$) to simulate several scenarios in which different populations of MSM were engaged with PrEP services over a decade.

The model was parameterized with data from an observational study of the sexual networks of MSWs in England and clinical data from the PrEP program of the Rhode Island STD Clinic. PrEP initiation was targeted to MSM in line with current recommendations to achieve one of three target coverage levels (15%, 20%, and 25%).

In a subset of these scenarios, PrEP initiation was further targeted such that eligible MSWs were twice as likely to initiate PrEP as all other MSM. The model was calibrated to reproduce current HIV prevalence and incidence among MSM in Rhode Island (4.1% and 0.24 per 100 person-years).

RESULTS: In the absence of PrEP, the model predicted an HIV incidence of 2.25 per 100 person-years (95% CI: 2.20-2.29) among MSWs, 0.99 per 100 person-years (95% CI: 0.97-1.02) among their clients, and 0.35 per 100 person-years (95% CI: 0.35-0.36) among all other MSM. In a scenario where 25% of MSM used PrEP but initiation was not explicitly targeted to MSWs, HIV incidence was reduced by 44% overall and 49%, 45%, and 43% among MSWs, their clients, and all other MSM, respectively. In a scenario where 25% of MSM use PrEP but initiation was further targeted to MSWs, HIV incidence was reduced by 66% overall and 95%, 69%, and 59% among MSWs, their clients, and all other MSM, respectively.

CONCLUSIONS: Focused PrEP implementation efforts among MSWs may maximize the impact of PrEP in both high-risk and the general population of MSM.

MOPEC359

Cost-effectiveness of HIV antiretroviral treatment scale-up among overlapping key populations in Tijuana, Mexico

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BACKGROUND: Tijuana, on the Mexico-U.S. border, harbors co-existing drug and sex work industries, resulting in diverse key populations with overlapping HIV risks. Overall, HIV prevalence is highest among men who have sex with men (MSM) at 17.3%, and lower among people who inject drugs (PWID) (3.5%), and female sex workers (FSW) (2.7%). However, prevalence varies within key populations depending on whether they are exposed to multiple risk factors (e.g. 6.2% among FSW who inject drugs). Despite Mexican guidelines recommending ART to all HIV+ individuals irrespective of CD4 count, coverage is low among key populations in Tijuana (from ~40% among MSM to < 10% among PWID). We estimated the cost-effectiveness of ART scale-up among overlapping key populations in Tijuana.

METHODS: We developed a dynamic compartmental model of HIV transmission among PWID, MSM, FSW and their clients, as well as all overlapping populations (e.g. PWID-FSW), comprising ten distinct groups. This incorporated the benefits of ART on HIV disease progression, mortality and transmission. We parameterized the model using local data from multiple studies in Tijuana, calibrated to time-series HIV prevalence. We utilized local ART costs, accounting for ART drugs, clinical monitoring, personnel and overheads (USD ~2,500/person/year). We evaluated cost-effectiveness of ART scale-up for each group through separately initiating 5 people from each of the ten groups onto ART in 2019, compared to the status-quo. We calculated costs (2019 USD\$) and health outcomes (in disability-adjusted life years, DALYs) over a 50 year time horizon, discounted 3%/year, to estimate cost-effectiveness (\$/DALY averted).

RESULTS: Cost-effectiveness of ART scale-up ranged from \$470/DALY averted (among MSM who inject drugs and buy sex) to \$1422/DALY averted (among PWID who do not engage in either commercial or male-to-male sex). ART scale up is cost-effective in all groups if policy-makers' willing-

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ness to pay is informed by the WHO 1 GDP/capita threshold (\$8,900/DALY averted in Mexico) and also by a more stringent and country specific threshold based on opportunity cost (\$2,410-\$6,749/DALY averted).

CONCLUSIONS: ART scale-up among key populations in Tijuana is highly cost-effective, especially among groups with multiple overlapping risks, suggesting investments for tailored interventions to reach them are warranted.

MOPEC360

Optimal allocation of HIV resources in geographically heterogeneous epidemics

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BACKGROUND: Health resources are limited, which means spending should be focused on the people, places, and programs that matter most. Choosing the mix of programs to maximize a health outcome is termed allocative efficiency. Here, we extend the methodology of allocative efficiency to answer the question of how resources should be distributed among different regions.

METHODS: A geographical optimization algorithm was implemented as an extension to the Optima HIV model. This algorithm allows optimal funding to be determined across regions, such as multiple countries or multiple districts within a country. The algorithm consists of three steps: (1) calibrating the model to each region, (2) determining the optimal allocation for each region across a range of different budget levels, and (3) finding the budget level in each region that minimizes the outcome (such as new HIV infections and/or HIV-related deaths), subject to the constraint of fixed total budget across all regions. As a case study, we applied this method to determine the optimal allocation of funds across three oblasts in Ukraine (Mykolajiv, Poltava, and Zhytomyr).

RESULTS: Geographical optimization was found to produce solutions with better outcomes than would be possible by considering within-region allocations alone. In the case of Ukraine, prior to optimization (i.e., with status quo spending), a total of 12,200 new infections were predicted to occur over the period 2016-2030 across the three oblasts. With optimization within (but not between) oblasts, this was reduced to 8,500. With geographical optimization (i.e., allowing reallocation of funds between oblasts), this was further reduced to 8,300. Total HIV-related deaths were also reduced via optimization: status quo spending was predicted to result in 10,800 HIV-related deaths, compared to 8,000 with within-oblast optimization and 7,800 with geographical optimization.

CONCLUSIONS: With the increasing availability of district- and even facility-level data, geographical optimization is likely to play an increasingly important role in health economic decision making. Although the largest gains are typically due to reallocating resources to the most effective interventions, especially treatment, further gains can be achieved by optimally reallocating resources between regions.

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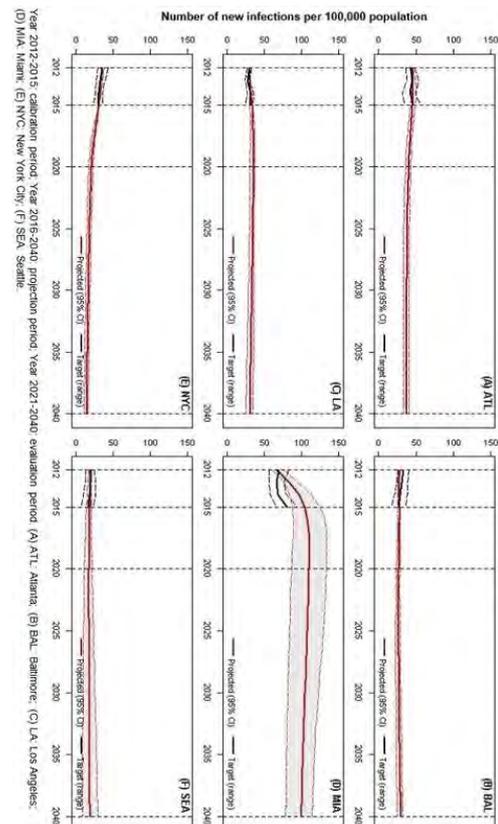
The status quo won't suffice: Modeled projections of the HIV/AIDS epidemic across 6 US cities

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BACKGROUND: The HIV epidemic has been highly heterogeneous across the United States – as has the public response – resulting in widely disparate rates of new infections across urban centers. Despite US\$25B of federal funding directed towards domestic HIV efforts, about 35,000 new HIV cases are diagnosed each year, 52% in Southern States. We projected HIV incidence in six US cities under current HIV treatment, care and prevention service provision over 25 years (2016-2040), assuming no changes in funding.

METHODS: Built off a systematic evidence synthesis, we adapted and extended an HIV transmission model to replicate the HIV microepidemics in Atlanta, Baltimore, Los Angeles, Miami, New York City and Seattle. We calibrated and validated the model to generate 2,000 parameter sets providing the best fit to 17 epidemiological targets, stratified by risk, gender and ethnicity for each city. We focused on the projected trajectory of HIV incidence in the adult population, aged 15-64.

RESULTS: We estimated that overall HIV incidence would decrease in Atlanta (from 45 [95% CI: 42-50] to 37 [33-41] cases/100,000 population) and New York City (from 31 [30-32]/100,000 to 15 [12-17]/100,000), remain relatively constant in Baltimore at 27 [22-32]/100,000 and Seattle at 18 [9-29]/100,000. In contrast, projections for Los Angeles and Miami suggest a slight increase in HIV incidence, ultimately stabilizing at 33 [26-37]/100,000 and 105 [79-134]/100,000, respectively (Figure).



[Figure. Trajectory for HIV incidence]

CONCLUSIONS: Results suggest that disparities in HIV incidence across these 6 cities will be exacerbated up to a 7-fold difference between New York and Miami if treatment and prevention services were to be held constant. City/area-specific combination implementation strategies will be required if the US is to achieve its goal of ending the HIV epidemic by 2025.

MOPEC362

The impact of expanding opioid agonist therapies on HIV epidemic and mortality in Ukraine: A modeling study

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BACKGROUND: HIV incidence and mortality are increasing in Eastern Europe and Central Asia (EECA), especially among people who inject drugs (PWID). Scale-up of opioid agonist therapies (OAT) is crucial for HIV prevention, yet coverage remains inadequate (< 3% of the PWID). We therefore conducted an optimization assessment using current OAT procurement allocation and modeled the impact that increased OAT scale-up would have on 23 administrative regions in Ukraine on HIV incidence and mortality.

METHODS: We first developed a linear optimization model to estimate efficiency gains that could be achieved based on current procurement of OAT. We then developed a dynamic, compartmental population model of HIV transmission that includes injection and sexual risk. We use this model to analyze the impact of scaling-up OAT on HIV infections and mortality over a 10-year horizon using regional data for Ukraine's 43 million population.

RESULTS: After optimizing dosage and region allocation without additional scale-up, OAT coverage would increase from 2.7% to 3.3%. OAT scale-up to 20% over ten years would prevent 17,964 new HIV infections, reduce deaths by 19,962 deaths, and reduce the overall HIV prevalence. Regional findings varied, suggesting differential prioritization for scale-up. If OAT coverage reached 20% in 7 regions, this would account 81% of new infections and 62% of averted deaths. Ignoring scale-up in other regions, however, would have a detrimental impact on health outcomes, resulting in 7,327 additional deaths and 3,345 new infections.

CONCLUSIONS: The results highlight the critical need to markedly scale-up OAT, especially in some regions, which would be accomplished by the combination of providing adequate dosing to promote in treatment alongside markedly increased procurement of medications to reduce the adverse consequences of HIV and addiction in Ukraine.

Surveillance in key population groups

MOPEC363

Factors associated with access to antiretroviral treatment and viral suppression among HIV+ Latin American MSM: Preliminary results of the Latin-American Men Internet Survey (LAMIS)

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BACKGROUND: In order to improve the HIV continuum of care (CoC) among men who have sex with men (MSM) in Latin America, factors associated with reported access to antiretroviral treatment (ART) and viral suppression (VS) were identified among HIV+ MSM participating in the Latin-American Men Internet Survey (LAMIS).

METHODS: From January to May of 2018, 64,655 adult MSM from 18 Latin-American countries responded to an on-line questionnaire exploring demographics, mental health metrics and HIV-related data. We used adjusted multivariable logistic regression to identify variables associated with being on ART if HIV-diagnosed, and reporting viral suppression among those on ART.

RESULTS: Among all respondents, 10,265 (16.0%) reported HIV diagnosis; among those, 8941 reported being on ART (88.9%), and among the latter, 7297 (81.8%) reported viral suppression. Being on ART was positively associated with an age of 25 or older [Prevalence Ratio(PR)=1.12, 95%CI:1.08-1.15], living in a city of 100,000+ inhabitants (PR=1.05, 95%CI:1.01-1.08), having a college/post-graduate degree (PR=1.04, 95%CI:1.02-1.06); and negatively associated with scoring 6+ in the Patient Health Questionnaire-4 (PHQ-4) used to screen for anxiety/depression symptoms (PR=0.95, 95%CI:0.93-0.97). Among those on ART, reporting viral suppression was positively associated with an age of 25 or older (PR=1.26, 95%CI:1.21-1.33), living in a city of 100,000+ people (PR=1.07, 95%CI:1.03-1.13), having a college/post-graduate degree (PR=1.06, 95%CI:1.03-1.08), and "feeling comfortable/very comfortable with current income" (PR=1.04, 95%CI:1.02-1.06); and negatively associated with a scoring 6+ in PHQ-4 (PR=0.99, 95%CI:0.94-1.00), and with scoring 1.4+ points in the Short Internalized Homonegativity Scale (PR=0.97, 95%CI:0.95-0.99).

CONCLUSIONS: In the LAMIS, non-young, more educated HIV-diagnosed MSM living in larger cities and with better mental health reported higher access to ART and more frequent viral suppression. Better economic status and less internalized homonegativity were also associated with viral suppression. Strategies to increase decentralized access to ART among younger, poorer, less educated HIV-diagnosed MSM, and efforts to address stigma and mental health issues are needed to improve the continuum of HIV care among Latin American HIV-diagnosed MSM, towards meeting the 90-90-90 goals.

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Trends in late diagnosis of HIV and time to viral suppression among gay, bisexual and other men who have sex with men (GBM) in Melbourne, Australia

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BACKGROUND: Early diagnosis of HIV remains a key priority to minimise the morbidity and mortality associated with late diagnosis, reduce community viral load and onward transmission risk. Using data on CD4 at diagnosis from the Australian Collaboration for Coordinated Enhanced Surveillance (ACCESS), we assessed trends of late diagnosis among gay and bisexual men (GBM) attending high HIV caseload clinics in Melbourne, Australia.

METHODS: Linked HIV diagnostic and monitoring test records were extracted from ACCESS for three general practice clinics and one peer-led community HIV testing service in Melbourne. GBM newly HIV diagnosed between January 2013 and July 2018 with a CD4 test result recorded within 90 days of diagnosis were included in the analysis. Late-diagnosis was defined as a CD4 of < 350 cells/μL. We assessed annualised trends in the proportion of late HIV diagnoses and the median time between diagnosis and achieving an undetectable viral load for GBM with CD4 counts of ≥ or < 350 cells/μL using Chi-square and Fisher's exact tests.

RESULTS: From 2013 to 2018, 284 new HIV diagnoses were identified, of which 254 (89%) had results of a CD4 result within 90 days recorded. There were 39 (15%) late diagnoses, and the annual proportion remained stable between 2013 and 2018 (p=0.38). Viral load results were available for 243 (96%) GBM; 207 (96%) among GBM with CD4 counts ≥350 cells/μL and 36 (92%) with CD4 counts < 350 cells/μL at diagnosis. Between 2013 and 2018, there was a decrease in the median time to achieving an undetectable viral load among GBM with CD4 counts ≥350 cells/μL at diagnosis from 332 (IQR:189-570) to 52 (IQR:44-79) (p< 0.001) and among GBM with CD4 counts < 350 cells/μL at diagnosis from 113 (IQR:56-135) to 48 (IQR:31-65) (p=0.4).

CONCLUSIONS: Despite decreases in annual HIV diagnoses, there is a persistent proportion of late diagnoses among GBM. For some GBM there continues to be barriers to routine and frequent HIV testing. Relative trends in time to viral suppression suggest the ongoing clinical prioritisation of timely treatment for GBM diagnosed late, with more substantial relative declines in other GBM potentially driven by prioritisation of treatment as prevention.

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Late diagnosis of HIV new infections in Chile

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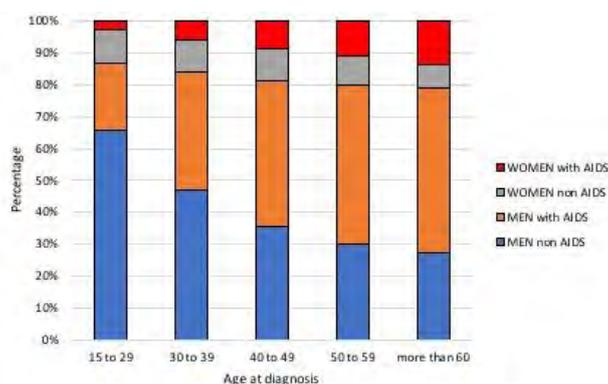
BACKGROUND: AIDS is the third stage of the HIV infection and the most severe one, in this stage the immune system have been damaged and the person is vulnerable to opportunistic diseases. The objective of this study was to identify factors associated with late diagnosis of HIV infection and discuss the implications of implementing actions aimed to improve early diagnosis.

METHODS: We analyse the new infections reported in Chile occurred in people aged 15 and over between 2007 and 2016. The data was obtained from the Obligatory Disease Notification Surveillance System. Descriptive and logistic regression was performed using Stata 14.

RESULTS: The percentage of new infection notified in AIDS stage had decreased from 46% in 2007 to 37% in 2016. Late diagnosis was strongly associated with age, sex, migration and region of residency. For each year of age increase, the odds to be diagnosed with AIDS increased 5%. Women

was 24.3% less likely of being reported with AIDS, compared to men. Chileans had a higher percentage of notifications with AIDS (39.5%) than migrants (35.2%), and 15.4% of the diagnoses in Chileans were women, compared to 23.7% of immigrants. People from the Metropolitan Region has less probability to be diagnosed on AIDS than other regions.

CONCLUSIONS: Although in Chile access to diagnosis and treatment for people living with HIV is guaranteed, this study shows that there are still barriers to early diagnosis, especially in older people, men and residents of regions. It is urgent to implement new strategies to increase early diagnoses in order to reduce morbidity and mortality in people living with HIV. It should be noted that this study may not include all individuals diagnosed during the reporting period. HIV notifications in Chile is mandatory, however there is an estimated underreporting about 30%



[Reported HIV new infections by stage and sex, Chile 2007 to 2016]

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Comparison of key findings of the 2013-2014 and 2018 bio-behavioral surveys amongst female sex workers in South Africa

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BACKGROUND: The first bio-behavioral survey (BBS) amongst female sex workers (FSW) in Johannesburg, Durban and Cape Town was carried out in 2013/14 and repeated in the same cities in 2018. The two BBS sought to estimate population sizes, HIV prevalence and associated risk factors, and to assess service utilization among FSW in the three cities. In this analysis, we compare the FSW profile, HIV prevalence, awareness of HIV status and condom use observed in both BBS.

METHODS: Respondent-driven sampling (RDS) was used to recruit consenting adult FSW (≥16 years) in both BBS. Eligible FSW self-reported behavioral information and provided whole blood specimens for HIV, antiretroviral (ARV) metabolites and viral load testing. RDS-Analyst software was used to produce population-adjusted estimates with 95% confidence intervals (CI).

RESULTS: In 2018, we recruited 546 FSW in Johannesburg, 556 in Durban and 781 in Cape Town compared to 764, 766, and 650 respectively in 2013/14. Study participants in 2013-14 were younger, more than half (52.7% - 64.5%) were < 30 years old, compared to 36.0% - 52.3% in 2018 across the cities. HIV prevalence in 2013-14 was 39.7% in Cape Town, 53.5% in Durban and 71.8% in Johannesburg, compared to 30.0%, 76.4% and 63.3% respectively in 2018 (Table 1). In 2013-14, 56.7% - 77.0% of FSW were aware of their HIV positive status improving to 65.0% - 79.1% in 2018. Similarly, less than a third of FSW (19.0% - 27.7%) self-reported being on antiretroviral therapy (ART) in 2013/14 increasing to between 52.2% - 77.2% in 2018. Self-reported condom use at last sex with clients was 76.4% - 89.4% in 2013-14 and 83.9 - 91.1% in 2018.

CONCLUSIONS: The 2018 survey, as the 2013/14 BBS, confirms high HIV prevalence amongst FSW in the three cities with significant increase in prevalence in Durban. Therefore, FSW remain at increased risk for HIV infection compared to the general population. Although lower than the '90-90-90' treatment targets, ART uptake more than doubled between the two surveys. We recommend continued strengthening and scale-up of current prevention and treatment programs targeting FSW for epidemic control.

Johannesburg 2013-14	Johannesburg 2018	Cape Town 2013-14	Cape Town 2018	Durban 2013-14	Durban 2018
71.8% (56.5-81.2)	63.3% (56.8-69.8)	39.7% (30.1-49.8)	30.0% (23.9-36.1)	53.5% (37.5-65.6)	76.4% (70.3-82.5)

[HIV Prevalence by city and year of survey]

MOPEC367

Migration and mobility: Correlates of recent HIV testing among female sex workers at the Mexico-Guatemala border

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BACKGROUND: The Mexico-Guatemala border is characterized by highly mobile populations including female sex workers (FSW). HIV testing among (FSW) in this region remains suboptimal due in part to stigma and limited access to health services. There is a lack of understanding of how migration may be associated with HIV testing among FSW in highly mobile contexts. The aim of this research is to understand the role of migration and mobility experiences in influencing HIV testing in the past year among FSW living at the Mexico-Guatemala border.

METHODS: Using modified time-location sampling (2013-2015) we recruited 255 FSW in four communities (i.e., Tecún Umán and Quetzaltenango, Guatemala; Tapachula and Ciudad Hidalgo, Mexico). Upon written consent, we conducted face-to-face interviews to obtain information on sociodemographics, migration and mobility experiences, and HIV testing in the past year. Crude and adjusted logistic regression models were used to evaluate relationships.

RESULTS: Sixty percent of participants were born in Guatemala, 19% in Mexico, 11% in Honduras, 6% in El Salvador, 4% in Nicaragua and 1 participant in the Dominican Republic. Forty-one percent of the total sample (n=105) reported receiving an HIV test in the past year. Recent migration was significantly associated with greater odds of HIV testing in the past year (OR=2.23, 95% CI=1.31-3.78, p< 0.001) in univariate analysis. In multivariable analysis, short-term travel to engage in sex work in another country were independently associated with greater odds of HIV testing in the past year (AOR=2.25, 95% CI=1.08-4.69, p< 0.05) after adjusting for key confounders age, years in sex work, having a current health permit, giving percentage of earnings to a bar owner, participation in HIV activities, and client volume.

CONCLUSIONS: FSWs in this setting face low HIV testing access and population-specific approaches addressing structural factors to address potential testing barriers. Tailored outreach to highly mobile women - particularly those engaging in short-term work-related mobility - may facilitate access to voluntary testing for this underserved and marginalized population. Findings from this study may inform future research considering migration and mobility to address HIV prevention in other settings.

MOPEC368

Results from a bio-behavioral survey among female sex workers in South Africa: High HIV prevalence and low uptake of HIV-related health services

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BACKGROUND: The Thembisa model (2018) indicates that an estimated 60% of female sex workers (FSW) in South Africa (SA) are HIV positive and access to services is lower than the general population. SA has limited information on FSW HIV burden, including HIV cases diagnosed, treatment, and viral suppression (VS) i.e. 90-90-90 targets. To address this gap, we conducted a bio-behavioral survey (BBS) to estimate 90-90-90 coverage among FSW in SA's three largest cities, Johannesburg, Durban and Cape Town.

METHODS: Respondent-driven sampling (RDS), was used to recruit FSW aged ≥16 years into the survey. Interviewers collected information on risk behaviors and whole blood was tested for HIV (two-test ELISA algorithm), antiretroviral (ARV) analytes using high-performance liquid chromatography and HIV VS i.e. < 1000 copies/ml³ (Abbott M2000 platform). Results were generated using RDS-Analyst.

RESULTS: Between June and November 2018, we enrolled 546 FSW in Johannesburg, 556 in Durban and 781 in Cape Town. HIV prevalence (95% CI) was 63.3% (56.8-69.8%) for Johannesburg, 76.4% (70.3-82.5%) for Durban and 30.0% (23.9-36.1%) for Cape Town. Notably, 65.0%, 79.1%, and 68.0% of HIV-infected FSW were aware of their status; of these, 77.2%, 69.1, 52.2% self-reported receiving ART (analyte results pending). Among those on ART, 67.2%, 70.4%, and 53.5% were virally suppressed in Johannesburg, Durban and Cape Town respectively. Overall, less than half of FSW had heard of pre-exposure prophylaxis (PrEP). Most FSW (>80% in all cities) reported condom use during their last sexual encounter.

CONCLUSIONS: There is high HIV prevalence, low service uptake, and sub-optimal population VS among FSW in the three cities surveyed. Additionally, awareness of key interventions such as PrEP was low. This indicates that FSW have a risk of HIV acquisition and potential for onward transmission to their sexual partners. For epidemic control, tailored programs that identify, initiate and retain HIV positive FSW on ART and provide prevention services to HIV-uninfected FSW, are urgently required to increase access to critical services.

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Sero-prevalence of human immunodeficiency virus and syphilis among pregnant women attending antenatal clinics in Tanzania: Results from ANC sentinel surveillance 2017/2018

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BACKGROUND: HIV and syphilis infections during pregnancy have continued to occur and pose major health risks to mothers and their unborn babies through mother to child transmission. It may result in adverse outcomes including miscarriage, late unborn baby, newborn death among the other severe complications. This study aimed at assessing the prevalence of HIV/syphilis co-infection prevalence among pregnant women attending antenatal clinics in mainland Tanzania to inform clinical practice and public health policy.

METHODS: A cross-sectional survey of antenatal clinic (ANC) attendees was conducted in all 26 regions in Mainland Tanzania. In total 158 sites from urban, semi-urban and rural places were represented. All eligible and consented pregnant women were tested for HIV 1 using the national guidelines testing algorithm which utilizes 1) SD Bioline HIV 1/2 and 2) Unigold (Trinity Biotech); ELISA was used to confirm all positive, discordant and some negative results for quality assurance. Syphilis was tested using SD Bioline Syphilis 3.0 test kit. Data were analyzed using STATA v13 software. Logistic regression was used to establish factors associated with HIV/syphilis co-infection.

RESULTS: A total of 31,721 participants were tested for both HIV and Syphilis. HIV and syphilis sero-prevalence were 6.1% [95% CI: 5.9-6.1] and 1.8% [95% CI: 1.7-1.9] respectively. Out of these, 1,756 (5.6%) had HIV mono-infection, 439 (1.4%) syphilis mono-infection and 132 (0.4%) had HIV/Syphilis co-infection. HIV sero-prevalence among pregnant women with syphilis infection was 23.0%. Syphilis sero-prevalence among HIV sero-positive pregnant women was 7.0%. ANC attendees with syphilis infection were five-times more likely to have HIV infection compared to their counterpart (AOR 5.08, 95% CI: 4.17-6.18, $p < 0.001$). Risk of HIV/syphilis co-infection appears to be increasing with increase age and education level. Cohabiting/married pregnant women had less odds of having HIV and syphilis than single pregnant women (AOR 0.26, 95% CI: 0.15-0.44, $p < 0.001$).

CONCLUSIONS: There was high prevalence of HIV/active syphilis co-infection identified. Syphilis has not been eliminated and we should continue with screening among pregnant women. To achieve the goal of eliminating HIV, effective screening, early diagnostics and prompt treatment of syphilis should be emphasized.

MOPEC370

Prevalence and factors associated with virologic suppression among adults and children living with HIV in Lake Victoria island fishing communities in Kenya, 2017/2018

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BACKGROUND: Effective antiretroviral therapy (ART) leading to durable viral suppression (VS) among persons living with HIV (PLHIV) improves health outcomes and prevention. Kenya's national viral load (VL) database reports 89% and 74% VS among children and adults on ART in 2018, respectively. We characterized non-suppression among PLHIV in Kenya's Lake Victoria fishing communities, a known high HIV burden population.

METHODS: We conducted a household bio-behavioral survey in eight island beaches in 2017/2018. HIV and VL testing was done for adults age 15-64 years. Children were tested based on living in the household (10-14 years) or HIV exposure (< 10 years). We assigned children as HIV-negative if non-exposed. We calculated frequencies, proportions, and used logistic regression to assess predictors of virologic non-suppression in adults, defined as VL $\geq 1,000$ copies/mL.

RESULTS: Among the 1696 adult participants enrolled, 531 were HIV positive with a weighted HIV prevalence of 33.7% [95% confidence interval (CI): 31.0-36.4%]. Knowledge of positive status was 82.6% [95%CI: 79.0-86.3]. ART uptake among self-reporting positive adults was 98.3% [95%CI: 97.1-99.5]. VS among all adults was 57.3% [95%CI: 52.2-62.2] and 71.2% [95%CI: 65.6-76.9] among those self-reported on ART. Being female was strongly associated with non-suppression [adjusted odds ratio (AOR) 5.0 [95%CI: 1.69-14.84], p -value=0.004]. Older ages were moderately associated with suppression: 35-44 years [AOR 0.35 [95%CI: 0.13-0.94], p -value=0.038] and 45-64 years [AOR 0.35 [95%CI: 0.11-1.08], p -value=0.068] compared to 15-24 years.

Thirty-five children living with HIV were identified with a median age of 7 (0-14) years and weighted HIV prevalence of 2.3% [95%CI: 1.5-3.0]. The majority (77.1%;95%CI: 59.5-88.6) were already known positive, of whom all reported being on ART. VS among all children living with HIV was 48.6% [95%CI: 32.0-65.5] and 59.3% [95%CI: 39.0-76.8] among those on ART.

CONCLUSIONS: Knowledge of positive status was high among adults and children, though gaps remain. ART uptake was nearly universal among PLHIV already aware of their positive status, however both adult and child VS proportions were sub-optimal and below national averages. Programs should ensure timely viral load monitoring and enhanced adherence support to improve outcomes in this priority population and further investigate challenges specific to women and younger ages.

Novel methods/algorithms for detecting acute and recent HIV infections

MOPEC371

Partner notification services as a strategy to identify HIV-positive contacts of female sex workers, western Kenya

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BACKGROUND: In 2017, Kenya reported 44,800 new HIV infections among adults. Female sex workers (FSW) are estimated to contribute 14% of new HIV infections nationally, highlighting the importance of reaching

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the sexual partners of FSW for HIV testing services (HTS). We evaluated the effectiveness of Partner Notification Services (PNS) as a strategy to identify HIV-positive sexual contacts of FSW in high HIV-burden counties in Kenya.

METHODS: Data were retrospectively abstracted from standardized Ministry of Health and program registers at 12 Drop-in Centers in Kisii, Kisumu and Migori counties for the period October 2017-September 2018. We calculated the overall and age band-specific frequency and proportion of PNS uptake by FSW and contacts, HIV test result among contacts, and linkage to care among HIV-positive contacts. Time from contact elicitation to testing, and from contact HIV-diagnosis to enrollment in care was calculated in days.

RESULTS: A total of 434 HIV-positive FSW were identified and offered PNS during the study period; median age was 29 (IQR 16 - 55). PNS uptake was 95.7% (415/434), with 47% (195/415) preferring contact referral, and 38% (158/415) preferring provider referral PNS strategies. A total of 813 sexual contacts (1.9 per index) were elicited through PNS; all were male. Median age of contacts was 32 years (IQR 16-79). Overall, 90.1% (564/620) of contacts were booked for HTS and 96.7% (547/564) were tested. Testing uptake was not different among contacts < 40 years compared to those ≥40 years (97.6% vs. 94.3%; p-value 0.073). Median time from contact identification to HIV testing was 20 days (IQR 4-29). HIV-positive yield was 21.0% (115/547). Although yield was significantly higher among men above 40 years (30.3% vs. 19.0%; p-value=0.018, nearly three quarters (85/115) of contacts diagnosed with HIV were 39 years and below. Overall 80.9% (93/115) of HIV-positive contacts were enrolled in care with a median time to enrollment of 3 days.

CONCLUSIONS: PNS is a highly acceptable and effective strategy in identifying HIV-positive sexual contacts of FSWs, including men below 40 years of age. Strategies to increase enrollment of newly diagnosed HIV-positive contacts of FSW need to be identified and implemented.

Novel studies to follow people during the early/acute phase (e.g., post PEP/PrEP, seroconverters, seroreverters)

MOPEC372

A fast track post-exposure prophylaxis (PEP) service delivery model for Thai men who have sex with men (MSM): A prevention opportunity for PEP to pre-exposure prophylaxis (PrEP) transition

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BACKGROUND: Post-exposure prophylaxis (PEP) is an emergency drug to prevent HIV, and must be started within 72 hours after a recent HIV exposure. Proactive methods to immediately identify, engage key populations with recent HIV risk exposure and seamlessly linking them to PEP services are critical to reducing new infections and transitioning from PEP towards pre-exposure prophylaxis (PrEP).

METHODS: Adam's Love (www.adamslove.org) leveraged a fast-track online-to-offline (O2O) PEP service delivery model for Thai men who have sex with men (MSM). The O2O model included web heuristics strategy based on the querying behavior of high-risk groups and site optimization framework targeting search queries, social media promotions, real-time PEP eCounseling, clinic bookings and appointment QR codes, location maps, and PEP adherence reminders. We measured the impact of O2O model on PEP linkage, uptake and adherence.

RESULTS: Between October 2017 and November 2018, Adam's Love promotions reached 171,419 people, and real-time PEP eCounseling were provided to 370 MSM participants (median age of 25 years, IQR 22-30), located in Bangkok (56.3%) and other provinces (43.7%). Median (IQR) time between incidence to contacting eCounselor was 10 (6-24) hours. Common search queries into Google included 'emergency HIV drugs', 'after HIV risk prevention, I had unprotected sex', 'not wearing or condom

broke', and 'AIDS counseling'. Majority (62.7%) were previously unaware of PEP as a biomedical HIV prevention tool and 31.1% had never tested for HIV. Of 270 MSM successfully referred to PEP care, 210 (77.8%) sought 28 days of PEP treatment. Median (IQR) time between incidence to starting PEP was 30 (13-48) hours. Among PEP takers, majority (66.2%) felt comfortable to receive daily-personalized PEP reminders. Self-reported adherence mean score was 94.42 out of 100 (SD=12.2). On a five-point LIKERT, participants were satisfied with reminders (mean 4.56, SD=0.63) and thought it helped being adherent (mean 4.18, SD=0.96). In total, 181 of 210 MSM (86.2%) successfully completed the 28-day PEP course, and 23 MSM were referred to PrEP services.

CONCLUSIONS: Our novel O2O PEP model successfully engaged Thai MSM and seamlessly linked them to PEP care. The model has high potential to help MSM enter HIV prevention cascade and enable PEP to PrEP transition.

Novel studies to measure HIV incidence

MOPEC373

Incidence in pregnant women attending antenatal clinics in western Kenya

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BACKGROUND: Monitoring HIV incidence among pregnant women is a key target of HIV surveillance throughout sub-Saharan Africa. In the absence of longitudinal data, recent infection testing algorithms (RITAs) may provide a suitable alternative, measuring recent infection for the purpose of estimating incidence or incidence trends. We present a comparison of HIV incidence among pregnant women in antenatal care (ANC) clinics in western Kenya measured with RITA to repeated serosurveys in a health and demographic surveillance site (HDSS) in the area ongoing since 2004. **METHODS:** From Feb-Nov 2018, women attending 14 ANC clinics in Gem, Kenya were linked to their KEMRI/CDC Siaya HDSS record, and all HIV-positive women were eligible for recency testing. ANC and HIV treatment records for participants were abstracted. The RITA assessed included sequentially:

1) Maxim LAG avidity EIA (< 1.5 ODn=recent),
2) viral load (>1,000 copies/ml=recent), and
3) record review for HIV treatment status (no ART or ART < 90 days=recent). Incidence estimates from the RITA were obtained using Kassanjee et al's method, with subtype-specific mean duration of recent infection (MDRI) and false recent rate estimated by CEPHIA.

RESULTS: Among 2,367 women attending ANC, 425 of 446 HIV-positive women provided a sample to undergo RITA. Median age of HIV-positive ANC attendees was 28 years (IQR=24-33), 67.0% were in their 3rd trimester, and the median were in their 3rd pregnancy (IQR=2-5); among HIV-negative women, median age was 23 years (IQR=20-28), 40.4% were in their third trimester, and median 2nd pregnancy (IQR=1-4). HIV incidence was estimated to be 0.78 per 100 py (95%CI=0.16-1.41) using the RITA. HIV incidence between last HDSS visit and ANC visit among women linked to the HDSS was 1.39 per 100 py (95%CI=0.92-2.00).

CONCLUSIONS: HIV incidence estimated using a RITA was lower than estimated with linked serosurveys in local demographic/HIV surveillance. This may reflect declining population-based HIV incidence since HDSS rounds, lower coital frequency during late trimester pregnancies, or RITA-related estimation difficulties, such as changes in subtype-distribution leading to a shorter MDRI. RITAs are a promising avenue for ANC incidence surveillance, though further assessment of potential biases is warranted.

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Inference of the HIV infection dates in Greece using a dense sampling of molecular sequences

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BACKGROUND: HIV infection dates are usually unknown. Molecular analyses have been increasingly applied for the estimation of critical epidemiological parameters. Our aim was to infer the HIV infection dates for all people living with HIV (PLHIV) for whom HIV sequences were available in Greece, using molecular epidemiology methods.

METHODS: Study samples included HIV-1 sequences isolated from 6,268 PLHIV diagnosed between 1999 and 2015 in Greece. Our analysis included 1,777 (28.4%) and 2,589 (41.3%) sequences of the subtype A1 and B, respectively. Infection dates were based on molecular clock calculations of the most recent common ancestor (tMRCA). Dating was performed only on subtype A1 and B monophyletic clusters (N=43) consisting of sequences from Greece at proportions >70%. Molecular clock analysis was performed by Bayesian methods as implemented in BEAST v1.8.0. The accuracy of inferred HIV infection dates was assessed by using samples with previously known infection dates. HIV transmission rates were estimated for all clusters using the inferred infection dates of treatment-naïve patients.

RESULTS: HIV infection dates were estimated for 3,127 PLHIV. Among them, 2,195 (70.2%) were treatment-naïve. The median difference in the estimated dates for PLHIV with previously known transmission dates was 0.6 years. Molecular clock analyses results were compared among identical clusters before and after the exclusion of sequences from treated PLHIV. Dating gave similar results when the proportion of treated PLHIV within clusters remained < 30%. The median cluster HIV transmission rate was 10.6 (IQR: 8.1-14.6) transmissions per 100 person-years. The highest transmission rates were estimated at 33.3 and 35.6 transmissions per 100 person-years for two clusters.

CONCLUSIONS: HIV infection dates were accurately inferred for PLHIV infected with subtypes A1 and B. This analysis provides one of the few studies with molecularly identified infection dates at a population level. Notably, transmission rates differed greatly across clusters; for some transmissions were estimated to have occurred at very high rates, suggesting "hot-spots" for HIV transmission. This information can be useful to develop target control measures.

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Using routinely collected data to measure HIV-incidence in high risk populations

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BACKGROUND: Understanding rates of HIV incidence in high-risk populations is important to measure the impact of HIV-prevention programs, a growing focus of the global response. Routine observational health data can be utilised to offer non-intrusive, cost effective and sustainable mechanisms to monitor changes in HIV incidence. However, characteristics of this data can include incomplete or irregular follow-up across multiple clinics, inconsistent recording conventions, or use of identifiers which may not be unique. We developed validated approaches to estimate HIV incidence rates in men-who-have-sex-with-men (MSM) using routine clinical data extracted from the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) system.

METHODS: Line-listed data was extracted from over 40 clinics between 2011-2017. The software created unique personal identifiers which enabled testing at different clinics by any one individual to be captured. We used these data to estimate incidence among MSM for 2012-2016 using simulated changes in cohort testing frequency (90 days, 180 days, 360 days). Incidence estimates were compared to age-standardised rates amongst MSM of locally acquired HIV based on national notifications data. The size of the at-risk population was estimated using Australian Bureau of Statistics estimated residential population adjusted for age and state specific proportions of sexually active HIV-negative MSM.

RESULTS: Over the period 2012-2016 443 incident cases were identified in 37,940 patients with repeat HIV testing, with a median time between tests of 114 days (IQR 77-241). There was no difference between the observed incidence rate based on routine data (0.48/100-person years, 95% confidence interval [CI]: 0.44-0.53) and that from HIV notification data (0.47/100-person years, 95%CI: 0.46-0.49). There was also no difference in trends in the incidence rates between the two methods. Incidence estimates based on routine data were similar for variations in testing frequency (incident rate ratio of annual average testing frequency compared to quarterly 1.00 (95%CI:0.81-1.22)).

CONCLUSIONS: Routine HIV testing data can be used to estimate HIV incidence in a high-risk population, and rates are robust even if testing frequency were to increase in the population. The software used to extract the data can be utilised in other countries to measure incidence.

Measuring the epidemic through population-based surveys, including the undiagnosed fraction

MOPEC376

Exploring differences in empirical incidence data in South African surveys using an agent-based network model

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BACKGROUND: Several surveys and cohorts in southern sub-Saharan Africa have observed HIV incidence falling more rapidly in men than in women during scale-up of antiretroviral therapy (ART) and voluntary male

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medical circumcision (VMMC). These include a 2012 national HIV survey in South Africa, a 2016 Population HIV Impact Assessment in eSwatini, and longitudinal cohort studies in the region. Surprisingly, a very different epidemic trend was seen in the Fifth South African National HIV Prevalence, Incidence, Behavior, and Communication Survey, conducted in 2017 and released in 2018. Rates of new infections in young men (ages 15–24) were found to have increased by 11% between 2012 and 2016, whilst in young women they fell by 26%. We used a mathematical model of HIV in South Africa to explore possible reasons for the unexpected results.

METHODS: HIV epidemic trends in South Africa were simulated using EMOD-HIV, a mathematical model that includes network-based transmission configured with age/sex-specific sexual network patterns from South Africa and a detailed care continuum for interventions. The model was calibrated to national estimates of HIV prevalence, number on ART, and number receiving voluntary male medical circumcision (VMMC), using program estimates from the Ministry of Health as well as five nationally representative HIV surveys, including the 2017 survey. The unexpected incidence measurement was not included in calibration. We investigated whether re-allocation of interventions (ART, VMMC) to higher-risk men and lower-risk women allowed the model to reproduce the unexpected incidence trends.

RESULTS: The calibrated EMOD-HIV model produced incidence trends that declined in men more rapidly than in women. Shifting intervention coverage to higher risk men (sex worker clients and those with multiple partners) and lower risk (monogamous) women did not flip these gender-specific trends. Changing the gender-specific incidence patterns required drastic changes to the age structure of the sexual network, effectively reversing previously measured age gaps in sexual relationships.

CONCLUSIONS: Scale-up of ART and VMMC, even if risk profiles were extremely different by gender, could not explain the reversal of gender-specific incidence trends in South Africa measured in the 2017 survey. Only substantial shifts in sexual behavior could explain the survey results.

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Sustained, low prevalence of undiagnosed HIV among gay and bisexual men in Sydney, Australia coincident with increased testing and PrEP use: Results from repeated, bio-behavioural studies 2014-2018

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BACKGROUND: Gay and bisexual men (GBM) with undiagnosed HIV contribute disproportionately to HIV transmission in Australia. Between 2012 and 2018, HIV Strategies in New South Wales (NSW), Australia intensified HIV testing, treatment and prevention among GBM with an aim to reduce the prevalence of undiagnosed HIV. Bio-behavioural surveillance was conducted as part of a suite of measures to evaluate the impact of the strategies.

METHODS: In February 2014 and February 2018 we recruited men at gay venues and events in Sydney. Participants completed a self-administered survey and provided an oral fluid sample for testing. We calculated the prevalence of HIV and undiagnosed infection, and indicators of sexual and HIV prevention strategies between 2014 and 2018. Two sample tests of differences in proportion were used.

RESULTS: In 2014, 944 men were recruited; 65 men tested HIV-positive (6.9%, 95%CI 5.3–8.5%), of whom 7 were previously undiagnosed (10.8%, 95%CI 3.2–18.3%). In 2018, 890 men were recruited; 49 men were HIV-positive (5.5, 95%CI 4.0–7.0%), of whom 4 were undiagnosed (8.2, 95%CI 0.5–15.8%). Among men who believed their HIV status was HIV-negative or untested the proportion with undiagnosed HIV infection declined non-significantly from 0.8% in 2014 to 0.4% in 2018 ($p=0.41$). Between 2014 and 2018, men reporting more than 10 recent casual partners increased from 22.3% to 27.7% ($p<.01$), condomless anal intercourse with casual partners (CLAIC) in the previous 6 months increased from 23.9% to 37.3% ($p<.001$)

and recent STI diagnoses increased from 14.4% to 27.5% ($p<.001$). HIV testing and use of prescribed PrEP in the previous 6 months increased from 49.6% to 56.3% ($p<.01$) and 2.0% to 21.0% ($p<.001$), respectively.

CONCLUSIONS: Bio-behavioural surveillance conducted during the most recent NSW HIV Strategies suggests that the prevalence of undiagnosed HIV remains low and may be falling, despite GBM reporting more casual sex partners, condomless sex and STIs. Increases in the frequency of HIV testing and use of PrEP may have assisted in sustaining a low level of undiagnosed HIV. The very low prevalence of undiagnosed infection in NSW is likely to have been an important contributory factor in recent declines in state-wide new HIV notifications.

Measuring the population impact of prevention and treatment interventions

MOPEC378

HIV prevention strategies in Barcelona's Latin American migrants: 68% reduction in incidence reported by BCN Checkpoint

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BACKGROUND: BCN Checkpoint is a community centre for men who have sex with men (MSM) and transgender women (TW) in Barcelona (Spain) specializing in peer led HIV testing and rapid linkage to care. The objective of this study was to measure the effect of recent prevention strategies on HIV incidence in migrants from Latin America (LAM).

METHODS: HIV incidence was measured in a cohort of HIV negative MSM and TW since 2008. Between 2009 and 2017 a total of 23,980.23 person-years of follow-up contributed to the cohort, of which 4,899.40 person-years of follow-up for LAM. The implementation of prevention strategies were assigned to three periods of three years each. Between 2009–2011: community centre establishment with free HIV and syphilis point of care testing, and testing campaigns; 2012–2014: recommendation for once yearly HIV testing, faster linkage to HIV clinic care plus coverage for undocumented migrants, patient preparedness to start treatment for health and prevention; 2015–2017: promotion of HIV testing every three months with technologies to detect early HIV infection, and implementation of sexually transmitted infection testing. For each period HIV incidence in LAM was then calculated from the cohort.

RESULTS: The overall HIV incidence during the 9-year period (2009–2017) was 2.11% person-years (95% confidence interval (CI): 1.94–2.30) and for LAM 2.39% person-years (95%CI: 1.99–2.86). Subsequently HIV incidence in LAM for the three three-year periods: 2009–2011: 5.41% person-years (95%CI: 3.87–7.58); 2012–2014: 4.30% person-years (95%CI: 3.19–5.80); **2015–2017: 1.69% person-years (95%CI: 1.10–2.59)**. The reduction of HIV incidence during these years was 68.8%.

CONCLUSIONS: The biggest gap in the treatment cascade is the initial diagnosis of persons living with HIV. A community testing centre was effective in increasing testing in LAM - the group with higher HIV incidence. Reduction of HIV incidence was significant during the last study period. More frequent testing, detection in earlier stages of infection and rapid treatment initiation were key strategies during this timeframe. This trend needs to be explored further once oral PrEP is added to the available prevention tools.

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Promising shifts in HIV risk factors and service uptake among young men in EswatiniA. Gottert¹, J. Pulerwitz¹, L. Apicella², Z. Reynolds³, S. Patel⁴, B. Lukhele⁵, P. Shabangu⁵, N. Dlamini⁶, M. Dlamini⁷, M. Nkhambule⁸, S. Mathur¹¹Population Council, Washington, DC, United States, ²Population Council, Dar es Salaam, Tanzania, United Republic of, ³MEASURE Evaluation, Chapel Hill, United States, ⁴Population Council, New Delhi, India, ⁵IHM Southern Africa, Mbabane, Eswatini, ⁶National Emergency Response Council on HIV and AIDS (NERCHA), Mbabane, Eswatini, ⁷Ministry of Health/Swaziland National AIDS Program (SNAP), Mbabane, Eswatini**BACKGROUND:** Community HIV prevention efforts are increasingly focused on engaging men. We investigated how such efforts are influencing men's HIV risk behaviors and service use in Eswatini.**METHODS:** Two cross-sectional surveys were conducted with 1,926 men ages 20-34 in Eswatini, in Dec. 2016 - Feb. 2017 (n=835) and June - Sept. 2018 (n=1,019). To reach men at risk of HIV, respondents were recruited at hot-spot venues across 19 districts where intensive combination-prevention programs, including DREAMS, were taking place.**RESULTS:** Men's mean age was 26 and 15% were married/cohabiting at Rounds 1 and 2 (R1/R2). Mean number of sexual partners in the last year decreased from 2.7 at R1 to 1.9 at R2 (unadjusted p< 0.001 - vol 1). Mean number of adolescent partners (ages 15-19) decreased from 0.75 to 0.55 (p=0.04), and, for young women partners (ages 20-24), from 1.9 to 1.2 (p=0.001). Hazardous drinking decreased from 45% to 38% (p< 0.01). Consistent condom use with last three non-marital/non-cohabiting partners saw a nonsignificant increase, from 36% to 41%. Ever testing for HIV increased from 76.3% to 80.6% (p=0.04). Testing in last year increased from 39% to 57% (p< 0.001); for half at R2, the last test was their first-ever. Receiving voluntary medical male circumcision in last two years remained at about 4%. Among self-identified HIV-positive men, current antiretroviral treatment use increased from 79% to 97% (p< 0.05). In multivariable analyses controlling for demographic characteristics, nearly all R1-R2 differences retained their significance. Participation in HIV-related meeting(s), and awareness of DREAMS, were associated with increased odds of ever-testing (p< 0.01, p< 0.001, respectively), last-year testing (p< 0.001, p=0.01), and consistent condom use (meetings only; p< 0.05).**CONCLUSIONS:** There are recent promising shifts in HIV risk behaviors and service uptake among men across Eswatini. Community-based HIV prevention programming (like DREAMS) may have contributed to increases in testing and condom use.

	Round 1 (n=835)	Round 2 (n=1,091)	Unadjusted Beta/Odds ratio (95% CI)	Adjusted Beta/Odds ratio ^a (95% CI)
Sexual risk behaviors^b				
Mean number of sexual partners: —In the last year	2.69	1.88	β -0.66*** (-0.97, -0.35)	β -0.78*** (-1.20, -0.37)
—Ages 15-19 in the last year ^c	0.75	0.55	β -0.19*	β -0.21*
—Ages 20-24 in the last year ^c	1.85	1.17	β -0.69*** (-1.08, -0.29)	β -0.68*** (-1.06, -0.29)
% using condoms consistently with up to last 3 non-marital/non- cohabiting partners	36.1%	41.2%	OR 1.24 (0.96, 1.60)	aOR 1.23 (0.96, 1.59)
% with current hazardous drinking ^d	45.0%	38.4%	OR 0.76 (0.63, 0.91)**	aOR 0.74 (0.61, 0.89)**
HIV service use				
% ever tested for HIV	76.3%	80.6%	OR 1.29* (1.01, 1.65)	aOR 1.23 (0.96, 1.58)
% tested in last year	39.1%	56.9%	OR 2.05*** (1.68, 2.52)	aOR 2.02*** (1.65, 2.48)
—Of above, last test was first ever (not asked)		51.4%	—	—
% received voluntary medical male circumcision in last 2 years	4.7%	4.3%	OR 0.92 (0.58, 1.47)	aOR 0.95 (0.59, 1.53)
(Among HIV-positive) % currently using antiretroviral therapy	(n=30) 79.3%	(n=36) 97.2%	OR 2.18 (-0.02, 6.08)	aOR 2.34* (0.08, 6.29)

*p<0.05 ** p<0.01 *** p<0.001 All analyses adjusted for the survey sampling design.

^aControlled for age, marital/cohabiting status and employment status^bAmong those who had ever had sex only, n=677 in Round 1, 919 in Round 2^cCoding participants who refused to answer as missing (n missing=13 for ages 15-19 and 8 for 20-24)^dAssessed using AUDIT-C measure with recommended cutoff

[Table 1. HIV risk factors and service use by survey round among young men in Eswatini]

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Vertical transmission in the Rwanda PMTCT Cascade: A cross sectional study of HIV-infected children in 2017-2018J.D.D. Ndagijimana Ntwali¹, G. Nsabimana¹, E. Nyirinkindi², B. Sangwayire¹, C. Karangwa¹¹Rwanda Biomedical Center, Institute of HIV Disease Prevention and Control, Kigali, Rwanda, ²Rwanda Biomedical Center, Institute of HIV AIDS Disease Prevention and Control, Kigali, Rwanda**BACKGROUND:** To achieve elimination of mother to child HIV transmission, the PMTCT program has been reinforced in Rwanda. The use of Option B+ and the active follow up of exposed infants and their mothers have been conducted to a drastic reduction in mother to child transmission (MTCT). However, we still observe a significant number of children infected through MTCT. Here we analyze the uptake of exposed infants in PMTCT program and characteristics of HIV positive women who are missing the PMTCT program**METHODS:** A Cross-sectional study of children infected through vertical transmission and enrolled in HIV care between 2017 and 2018 was conducted in 65 health facilities with high number of exposed infants across the country. Using descriptive statistics, we have described characteristics of those women who transmitted HIV to their children. We have conducted multivariate analysis to understand factors associated with non-enrolment in PMTCT program for the mother-child pair.**RESULTS:** Among 2035 exposed infants identified in PMTCT, 73 children have been infected through MTCT. Most of them were female 59.8% (n=43). Only 37% (n=27) have been followed in PMTCT program before HIV positive test. Not being enrolled in PMTCT was significantly associated with children born out of the health facilities (OR 10.2, P 0.01), women that have never been tested for HIV before the last pregnancy, (OR 11.3, P=0.006), women that have never attended or attended late ante natal care services, (OR 6.7, P< 0.001) and women tested HIV positive after delivery (OR 6.15, P 0.004).**CONCLUSIONS:** Despite a scale up of PMTCT services, a high number of children infected through MTCT have never been followed in PMTCT program. A close follow up of HIV positive women identified during antenatal period would decrease the number women missing PMTCT opportunities, increase the retention in PMTCT and reduce vertical HIV transmission.

Characteristics	Overall children N=73	HIV infected infants not enrolled in PMTCT		
		N(%)	OR	95%CI
Child Sex				
Male	30 (41.1)	18 (39.1%)	1-	
Female	43 (58.9%)	28 (60.9%)	1.2	0.4-3.2
Place of birth				
Health facility	54 (74.0%)	33 (71.7%)	1-	
Home	19 (26.0%)	13 (28.3%)	10.2	1.25-83.4
Mother Marital status				
Married	43 (58.9%)	30 (65.2%)	1-	0.6
Not married	30 (41.1%)	16 (34.8%)	0.49	0.18-1.3
HIV test before pregnancy				
Tested	58 (79.5%)	32 (69.6%)	1-	
Never tested	15 (20.5%)	14 (30.4%)	11.3	1.4-92.3
Attendance of ANC services				
Early attendance	31 (42.5%)	12 (26.1%)	1-	
Late or no attendance	42 (57.5%)	34 (73.9%)	6.7	2.3-19.3
When mother tested positive				
Before delivery	50 (68.5%)	28 (60.5%)	1-	
After delivery	23 (31.5%)	20 (43.5%)	6.15	1.62-23.3

[Table. HIV Infected infants not enrolled in PMTCT
OR: Odd ratio; CI: Confidence interval; ANC: Ante-natal care]

Methodological challenges to scale up and optimization of services

MOPED528

Patterns of substance use screening in HIV primary care clinics

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BACKGROUND: Optimal HIV medication adherence and viral suppression depend on the successful treatment of co-occurring substance use disorders (SUDs). Electronic health records (EHRs) are posited to facilitate enhanced care; yet, little is known about the inclusion of SUD data elements in EHRs in standardized ways and their utility for diagnostic and treatment purposes as part of HIV primary care.

METHODS: Retrospective analysis involved substance use screening data from EHR-based Smart Forms for 10,125 patients with HIV who attended at least one primary care visit at the Institute for Advanced Medicine at Mount Sinai in New York City from 07/01/2016-12/01/2017. Data from all patient encounters (60,987) were extracted and data from 23,240 primary care visits were selected for analyses. Patterns of substance use screening were examined using a repeated measurements analytic approach with Generalized Estimating Equation (GEE) methodology employing an auto-regressive working correlation to account for within-subject correlation.

RESULTS: Patients were 76% male; 34% Black, 24% Hispanic, 22% White and 20% „mixed or other“; 53% were aged 50 years or older; 43% had a mental health diagnosis; and 67% were virally suppressed. Screening was conducted in fewer than 10% of primary care visits, and substance use was identified in 859 screeners (10%); of those, 35% specified alcohol use/abuse and 13% indicated SUD treatment in the prior 12 months. GEE analyses indicated increased odds of having a screener completed during a primary care visit in patients 50 years of age or older compared to younger patients (Wald $\chi^2>7.75$), with an unsuppressed vs. suppressed viral load (Wald $\chi^2>7.74$), without a documented mental health diagnosis compared to those with a diagnosis (Wald $\chi^2=4.02$), and when a screening was completed by physicians compared to fellows and nurse practitioners and by female providers compared to their male counterparts (Wald $\chi^2>7.81$).

CONCLUSIONS: Our findings demonstrate suboptimal screening of SUDs in patients with HIV. Patterns in screening suggest that interventions designed to address factors at the provider level could be key. Given the critical role of addressing SUDs in support of sustained virologic suppression, systematic improvements in screening and ongoing monitoring are instrumental for the integration of behavioral health and HIV care.

MOPED529

Achieving HIV epidemic control in Zambia: Improving treatment and viral load monitoring coverage in Lusaka urban district through a 'Surge' campaign

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BACKGROUND: Zambia's highest HIV prevalence is in the capital city, Lusaka, at 16.1%, where 80% of people living with HIV (PLHIV) residing in Lusaka Urban District. Led by Ministry of Health (MOH) and with PEPFAR funding, the Centre for Infectious Disease Research in Zambia (CIDRZ) worked with partners in Lusaka Urban to implement a treatment „Surge“ campaign strategy in pursuit of the 2nd and 3rd 90s. Here, we describe our „Surge“ strategy, and changes in ART and VL coverage among PLHIV in Lusaka Urban since „Surge“ inception.

METHODS: „Surge“ activities were implemented October 1, 2017–September 30, 2018.

We developed targeted, quality improvement (QI)-based strategies focused on improving performance indicators for: HIV case finding, linkage to care, immediate anti-retroviral therapy (ART), and viral load (VL) coverage and suppression (<1,000 copies/ml). Weekly targets were provided to facilities and achievements closely monitored through site-level supervision and collaborative CIDRZ-MOH review of indicators. Using CIDRZ program data disaggregated by age and sex, and ZAMPHIA estimates updated by PEPFAR for number of PLHIV in Lusaka Urban, we estimated ART and VL coverage and VL suppression before (baseline, FY17) and after (endline, FY18) the „Surge“. We compared baseline and endline indicators using one- and two-sample tests of proportions.

RESULTS: CIDRZ supported „Surge“ activities in 32 facilities and surrounding catchment areas, reaching 83% of estimated PLHIV in Lusaka Urban. Of 188,260 estimated PLHIV in CIDRZ-supported facilities at baseline, 144,053 (77%) were on ART, with treatment coverage 60% among PLHIV <15 years, 52% among PLHIV 15-25 years, and 81% among PLHIV >25 years; 31,491 ART-treated PLHIV had ≥ 1 routine VL, representing 22% coverage, with 86% of these achieving VL suppression. By endline, 160,424 PLHIV (85%) were on ART (64% for < 15 and 15-24 years and 89% for >25 years), a significant increase ($p < 0.001$). VL coverage increased significantly to 37% (48,280/160,4204, $p < 0.001$), with 81% suppressed.

CONCLUSIONS: In a resource-limited, high-burden setting, implementation of a „Surge“ campaign characterized by targeted, facility-level QI and strengthened cooperation among MOH and partners, resulted in rapid HIV service scale up and significant increases in PLHIV-population coverage of ART and VL monitoring within a 12-month period.

Impact evaluation of differentiated service delivery

MOPED530

Retention in non-facility-based ART delivery models among stable ART patients in Lusaka, Zambia: Findings from the HPTN 071 (PopART) trial

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BACKGROUND: Non-facility based models of antiretroviral therapy (ART) delivery may retain patients in care and facilitate task-shifting. Within the HPTN 071 (PopART) trial, two models, home-based delivery (HBD) or adherence clubs (AC), were offered and compared to clinic-based standard of care (SoC) for stable patients. We estimate patient retention in non-facility based ART delivery models and compare HBD and AC.

METHODS: A three-arm cluster randomized non-inferiority trial, nested in two urban HPTN 071 trial communities in Lusaka Zambia, randomly allocated 104 zones to SoC, HBD or AC arms. In both HBD and AC arms, patients were offered the choice between SoC or non-facility based ART model. All patients received ARVs and support every 3 months at home (HBD), out-of-clinic adherence club (AC) or at the clinic (SoC). In both intervention arms, patients were referred back to SoC if they relocated to an area not offering the intervention, developed a co-morbidity, had a viral rebound, missed > 2 visits or opted out. We assessed the proportion of patients referred back to routine care (SoC) during the first 18 months of the programme.

RESULTS: Between May and December 2017, 2,493 patients were enrolled of which 774 (31%) were randomized to SoC, 869 (35%) to HBD and 850 (34%) to AC arms [Fig 1]. After 18 months, 743 (93.6%) patients were

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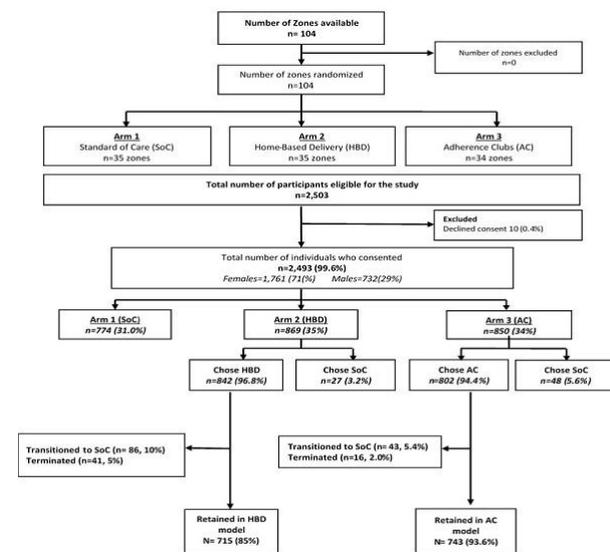
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retained in the AC arm versus 715 (84.9%) in the HBD arm. The most common reason for not being retained was shifting out of a study zone which did not offer the intervention.

CONCLUSIONS: Overall patient retention in non-facility based ART delivery models was high (85%) and this was higher in adherence clubs as patients who shifted from study zones could continue going for their club meetings to receive care.



[Flow Chart of Study Participants]

MOPED531

Centralized dispensing and alternative pick up points increase access to ARVs in Zambia

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BACKGROUND: With countries adopting the Universal Test and Treat (UTT) approach, it is expected that the demand for ART will increase. As a result, the increased patient volumes will put a strain on the pharmaceutical supply systems and infrastructure, resulting in longer patient waiting times and impacting on the quality of care. To enable successful implementation of UTT and to optimise the use of current limited resources, there is a need to decongest high patient volume sites through the implementation of Differentiated Models of ART Delivery (DMAD). Right e-Pharmacy, together with its partners, piloted a Centralised Dispensing Unit (CDU) to provide chronic medication to patients in Ndola, Zambia at convenient alternative Pick up Points (PuP).

METHODS: Healthcare workers at parent health facilities electronically capture and transmit scripts to the CDU where pharmacy personnel review and validate the scripts before ART packs are dispensed and packed. A courier distributes ART packs to the preferred approved PuPs chosen by the patient. PuPs are situated at convenient locations for patients where their ART medicine parcels are issued to them. Clinical visits are mandatory every 6-month interval at the parent health facility where a new script is issued.

RESULTS: The CDU was established in the Ndola industrial area and commenced operations on the 6th of June 2018. As of 31st October, 2827 patients have been enrolled from 6 participating clinics. 12 982 dispenses were processed from 3036 captured prescriptions with a total of 6491 patient ready parcels delivered to 11 pick-up points located in shopping malls, rural markets and clinics. 96% of the patients have been retained on care, with 4% lost due to death and pregnancy. The program has achieved a 94% pick up compliance rate with 93% of patients having an undetectable viral load (< 50 copies/ml).

CONCLUSIONS: The CDU as a differentiated model of medicines delivery has proved effective in increasing ease of access, adherence and retention on treatment. Patient tracking has improved due to use of electronic patient records with centralised information from multiple allied health teams making patient health decisions more efficient.

MOPED532

Differentiated ART delivery for key populations: A systematic review

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BACKGROUND: Key populations (KP) including men who have sex with men (MSM), sex workers (SW), transgender people, people who use drugs (PWUD) and prisoners face increased risk of HIV and barriers to accessing care. There is increasing interest and investment in differentiated ways to provide ART to key populations, including decentralising ART delivery to community-based organisations which aim to reach specific KP groups and the involvement of peers. We examined selected interventions addressing issues of access and treatment failure affecting KP: peer support and navigation and the provision of clinical HIV services in community settings.

METHODS: EMBASE, PsycINFO, PubMed, Scopus and Web of Science were searched for randomized and non-randomized studies comparing standard care with peer-support or delivery of HIV clinical care in the community. Eligible studies examined KP exclusively or reported disaggregated data for KP participants, measuring ART uptake, adherence and viral suppression. Data were extracted and summarised and risk of bias was assessed.

RESULTS: Searching yielded 7,440 unique articles; after screening titles and abstracts 591 were selected for full-text review. Only nine studies met inclusion criteria. Three studies examining different models of directly observed ART in community settings among PWUD all found greater achievement of viral suppression; one also reported higher levels of adherence. Regular home visits by a nurse to PWUD were associated with improved adherence in one study. Peer-navigation interventions were associated with sustained viral suppression among released prisoners and with improving ART adherence among SW. A multicomponent intervention study including peer support showed no significant increases in ART initiation among PWUD. Online peer support among MSM showed only modest increases in adherence; a study among prisoners of building family and peer support showed no advantage for adherence.

CONCLUSIONS: Making ART more accessible in community settings and using peer navigators improves treatment outcomes for KP, although the nature of these interventions and manner in which they are implemented varies substantially.

Further evaluation is needed of strategies that are acceptable to KP, that address their needs and barriers they face to improve ART uptake, adherence and treatment success. Further, an evaluation of the cost effectiveness of different approaches is warranted.

MOPED533

Community Adherence Group (CAG) for HIV viremic patients: Early lessons learnt from Lusaka, Zambia

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BACKGROUND: Despite progress with ART scale up, 10.8% of HIV patients on treatment do not achieve virological suppression in Zambia. While most differentiated service delivery (DSD) models are tailored to fit the need of stable patients, unstable (i.e. viremic) patients receiving the standard of care face increased clinic visit frequency and longer wait times. This constitute a barrier to patient engagement in care and, ultimately, viral load (VL) suppression. We developed a novel viremic patient DSD model offering combined community- and clinic-based services including:

- 1) inviting them to join a routine CAG;
- 2) close clinical follow up in a dedicated "Viral Load" clinic.

We conducted a retrospective cohort study to test the hypothesis that our model would help viremic patients achieve viral suppression.

METHODS: We implemented our DSD model at one first-level hospital in Lusaka to accommodate patients with viral load >1,000 copies/ml. To assess uptake of viremic DSD services and the proportion of beneficiaries who re-suppress, we reviewed all patient records for patients who received the intervention from the model's inception, October 2017, to November 2018. We calculated descriptive statistics for baseline clinical & demographic variables and describe the care continuum for viremic patients in the model.

RESULTS: We approached 386 patients to join the model who had a routine monitoring VL >1,000 copies/ml. Table 1 presents clinical and demographic characteristics of patients approached. All 386 (100%) patients accepted to attend the high VL clinic day and 346 (89.6%) accepted to join both CAG and high VL clinic. Of those accepting, 119/386 (30.8%) have completed Enhanced Adherence Counselling (EAC) and had their VL test repeated. Of 119 samples collected, 97 (81.5%) VL results were received, of which 27 (27.8%) suppressed (VL< 1000).

CONCLUSIONS: Introducing a dedicated DSD for viremic patients is a feasible intervention in urban Zambia and results in high patient uptake of services, particularly "fast track" clinical care in a dedicated clinic. Despite high uptake, only 27% of viremic patients with a documented repeat VL result achieved virologic suppression. Further research, including genotype testing and adherence monitoring, is needed to understand reasons for failed re-suppression after DSD model enrolment.

MOPED534

Differentiated antiretroviral therapy delivery: A review of implementation progress and challenges in Zimbabwe

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BACKGROUND: An estimated 1 154 150 people living with HIV (PLHIV) were on ART in Zimbabwe, 2018. Realising there cannot be a "one size fit all" approach to service delivery for PLHIV has motivated expansion of differentiated ART delivery for stable clients (including fast-track, clubs, family member and outreach refill models and community ART refill groups (CARGs)). These were detailed in the operational and service delivery manual (OSDM) to guide implementation. To assess the extent of implementation of DSD, the FACE-HIV program conducted an assessment at 119 high yield health facilities across 5 provinces in Zimbabwe.

METHODS: The facilities were purposively selected in the FACE HIV priority districts which contribute an estimated 80% of PLHIV for the program. In October 2018, quantitative data was collected using structured questionnaires and descriptively analysed using STATA V12.

RESULTS: The majority of facilities (92%) were offering DSD models. The primary reason provided by the 10 sites not offering DSD models was lack of training, (6/10). The facility based DSD models; family member and fast track refill models, 72% and 52%, respectively were frequently reported. Approximately 62% of the facilities had 2 ≤ DSD models. The primary implementation challenges were: lack of registers and standard documentation procedures; limited training on 'how' to operate DSD models, resistance of clients (particularly in urban and private clinics) to join CARGs due to privacy and confidentiality needs and user fees at some health facilities.



[Frequency distribution of current DSD models (N=119) and Number of DSD models on offer per facility]

CONCLUSIONS: As a technical partner to the MOHCC, the FACE HIV program is implementing enhanced onsite support and mentorship to facilities to close the guidelines-practice gaps and expand DSD implementa-

tion. Additionally, we are supporting documentation of M&E indicators for DSD. The sharing of quality improvement protocols for DSD at facilities is important for quality standards and processes during the scale-up and maintenance of DSD ART delivery towards UNAIDS 90-90-90.

Provider and facility determinants of outcomes

MOPED535

Back to basics: Friendly health providers are the key to retaining adolescents living with HIV

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BACKGROUND: Almost one-third of adolescents on treatment are lost to follow-up. To improve retention, services must be tailored to meet their unique needs. Differentiated approaches tend to focus on structural modifications to the health system - multi-month prescriptions, extended clinic hours, fast-track visits and decentralization. However, negative health provider attitudes may also lead to adolescent service disengagement but receive less attention.

METHODS: We conducted cross-sectional surveys with 63 young people living with HIV engaged as peer supporters at clinics in 11 sub-Saharan African countries. Together, they support 55,059 adolescents and young people living with HIV. Surveys set out to quantify and compare the strength of young people's preferences for specific HIV service features. We provided respondents with a series of choices between hypothetical clinics within which the following five attributes were varied: wait time (no wait, or a 1-, 3- or 5-hour wait time), distance from home (1, 10 or 20km), visit frequency (1-, 3- or 6-monthly), clinic hours (weekdays until 16h00, or weekdays until 18h00 plus weekends), and health provider attitudes ("friendly and kind" or "rude and unfriendly"). Data were analysed using univariate statistics to describe central tendencies.

RESULTS: Respondents were 60% female, with a mean age of 22 years and originated from Southern (56%), East (37%) and West/Central Africa (8%). For each hypothetical choice, young people exhibited a strong preference for the clinic with "friendly and kind" providers, regardless of its wait time, distance from home, visit frequency or operating hours. Young people were willing to accept a longer wait time (5 hours as opposed to no wait), greater distance from home (20km as opposed to 1km), more frequent visits (monthly as opposed to 6-monthly), and operating hours (weekdays until 16h00 as opposed to weekdays until 18h00 and weekends) in order to access "friendly and kind" providers.

CONCLUSIONS: Findings suggest that for young people, positive provider attitudes are the most desired feature of care. Moreover, young people are willing to relinquish convenience to access client-centred providers. To satisfy young people's preferences and enhance the quality of the client experience, programmes should invest in health provider training and sensitization.

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MOPED536

Improved 12-month ART retention rates through intensive monitoring of key process measures in Zambézia province, Mozambique

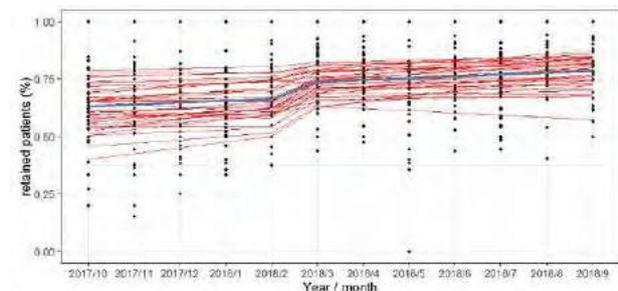
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BACKGROUND: The 12-month retention rate of patients on antiretroviral treatment (ART) in Zambézia remains low (56%; 2017). An essential first step in characterization of patient attrition rates is ensuring that clinical files (CF) of defaulting and lost to follow-up (LTFU) patients are retrieved in a timely fashion to initiate tracing activities. To address this, in 2016, Friends in Global Health piloted a standardized procedure for CF management, and expanded to 39 health facilities (HF) in February 2018, with weekly monitoring of process measures. We report results on the effect of this Quality Improvement (QI) intervention on retention.

METHODS: Data on availability of CF and 12-month retention rate of HIV-positive non-pregnant/non-lactating adults (>15 years) enrolled in care at 39 HF was evaluated between September 2017-2018. CF availability was based on the number of files found within two hours from weekly lists generated for defaulting/LTFU patients. Retention was defined as the percentage of patients actively receiving ART 12 months following ART initiation. The effect of this intervention on 12-month retention rates was evaluated using a generalized linear mixed model.

RESULTS: A total of 20,729 patients who initiated ART between September 2016-2017 were included. The overall CF availability and 12-month retention rate increased from 61% to 82% (data not shown) and from 64% to 79%, respectively. With the intervention, patients are 41% more likely to be retained (OR 1.41; 95%CI:1.03-1.96; p-value=0.03). This improvement was sustained post-intervention with variability at HF level.



[Figure 1. Fitted model of effect of intervention on 12-month retention in care rates (blue line: ave)]

CONCLUSIONS: Intensive monitoring of CF availability for defaulting and LTFU patients is associated with significant improvements in 12-month retention rates where this QI intervention was implemented. The variations between HF suggest that site-level, contextual factors play a role. The feedback loop may be an important factor in compliance by health personnel to the defined standard operational procedures, positively affecting defaulter tracing and quality of retention data.

MOPED537

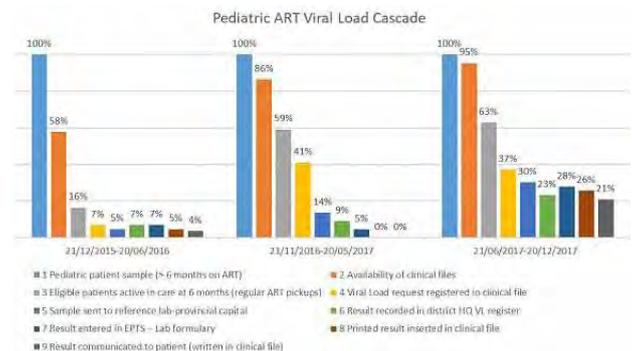
Implementing quality improvement in a large HIV clinic to improve the availability of pediatric viral load results for patient care in rural Zambézia, Mozambique

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BACKGROUND: In 2015, viral load (VL) testing became routine for children 2-5 years in Mozambique. Programmatic data from 11 supported districts in Zambézia showed that 9% of children on antiretroviral treatment (ART) for ≥6 months had a VL result registered between February 2015 - February 2016. Embedded within Quality Improvement (QI) activities, we designed a cascade including all steps leading up to VL results being communicated to caregiver, in an attempt to identify bottlenecks and devise tailored interventions to address them.

METHODS: In the Namacurra main health facility, we collected patient-level data for 85, 22 and 43 HIV+ children (< 5 years old), who initiated ART between December 21, 2015-June 20, 2016, November 21, 2016-May 20, 2017 and June 21-December 20, 2017, respectively. Eligibility for VL, defined as having consistent ART pick-ups for the initial 6 months, was confirmed using Clinical Files (CF). Data on VL cascade such as VL requisitions, turn-around of samples and results, entry into the electronic patient tracking system (EPTS), entry into the CF, and communication to patient/caregiver were collected over three cycles.

RESULTS:



[Figure 1. Namacurra Health Facility Pediatric Viral Load Cascade]

Initial bottlenecks included availability of CF and inconsistent ART pick-ups (impacting eligibility). Subsequent barriers included problems with result availability in the CF. QI activities such as clinical-mentoring and standard operating procedure for maintenance of CF improved outcomes: CF availability improved from 58% to 95%, VL requests registry from 7% to 37% and VL results registry in CF from 5% to 26%. Communication to the caregiver/patient was 21% in the third cycle.

CONCLUSIONS: Despite improvement in the availability of pediatric VL results, registration of VL requisitions remained suboptimal. This QI initiative identified key components in the pediatric cascade for improvement and inclusion in the QI/HIV action plans of this and other health facilities, that when implemented consistently can result in significant improvement in pediatric outcomes.

MOPED538

Achieving the "third 90" in western Kenya: A quality improvement collaborative (QIC) to improve viral load utilization at 30 health facilities in Siaya County, Kenya

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BACKGROUND: Scaling up routine HIV viral load testing (VLT) is a priority for Kenya's National AIDS Control Program (NASCOP), which has successfully expanded VLT coverage with the support of partners. National guidelines recommend that clients on antiretroviral therapy (ART) with unsuppressed VL(UVL) defined as > 1,000 copies/mL -receive enhanced adherence counseling (EAC) at monthly intervals for three months, followed by repeat VLT to guide ART management. Despite rollout of national policies, guidelines and training, VL utilization has been suboptimal.

METHODS: In collaboration with NASCOP, HRSA and CDC, ICAP at Columbia University designed and implemented a QIC at 30 health facilities in Siaya County, Kenya, from April 2017 to May 2018 to optimize VL utilization (timely EAC, repeat VLT, and appropriate ART management) for clients with UVL. Key indicators were collected at baseline and throughout QIC implementation, which included training on QI methods and VL results management for 196 health care workers followed by monthly QI coaching visits and quarterly learning session workshops. Each facility QI team identified contextually appropriate interventions; used QI methods and tools to conduct rapid tests of change; and analyzed monthly progress using run charts. Facility teams presented on their performance and shared best practices at quarterly learning sessions.

RESULTS: QI teams tested interventions over 14 months including: test result management, improved staff and client education, staffing modifications, workflow process modifications, commodity management, documentation, and data quality improvements. In aggregate, completion of three EAC sessions within 4 months of test results improved from 18% at baseline to 80% during QIC implementation. On average, it took facilities 2.6 months (median 2, range 0-10) to achieve 90% EAC completion and this performance was sustained for 8 out of 14 months. In addition, appropriate switching to second-line ART for clients with persistent UVL improved from 35% to 78%.

CONCLUSIONS: QIC interventions improved VL results utilization by helping facilities generate local innovations to ensure timely identification of UVL, delivery of EAC sessions, and switch to second-line ART when indicated. In addition to building QI capacity and improving targeted outcomes, the VL QIC validated a "change package" of successful initiatives that has been disseminated within Kenya.

MOPED539

Differentiated Service Delivery (DSD) implementation fidelity: Improving coverage and quality of DSD ART delivery in Zimbabwe

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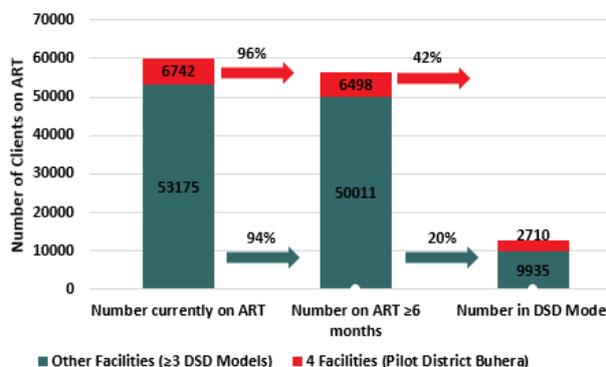
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BACKGROUND: Differentiated Service Delivery (DSD) is a strategy that adapts HIV services to reflect preferences and expectations of sub-populations of PLHIV while reducing burden on health system and facilitate utilization of limited human resources efficiently. Zimbabwe a high

burdened country, had an estimated 1154150 PLHIV on ART in 2018. Our objective was to examine current coverage and uptake of DSD models at public health facilities in Zimbabwe.

METHODS: Evaluation of DSD implementation at 119 purposively selected high volume facilities across 24 Districts of Zimbabwe supported by FACE HIV Program was conducted in November 2018. Quantitative data of clients on ART in September 2018 was collected at 36 health facilities offering ≥3 DSD models. Descriptive analysis was conducted using STATA v12.

RESULTS: A total of 109 out of 119 (92%) health facilities were offering DSD models. Approximately 62% (68/109) had 2≤DSD models. Family member and fast track refill models, 72% and 52%, were frequently reported, respectively. Among 59917 adult clients (15≥ years) currently on ART at the 36 facilities, 94% (n=56509) were on treatment for 6≥months (the commonly used eligibility criteria for DSD enrolment). Overall, 22% (12645/56509) of eligible clients were enrolled in DSD models. There was significant difference between the pilot district coverage (Buhera) 42% and other facilities 20%, p<0.05. The majority enrolled in DSD were on fast track refill (51%; 6482/12645) and 6% (818/12645) were in DSD models for specific subpopulations (key and vulnerable populations).



[The Cascade of Care Among Adult Clients on ART at 36 Health Facilities Offering ≥3 DSD Models]

CONCLUSIONS: Although, our findings reflect implementation fidelity of DSD implementation in Zimbabwe was suboptimal, the pilot district demonstrate the feasibility of expanding coverage in other districts. Findings and lessons from pilot have been used in technical assistance and onsite mentorship to scale-up and implementation fidelity in over 660 health facilities supported by the FACE HIV program towards the Ministry of Health and Child Care 2020 DSD targets.

MOPED540

A change package for facilitating rapid initiation of ART and early retention in care from a Quality Improvement Collaborative

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BACKGROUND: Rapid initiation of ART, including on the day of diagnosis, among clients with no contraindications, has clinical and programmatic benefits. These benefits may not be fully realized due to structural, client and provider related barriers[1]. We implemented a Quality Improvement Collaborative (QIC) in Zimbabwe to accelerate implementation of the treat all guidelines and generate evidence on the change ideas that facilitate rapid initiation of ART and early retention in care.

METHODS: We implemented a QIC model adapted from the IHI breakthrough series. Multidisciplinary teams from 27 health facilities worked in a structured way to improve early initiation of ART, retention in care, viral load monitoring and suppression rates. Learning sessions, wherein teams shared experiences and exchanged ideas for improvement were followed by action periods in which rapid cycles of changes were tested and implemented. The change ideas were packaged into a change package which will be used to scale up the Collaborative.

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RESULTS: Change ideas that were found to be effective for rapid ART initiation include:

- Shifting from group to individualized counselling
- Compressing pre-ART counselling sessions
- Intensifying post initiation counselling and follow up during the first 3 months
- Assess patient knowledge, attitude and readiness for ART before and after initiation
- Engage expert patients as peer counselors and patient navigators to physically escort clients from one care point to another
- Ensure registers are available at each care point for real time completion and enrolment into care;
- Initiate ART before transferring patients to preferred sites for follow up
- Engage data personnel to capture, analysis and utilization of data
- Integrate services across the cascade to be provide under the same roof, by the same provider on the same day
- Maintain consistent staff and minimize staff rotations to support enrolment

CONCLUSIONS: Rapid initiation of ART, including initiation on the day of diagnosis, is feasible and acceptable. Systems and processes at facility level should be analysed and redesigned to improve performance across the HIV care cascade.

MOPED541

A quality improvement collaborative (QIC) approach to improve early infant diagnosis (EID) and antiretroviral therapy (ART) initiation at 25 health facilities in Lusaka urban district, Zambia

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BACKGROUND: Early infant diagnosis (EID) and rapid antiretroviral therapy (ART) initiation are life-saving interventions for HIV-infected infants. In Zambia, EID testing coverage for HIV-exposed infants is suboptimal and the time to initiate ART upon receipt of positive test results often exceeds the national standard of 2 weeks, despite rollout of national guidelines.

METHODS: In collaboration with MOH, HRSA and CDC Zambia, ICAP at Columbia University designed and implemented a QIC to improve reporting of EID test results and same-day ART initiation among HIV-infected infants at 25 health facilities (HF) in Lusaka between February 2017 and May 2018. Key indicators were collected at baseline and throughout QIC implementation, which included training on QI methods and EID guidelines for 76 health care workers followed by monthly QI coaching visits and quarterly learning session workshops. Each HF team identified contextually appropriate interventions; used QI methods and tools to conduct rapid tests of change; and analyzed progress using run charts. QI teams presented their performance and shared best practices at quarterly learning sessions.

RESULTS: Over the 15-month implementation period, QI teams tested and identified successful interventions focused on: health worker training through mentoring and supervision, data quality, caregiver education, workflow processes and community engagement. These interventions improved return of positive results to caregivers from 48% at baseline to 85% during the QIC; ART initiation for HIV-infected infants from 46% to 82%; and swift ART initiation (e.g., within 2 weeks of diagnosis) from 25% to 62%. Improvement was rapid but not always sustained. For example, it took on average 1.4 months (median 1, range 0-7) for HF to reach a 90% target of initiating ART within two weeks of diagnosis and this was sustained for an average of 2.9 months (median 2, range 0-9).

CONCLUSIONS: The QIC approach improved EID coverage and ART initiation by helping facilities generate local innovations to ensure rapid return of results to caregivers and timely ART initiation. Ongoing effort is required to ensure that improvements are sustained over time. In addition to building QI capacity and improving outcomes, the QIC resulted in a "change package" of successful initiatives that will be disseminated within Zambia.

MOPED542

Suppressed viral load among persons on antiretroviral therapy - A case for clinical judiciousness and comprehensive monitoring for persons living with HIV

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BACKGROUND: The UNAIDS 90-90-90 treatment targets have led most HIV delivery programs to focus on viral suppression as the ultimate outcome of antiretroviral therapy (ART) with clients' clinical condition being of secondary concern. Several studies, however have documented a discordance between virological and immunological outcomes in some patients and research points to poorer clinical progression in patients with discordant outcomes. We review discordance between viral load and clinical staging among patients on ART to contribute to the evidence on this topic.

METHODS: A retrospective review of clinical records of 110,226 persons living with HIV aged 15 years and older from 379 facilities in 13 of Nigeria's 36 states was conducted. We categorized viral load (VL) values into suppressed (<1000/ml) and unsuppressed (>1000 copies/ml) and compared this to WHO clinical staging at the last clinic visit when viral load samples were collected.

RESULTS: Of the 110,226 patients that had viral load documented, 104,101 (94.4%) had a WHO clinical staging condition documented and 89,980 (81.6%) had a CD4 count at the last clinical visit. Both CD4 and clinical staging at last visit were documented for 85,299 patients. CD4 was < 200 in 52.7% of patients at baseline and this reduced to 17.9% at last follow-up clinic visit. Of the 85,299 patients, 70.4% were virally suppressed and 10.2% had WHO stage III or IV illness at the time of the VL which was after a mean 56 months (IQR 92 - 33 months) on ART. Of those with clinical stage III or IV conditions, 66.3% had suppressed viral loads ($p < 0.000$).

CONCLUSIONS: Some patients who are virally suppressed on ART remain at risk of life threatening opportunistic infections as close to 18% in this review were still immunosuppressed even after a suppressed viral load and 10.2% had an OI which put them in Stage III or IV. Following viral suppression, continued clinical vigilance is needed to identify those at risk of ongoing morbidity and mortality. It remains important for clinicians to pay attention to the whole patient and not just triage care based on laboratory viral load results.

MOPED543

Engagement of peer navigators in the multidisciplinary team of providers in the same-day antiretroviral therapy initiation hub model in Bangkok, Thailand

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BACKGROUND: Peer navigators play crucial roles in facilitating HIV care uptake and retention. Same-day antiretroviral therapy (SDART) initiation hub services at the Thai Red Cross Anonymous Clinic (TRCAC) have integrated key populations (KPs) to assist with linking clients to long-term ART sites and to refer clients suspected of opportunistic infections (OIs) to receive investigations. We evaluated the effectiveness of KP-integrated SDART services.

METHODS: A multidisciplinary SDART team was established consisting of 4 doctors, 2 nurses, 10 counselors, and 5 peer navigators comprised of men who have sex with men (MSM), transgender women (TGW), and PLHIV. Peer navigators supported clients in navigating the referral systems to prepare the transition from SDART initiation hub to long-term ART hospi-

tals. Peer navigators assessed clients' psychosocial status, ART adherence, and retention in care at 2 days, 3, 6, and 12 months after ART initiation. For clients clinically excluded, PLHIV navigators accompanied them to referral hospitals to receive investigations and kept contact until OI treatment/ART was initiated.

RESULTS: From July 2017–December 2018, 2,214 MSM and 160 TGW tested HIV-positive. Of 1,949 MSM and 137 TGW logistically eligible for SDART, 1,779 (91.3%) MSM and 132 (96.4%) TGW accepted SDART services. Of these, 1,557 (87.5%) MSM and 121 (91.7%) TGW were clinically eligible and initiated ART (78.5% of MSM and 81.8% of TGW had same-day initiation). Referral to long-term ART hospitals was successful in 88.4% of MSM and 85.4% of TGW. Retention at 3, 6, and 12 months for MSM was 93.2%, 89.6%, and 90.6%; and for TGW was 87.4%, 88.1%, and 85.7%, respectively. 89% of MSM and 94.7% of TGW were virally suppressed after 6 months of ART. Of 301 clients referred for OI investigations, 61.5% successfully started ART after OI investigations/treatment, 12% were taking OI treatment, and 6.3% were under OI investigations.

CONCLUSIONS: Peer navigator who is a member of MSM, TGW, and PLHIV populations is key to the success of SDART. High rates of SDART acceptance and initiation can be achieved among HIV-positive MSM and TGW. PLHIV navigators are crucial for supporting clinically unwell clients for successful linkage to OI management and ART initiation.

MOPED544

Optimizing treatment models for people living with HIV in urban Zimbabwe: Findings from a mixed methods study

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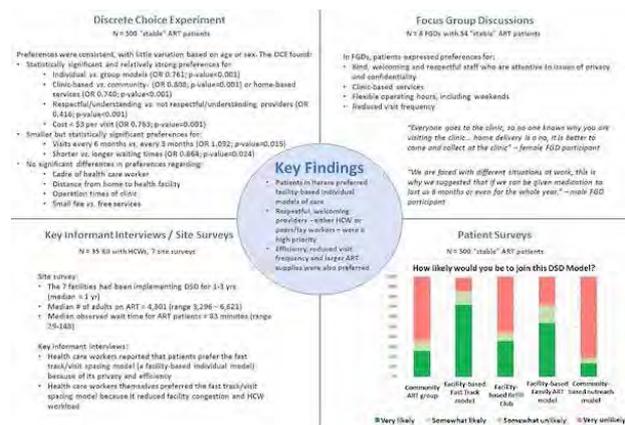
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BACKGROUND: Zimbabwe is scaling up differentiated HIV service delivery to improve patient and healthcare worker (HCW) satisfaction, HIV treatment outcomes, and program efficiencies. The Ministry of Health and Child Care and its partners support five differentiated antiretroviral treatment models (DARTs) for stable HIV-positive adults, but program data suggest that urban and rural patients prefer different models. We designed a mixed-methods study to explore the treatment preferences of urban people living with HIV (PLHIV).

METHODS: The study took place at 7 health facilities (HF) in Harare and included 35 key informant interviews (KII) with HCWs; 8 focus group discussions (FGD) with 54 PLHIV; a discrete choice experiment (DCE) in which 500 adult DART-eligible PLHIV selected their preferences for HF vs. community location, individual vs. group meetings, provider cadre and attitude, clinic operation times, visit frequency, visit duration (including wait time), and cost to patient (including transportation); and a survey with the 500 DCE participants exploring DART knowledge and preferences.

RESULTS: Patient preferences were consistent in the FGDs, DCE and survey. Participants strongly preferred HF-based services, individual DART models, respectful and understanding HCWs, and services costing < \$3/visit. Patients also preferred less frequent visits and shorter wait times. They were indifferent to variations in HCW cadre and distances from home to HF (Figure 1). These preferences were mostly homogenous, with only minor differences between male vs. female and older vs. younger patients. In KII, HCWs characterized the fast track/visit spacing model (a facility-based individual model) as the one most favoured by patients; HCW also preferred this model, which they felt decompressed HF and decreased HCW workload.

CONCLUSIONS: DARTs-eligible PLHIV in Harare preferred attributes associated with two of Zimbabwe's five DART models. Prioritizing these models for scale-up in urban areas may be the most efficient way to sustain positive patient outcomes and increase health system performance.



[Key findings from qualitative and quantitative study components]

Healthcare workers and volunteers: training, mentoring, retaining, task shifting, safety

MOPED545

Peer supporters a crucial prong in the HIV response: Perspectives of health providers

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BACKGROUND: Health facility-based adolescent peer support programmes have recently gained attention as a promising, scalable intervention in planning, delivering and monitoring services for adolescents and young people living with HIV (AYPLHIV). Although such programmes are being scaled up, their real-world impact remains scarcely documented. This analysis investigates their impact according to the perspectives of health providers based at health facilities with active peer support programmes.

METHODS: In 2018, Paediatric Adolescent Treatment Africa conducted a cross-sectional survey among 31 health providers from 11 sub-Saharan African countries. The main objective was to establish what health providers understand to be the most important activity peer supporters perform to improve services and outcomes for AYPLHIV. Data were analysed using descriptive statistics to describe central tendencies.

RESULTS: Respondents were 85% female, mean age of 40 years and originated from Southern (56%), East (37%) and West/Central Africa (8%). Respondents comprised of three categories: nurses (55%), counsellors (32%) and doctors (13%). All participants (100%) reported peer supporters to be beneficial in providing service delivery for AYPLHIV. They reported that the most important peer supporter activities included "making the clinic more welcoming and friendlier" (26%), adherence counselling (23%); disclosure support (19%); and conducting home visits for those lost to follow-up (16%). These perceptions were similar across the three health provider categories.

CONCLUSIONS: Findings build on a growing body of evidence that demonstrate the benefits of peer support and provide insight into the activities that health providers most value. These activities link directly to the prevention, treatment and care cascade. Through providing an enabling environment and thus promoting service uptake, retention in care, ART adherence and virologic suppression, making the peer support model a critical strategy in the HIV response. Further operational research is needed to determine optimal implementation approaches and to inform the development of guidance and standard operating procedures for efficient and effective scale-up.

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MOPED546

Systematic review of the evidence regarding the effectiveness of community-based primary health care in improving HIV/AIDS outcomes for mothers and childrenI. [Mushamiri](#)¹, W. [Belai](#)², H. [Perry](#)³¹*Mailman School of Public Health, Columbia University, Epidemiology, New York, United States*, ²*Bloomberg School of Public Health, Johns Hopkins, Department of International Health, Division of Health Systems, Baltimore, United States*, ³*Bloomberg School of Public Health, Johns Hopkins University, Department of International Health, Division of Health Systems, Baltimore, United States***BACKGROUND:** The effectiveness of community-based primary health care (CBPHC) interventions in low- and middle-income countries, especially for maternal, neonatal and child health, is well established. However, there has not been a systematic review of the literature on the effectiveness of CBPHC on HIV outcomes derived from rigorous assessments of primary studies.

Furthermore, HIV programming to date has been primarily at the facility level, limiting the experience of community-based approaches. Using peer-reviewed studies of randomized interventions or those containing a specified control group and directly measuring biological HIV outcomes, we provide evidence for the effectiveness of CBPHC on HIV outcomes for mothers and children in low- and middle-income countries.

METHODS: Eligibility criteria included studies assessing effectiveness of community-based interventions or integrated projects, with outcome measures being population-based indicators that defined an aspect of HIV health status including nutritional status, serious morbidity and mortality of pregnant women and children < 5y. Articles published before April 2018 were identified by searching Pubmed, Embase, Scopus and Ovid Global Health databases. The kind of projects implemented, the outcomes, implementation strategies and implications of the findings were assessed. Two independent reviewers completed a data extraction form for each article and a third reviewer resolved any differences.**RESULTS:** Initial screening identified 9,827 articles; 4,241 articles underwent further title and abstract review after removing duplicates. Of these, 99 studies qualified for further screening and only 19 were included in the final analysis based on the eligibility criteria. Most of the studies showed that community-based interventions improved HIV/AIDS prevention and treatment outcomes compared to facility-based approaches alone. Most interventions were implemented by community health workers; other implementers were government workers, community members, or research staff. Strategies used included peer-to-peer education, community collaboration, psychosocial support, training of community champions, follow-up care, home-based care, integrated care, health systems strengthening, and utilization of mHealth tools.**CONCLUSIONS:** CBPHC strategies are effective in improving population-based, HIV-related health outcomes for mothers and children, but there is a need to assess the scalability of such interventions and how to integrate them into existing health systems in order to assess their impact on the HIV epidemic in more routine settings.

MOPED547

Game changer partnerships with non-HEALTH - Civil Society Organizations critical for reaching 90-90-90S. [Dwivedi](#)¹, [V.S. Prasad](#)², E. [Michael](#)², M. [Kumar](#)²¹*AIDS Healthcare Foundation, Delhi, India*, ²*AHF India, Delhi, India***BACKGROUND:** AIDS HEALTHCARE FOUNDATION (AHF) India - partners with 19 Civil Society Organisations (CSOs) in implementing a Community-Based HIV testing program across India. These CSOs are grassroots organisations working in different community development issues beyond health care, but have incorporated community-based HIV testing among vulnerable, high-risk populations and migrant workers in their respective areas of work.**METHODS:** With hands-on training, specific tasks can be moved from highly trained health care workers to people with lower qualifications working in remote settings. In this study, teams consisted of a counsel-

lor, testing personnel, linkage coordinator, and outreach worker with no prior experience in HIV work. To build knowledge and enhance skills the staff were trained intensively for 5 days on basics of HIV, national protocols, HIV/AIDS law, counselling, community-based rapid testing, universal safety precautions, project management, including stock management, reporting and finance. The M&E manager and prevention coordinator conducted periodical monitoring of each implementing site and provided supportive supervision.

RESULTS: The CSOs conducted a little over 0.75 million HIV rapid tests in the field and identified 6820 positive clients (0.90% sero positivity) and linked 5528 to ART (81%) through accompanied referral in 2017 -2018. During 2017, the sero positivity was 0.8% and linkage to ART was 75%, and in 2018 the sero positivity was 1% and linkage to ART was 87%, a significant improvement after hands-on mentoring and supportive supervision.**CONCLUSIONS:** "Task shifting" of HIV testing services to CSOs working in non-health care developmental areas at a grassroots level and building their capacities with appropriate training and supportive supervision represents an effective strategy for reaching out to a large number of people in remote locations. This further leads to improvements in enrolment and retention in care. Many CSOs were able to anchor themselves as health catalysts in their respective communities by participating in the task shifting strategy.

The results indicate that governments should implement task shifting of HIV services to non-healthcare focused CSOs, with accompanying intensive training, as a way to achieve the first 90 target of the 90-90-90 strategy.

Demand creation for HIV services

MOPED548

Innovative demand creation changes in rolling out oral pre-exposure prophylaxis (PrEP) in Kenya - the Jilinde experienceA. [Musau](#)¹, D. [Were](#)¹, E. [Mutsiya](#)², A. [Gomez](#)³¹*Jhpiego Kenya, Nairobi, Kenya*, ²*Population Services Kenya, Nairobi, Kenya*, ³*AVAC, New York, United States***BACKGROUND:** According to UNAIDS, Kenya has the joint fourth-largest HIV epidemic in the world, alongside Mozambique and Uganda. While there is a reduction in new infections since 2005, prevalence rate remains high, with those at the highest risk of infection, including men who have sex with men (MSM), female sex workers (FSWs), adolescent girls and young women (AGYW).

The aim of the Jilinde project, funded by the Bill & Melinda Gates Foundation, is to scale up integrated delivery of oral PrEP as a HIV prevention option to these populations in order to demonstrate that taking PrEP to scale is both feasible and impactful in reducing HIV infections. The project also aims to answer access and operational questions about enablers and barriers to scaling-up PrEP in routine programmatic settings.

METHODS: A behavioral economics approach was used to develop a quantitative survey which was fielded in four high prevalence areas. Machine learning was used to create a tool for classifying participants into the segments. The tool identified the key features that differentiated participants across segments.

The results were then further clustered to delve deeper into the variables. The qualitative survey used a range of ethnographic techniques such as immersion and shadowing. The results of both were assessed by the program team against an agreed set of criteria. Interventions were then further prototyped, piloted and evaluated.

RESULTS: MSM do not see images that reflect them or their lifestyles in the public health interventions. Furthermore, any interventions that come from outside the group are viewed suspiciously. FSW want to hear how to keep themselves healthy in the course of their work; this was a priority to them over any other interventions. Social sanction was important to all groups, but AGYW particularly needed this to come from the community not just peers.Tuesday
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CONCLUSIONS: The three groups had very different needs and wants regarding PrEP information and they wanted to hear it different influencers and through varying channels. In order to do this effectively programs need to be ready to retrain counsellors and peer educators, as well as vastly change and tailor interventions.

MOPED549

The student resource centre model and its impact on student access to HIV related services: A case of Mutare Teachers' College, Mutare, Zimbabwe

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BACKGROUND: A Student Resource Centre is a facility established to allow students access to edutainment activities, resources and programmes in one place which is accessible to all students within a college. Students are attracted to the Resource Centre by a variety of entertainment and games and free Internet access. Besides being entertainment hubs, Resource Centres allow students an opportunity to freely and openly discuss about sex and sexuality issues and to seek professional advice and guidance on what to do when faced with challenges of a sexual and reproductive nature.

SAYWHAT in partnership with UNFPA and Mutare Teachers' College established a Student Resource Centre at Mutare Teachers' College in January 2016 with the aim not only to create a conducive environment for students to freely meet and talk about SRH issues but also to strengthen the link between the college clinic and the students.

METHODS: Two Resource Centre Minders were trained by SAYWHAT to coordinate the Resource Centre and its activities. The Resource Minders were trained on Peer Education, Monitoring and Evaluation, Referral for SRH services, and Student mobilization for HIV services. After the training, the Resource Centre Minders work at the Resource Centre on a daily basis and their role is to guide students on all Resource Centre activities and games. They ensure that students complete Resource Centre Registers which capture all relevant data like purpose of visit, duration of stay, services referred for and services accessed in the Resource Centre. They also facilitate discussions with students on contemporary SRHR issues and assist students in making informed choices about their SRHR. This paper compares the Mutare Teachers' College clinical data on HIV testing services accessed by students in 2015 (before the Resource Centre was established) and the same data for 2016 (after the establishment of the Resource Centre).

RESULTS:

Indicator	2015 (Before the Resource Centre)	2016 (After the Resource Centre)
Number of students getting tested for HIV and knowing their status	121	522
Number of students initiated on ART	5	88

[HIV Services Demand]

CONCLUSIONS: Resource Centres are an effective mobilization tool for students to access HIV testing and other HIV related services in a college set up. Investing in the establishment of Resource Centres in colleges is investing in students' health.

MOPED550

A culturally sensitive online communication strategy to reach men who have sex with men (MSM) for HIV/STI prevention and testing in South Korea

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BACKGROUND: Given the intense geopolitical backdrop, confucianism and homosexuality stigma, little is known about men who have sex with men (MSM) in South Korea. Adam's Love (www.adamslove.org), sought to assess Korean MSM community concerns, information needs and sensitivities surrounding the establishment of an online HIV prevention outreach platform.

METHODS: A qualitative research was conducted from December 2017-June 2018 in Seoul, Incheon, Daegu and Busan to gather inputs from local MSM communities and stakeholders. The study involved meetings with 21 organizations including healthcare providers, MSM, HIV/AIDS and sexual-minority rights organizations, gay dating application and fashion magazine owners, and 50 men randomly selected from gay clubs/bars at Itaewon, Jongno and Beomil-gil, largest gay hotspots.

RESULTS: Being gay is considered dangerous in South Korea. Korea is a Confucius society with strong religious beliefs, and coming out remains biggest challenge for gay men. Of 50 MSM interviewed, almost all (96%) hid their sexual identity to their family and society. "If I tell my mom, she will cry till she dies. So I choose not to disclose", shared a 37-year-old gay man. "If the society knows he is MSM, he will be thrown out and lose his job, friends. It's strong stigma here", replied a provider. All stakeholders universally reported an increasing HIV epidemic among MSM and outreach to MSM as a major challenge. "In my clinic, almost 90% HIV-infected population is MSM" shared a medical doctor. "Money boys are mostly in the apps. Our app attracts 5,000 Korean visitors a day. We have total 300,000 members, and 100,000 actively dating members" sole Korean gay app owner. HIV-positive support groups reported high suicidal rates and the need for support platforms. To address outreach challenges, Adam's Love Korea program was launched in December 2018. The website features >23 Korean medical expert advice videos on sexual health. Male fashion photography is linked to HIV/STI testing and treatment information. Celebrity edutainment videos launched through social media channels engaged >100,000 viewers in one month.

CONCLUSIONS: Adam's Love Korea pilot launch demonstrates active MSM engagement in online interventions. Next steps involve real-time support to MSM for linkages to collaborated HIV testing and care sites.

MOPED551

Community-led demand creation approaches to improve uptake of safe voluntary medical male circumcision in Eastern Uganda

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BACKGROUND: The Uganda Population-Based HIV Impact Assessment 2017 estimated the unmet need for voluntary medical male circumcision (VMMC) at 20% (4,405,741) and of these 2.2% (97,400) were in Eastern Uganda. USAID-funded Regional Health Integration to Enhance Services in Eastern Uganda (RHITES-E), led by IntraHealth International, implemented multiple approaches for demand creation to infiltrate and mobilize both traditionally and non-traditionally male circumcising communities of Eastern Uganda for VMMC. The campaign aimed to circumcise 34,313 males based on PEPFAR targets for October 2017-September 2018.

METHODS: USAID RHITES-E employed four innovative community-based participatory approaches targeting boys and men aged 15 to 49 for VMMC with special focus on the 15-29 PEPFAR age pivot. Approach 1 engaged 72 female village health teams over nine months to mobilize and educate school-aged boys on the importance of circumcision beyond reducing HIV infection such as hygiene and averting cervical cancer for their female partners. Approach 2 targeted the school holidays in April, August, and December to circumcise school-aged boys who reported fears related to

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wound healing if circumcised during the school time. Approach 3 engaged five religious leaders over three months to educate communities (especially those traditionally circumcising) on safe clinical services rather than traditional methods. Approach 4 used mobilization through radio, peers, and male village health workers conducting home-to-home visits.

RESULTS: 37,780 boys and men aged 15-49 were circumcised in 14 months (October 2017 to December 2018) and of these, 54% (20,401) were in the PEPFAR VMMC age-pivot of 15-29 years. Of the total, the contribution per approach was 29%, 26%, 19%, and 26%, respectively.

CONCLUSIONS: Tailoring VMMC demand-creation to specifically target different ages, align services with the school holidays to give ample wound healing time, and emphasize non-HIV prevention benefits, such as improved hygiene proved to be effective approaches for meeting the target. Promoting VMMC among women appeared to have considerable influence over men's decision to get circumcised in traditionally non-circumcising communities while the influence of religious leaders was highest among traditionally circumcising communities. Multiple demand creation approaches involving both male and female community mobilizers were most effective in reaching the 15-29 age group.

Partnerships: Academic-community, public-private

MOPED552

Leveraging interprofessional student collaboration to educate healthcare providers and increase access to pre-exposure prophylaxis: Results of a novel educational approach

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BACKGROUND: Pre-Exposure Prophylaxis (PrEP) is a highly-effective, medication regimen for reducing risk of HIV infection, but uptake has been slow and unequal. One reported reason for the slow uptake of PrEP is lack of healthcare provider education. A number of educational interventions regarding PrEP for HIV-risk mitigation have been described in the literature, however they have focused primarily on prescribers, omitting many other professionals in the HIV-prevention continuum. There is a need for innovative methods for educating current and future healthcare providers about PrEP for HIV prevention.

METHODS: An interprofessional team of 11 first-year health professions students collaborated in a service-learning project to compile a training module about PrEP and HIV risk factors. The training module was then presented to interdisciplinary care teams at the Lake County Health Department, in Lake County, Illinois, USA. The training module included psychosocial, financial, and medical information about PrEP and HIV risk. Clinical vignettes were designed to specifically represent the patient population served by the health department. Each interactive workshop lasted 75 minutes and integrated the didactic information through small-group, student-led discussion of case studies.

RESULTS: Assessment of this initiative followed a mixed methodology. Results showed that providers and students were both under-informed about PrEP. Both groups self-reported an increase in awareness and confidence in identifying patients at risk for HIV infection. Data captured from the LCHD electronic medical records demonstrated an increase in PrEP prescriptions following workshops hosted by the student team. Analysis of student self-reflections demonstrated 4 recurrent themes of role for collaborative practice in providing HIV preventative care.

CONCLUSIONS: The pilot implementation of this project demonstrated effectiveness in educating students and providers about PrEP, and increased PrEP prescriptions in primary care. From this pilot implementation, guidelines for implementing this model of training and service learning

at other institutions have been established. Closing the gap in PrEP utilization requires education of both current and future healthcare providers about HIV risk and the use of PrEP. The present framework is designed to accomplish this task, and to do so in a manner that is strategically designed to meet the needs of a specific patient population.

Community-led initiatives

MOPED553

Results from a community mentor mother-led case management of children living with HIV: A case study of USAID's Nilinde Project

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BACKGROUND: Globally, HIV care and treatment is recognised as a pillar in halting the spread of the HIV epidemic. Evidence shows that treatment can avert new HIV infections, AIDS related deaths, and prevent related illnesses. The AIDS-free generation by 2030 led by UNAIDS through the 90-90-90 strategy has rallied unified intervention efforts. Kenya is progressively scaling up HIV treatment services, achieving 75 percent antiretroviral therapy coverage among those ages 15 and older, and 84 percent among children below 15 years with a viral load (VL) suppression rate of 77 percent. Kenya still misses opportunities in scaling up HIV treatment due to low linkage rates and has yet to meet the 3rd 90 goal.

METHODS: The Nilinde[1] project trained 112 community mentor mothers (CMMs) to provide community-level HIV service delivery to Children Living with HIV (CLHIV). CMMs support active case finding of CLHIV for enrolment into the project, linkage to HIV treatment, retention and adherence to antiretroviral drugs. At the start of year three, of the 4,022 CLHIV, 83 were not linked to treatment, 1,611 (41%) did not know their viral load results and 10% of those with results had VL results of above 1000 copies/mL. CMMs, as case workers identified and enrolled new CLHIV to the project, linked CLHIV to treatment, supported adherence to drugs and supported caregivers to obtain viral load results.

[1] Nilinde (Swahili for Protect Me) is a 5-year project ending in the year 2020 which is funded by United States Agency for International Development and implemented by Plan International to improve the welfare and protection of 163,640 orphans and vulnerable children in five high disease burden counties of Kenya.

RESULTS: The CMM led model led to enrolment of an additional 297 CLHIV, 100 percent linkage to HIV treatment, 27 percent increase in knowledge of VL results and an overall increase in viral load suppression rates by 5 percent.

CONCLUSIONS: CMM-led case management is a promising service delivery model in improving linkages to HIV treatment, increasing individual knowledge on viral load results, and contributing to viral load suppression. Treatment partners should apply the model as part of the continuum of care.

MOPED554

Reasons why parents are reluctant to disclose their HIV positive status to their children: Lesson learnt in BotswanaM. Mokalake^{1,2}, L.C. de Jager³¹University of Botswana, Educational Foundation, Gaborone, Botswana,²Stellenbosch University, Economic and Management Sciences, CapeTown, South Africa, ³Stellenbosch University, Economic and Management Sciences, Stellenbosch, South Africa

BACKGROUND: Despite the Botswana's provision of universal free anti-retroviral treatment (ART) to all people living with HIV (Treat All Strategy), it is one of the countries which are highly affected by HIV. However, some of socioeconomic, socio-demographic and sociocultural factors in relation to HIV and AIDS are not taken into consideration but are vital to health care system. With this background, the study wanted to explore reasons why parents are reluctant to disclose their HIV positive status to their children.

METHODS: A quantitative cross sectional analytic survey was used to collect data from a sample of 50 HIV positive parents from Infectious Disease Control Centre (IDCC) in two clinics in Botswana (25 participants from Oodi clinic and 25 from Shoshong clinic). The data was collected from 12 males and 28 females HIV positive parents selected randomly. The information about participants' demographics, knowledge, attitudes and challenges experienced on parental HIV disclosure was collected. A data collection tool consisting close ended questionnaires was used to collect data from HIV positive participants visiting the clinic during allocated time frame from August 2016 to December 2016.

RESULTS: Study results indicated that, 80% of participants believed that parental HIV disclosure has to be done when the child is an adolescent and 32% of participants feel that if parents disclose their HIV positive status to their children, this can make children to reject them. The greater percentage (62%) of participants believe that, it is important to disclose their HIV positive status considering child's maturity. Therefore, 88% of parents feel it is vital for the government to introduce policies and guidelines on parental disclosure.

CONCLUSIONS: Since main findings show that fear of rejection was the main factor for postponing disclosure, and that disclosing at a young age was not considered viable, the government should establish parental HIV disclosure policies and guidelines to help health care providers to support parents on HIV disclosure in health care settings.

MOPED555

Elimination by the people: A community led approach towards elimination of mother to child transmission of HIV & syphilis. Experience from Global Fund supported Ahana project in IndiaK. Biswas¹, K.B. Reneeje², D. Nirwal¹, S. Kanoujia¹, M. Singh¹, R. Mitra¹¹Plan India, The Global Fund, New Delhi, India, ²Plan International (India Chapter), The Global Fund, New Delhi, India

BACKGROUND: While India has made a significant progress in arresting and reversing the HIV epidemic, testing coverage for pregnant women remained very low. Evidence suggests access to HIV testing remained at 18% during Oct, 15 in the 356 districts of 14 identified states with an estimated annual pregnancies of 16 million per year. Complementing India's EMTCT of HIV strategy, Plan India has been implementing Ahana programme supported by The Global Fund towards attaining Elimination of Mother to Child Transmission by 2020.

METHODS: Forty thousand primary health care providers from the community in more than 3,000 blocks were trained to carry out HIV testing using finger prick test in Village Health and Nutrition Day (VHND). They were then linked with the HIV finger prick test kits and consumables through the Govt. health systems to reach out to 16 million annual pregnancies. Data has been captured and analysed in the Strategic Information Management System (SIMS) of National AIDS Control Organisation (NACO).

RESULTS: Provisioning of services through community led VHND model enabled Govt. to expand the HIV testing service 11 million more pregnant women who were earlier deprived. With the community led testing HIV

testing coverage among pregnant women increased from 18% to 69% during Oct, 15 to Sept, 18. This has also resulted in identifying more than 3,000 HIV positive pregnant women who then were brought under PMTCT programme coverage.

CONCLUSIONS: To attain Elimination of Mother to Child Transmission as committed by Govt. of India by 2020, community based or led testing to play a critical role to reach out to a hopping 30 million annual pregnancies across the country. Plan India along with National AIDS Control Organisation devised the programme delivery model which included an integration approach with the general public health to achieve the acceptance from both demand and supply side and also to ensure a sustainability.

MOPED556

Effects of malnutrition on ART adherence. Findings from a community HIV project in Botswana

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BACKGROUND: With the USAID financial support, the Advancing Partners and Community (APC) program in Botswana provides community support to people living with HIV (PLHIV) on treatment with the aim of increasing adherence to treatment and retention in care. Through quarterly visits, community health workers (CHWs) screen PLHIV for medical conditions, including poor nutritional status and accordingly counsel and refer to national health services.

METHODS: Clients enrolled in community care including patients initiating ART, treatment defaulters and some stable patients were assessed for their nutritional status by measuring the mid-upper arm circumference (MUAC) with colour-coded tapes. Routine monitoring data obtained from a dynamic cohort were analysed with STATA-12 to assess factors associated with poor nutrition status among PLHIV. Malnourished individuals were referred to social services to apply for food basket.

RESULTS: From October 2017 through September 2018, a total 17,755 clients aged 0-95 years received community services through 45,955 assessments, including 15,865 (34.5%) initial assessments. The majority were female (59.1%), the mean age was 35.7 years. 73.1% of the clients were assessed for nutritional status. Children aged below 18 years were more likely than adult to be malnourished (13.8% versus 2.4%, $p < 0.001$). The proportion of malnourished individuals dropped from 4.1% at first or second encounter with client to 2.8% at subsequent visits ($p < 0.001$). Malnourished clients were more likely than others to report: non-adherence to treatment in past month (7.6% versus 6.0%; $p < 0.025$), having been late for refill appointment in the past three months (16.1% versus 11.5%; $p < 0.001$), symptoms of tuberculosis at intensified case finding (9.2% versus 0.7%; $p < 0.001$), regular alcohol use (9.9% versus 7.6%; $p = 0.004$), being bedridden (2.3% versus 0.3%; $p < 0.001$) and not having had a viral load measure in the past 6 months (79.0 versus 74.2; $p < 0.001$).

CONCLUSIONS: Malnourished PLHIV have more difficulty to adhere to HIV treatment. The measure of the MUAC at community level is useful to identify people in needs of regular community support to remain in care. Community intervention to PLHIV may reduce the proportion of malnourished people through referral to adequate services and counselling.

MOPED557

Standardization of the services provided in HIV from the community, registration, monitoring and evaluation of these within the framework of the Colombian health system, as strategy for maintaining the responseD.S. Martínez Porras¹, M. Barriga², J. Guillen³, J.F. Ramirez Correa²¹Corporacion Red Somos, Bogotá, Colombia, ²Corporacion Red Somos, Bogotá, Colombia, ³Corporacion Red Somos, Education and Research Coordination, Bogotá, Colombia

BACKGROUND: As part of the recognition of CBOs as primary health service providers from the community in the response to HIV / AIDS in Colombia, Red Somos Corporation conducted a situational analysis of the Community Based Organizations. This analysis made it possible to recog-

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nize the existence of 112 community-based organizations that work with populations of patients with HIV, tuberculosis and viral hepatitis, people who inject drugs, MSM, transgender women, sex workers, young people, women and pregnant women. Of these 112 organizations, 15% did not have legal status, 9% without statutes, 42% without administrative manuals and 43% without financial manuals.

The CBOs have demonstrated the importance of their actions in the effective response to the health needs of the communities. However, the weaknesses in the training and formalization processes of the organizations have limited the possibility of expanding the field of action of the same. Different strategies have been proposed in order to improve its administrative and financial structure, strengthen its management capacity and facilitate its recognition as important actors for the health system.

The COLOMBIAN ASSOCIATION OF COMMUNITY BASE ORGANIZATIONS IN HEALTH (ACOBCS) has developed procedures for documenting procedures and manuals, in particular the missionary processes of CBOs that provide community services in SRH.

METHODS:

1. Systematic review of Colombian legislation on health and the services provided by CBOs.
2. Selection of OBC to recognize the developed processes.
3. Prioritization of the activities to be documented based on: Level of demand for the activity, Possibility of commercialization and Cost of benefit.
4. Field activity to recognize in situ the processes and procedures
5. Development and validation of process flowcharts,
6. Elaboration of manuals of mission processes and critical points
7. Pilot test of manuals.

RESULTS: 21 standardized procedures and contained in 6 processes or lines of action of the OBC.

CONCLUSIONS: OBCs has demonstrated the importance of its actions in the effective response to the health needs of the communities. This process allows improving the capacities of the CBOs and strengthening their management capacity and facilitating their recognition as important actors for the Colombian health system.

MOPED558

High uptake and completion of HIV self-testing using a novel community-based delivery strategy for young people in Kenya

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BACKGROUND: HIV self-testing (HIVST) is a flexible and confidential complement to facility-based testing that may improve testing uptake and engagement in care and prevention among adolescents and young adults (AYA). Kenya is among the first African countries to offer HIVST, however optimal implementation strategies are unclear. We present preliminary results from an ongoing study evaluating three community-based HIVST delivery channels that target AYA to inform national scale-up.

METHODS: In this cohort study, peer mobilizer/HIV test counselor teams recruit AYA through home-based testing (HBT), 'hot spots,' or pharmacy channels. Eligible AYA are ages 15-24, report negative or unknown HIV status, and reside in a settlement in Nairobi. Teams offer OraQuick HIVST kits and optional assistance and post-test counseling per national guidelines. Month 1 and 4 follow-up surveys assess HIVST experiences, sexual behavior, and linkage. The primary outcome is HIVST completion within one month; secondary outcomes include test acceptance, willingness to pay, and linkage to care/retesting, at four months. Results are summarized descriptively by channel.

RESULTS: Among 185 eligible, 181 AYA (97.8%) have enrolled since November 2018 through HBT (69.1%), hot spots (24.9%), and pharmacies (6.1%). Most were ages 18-24 (64.6%), female (66.3%), sexually active (66.7%)

ever tested for HIV (82.9%). A higher proportion of AYA from hot spots thought their risk of HIV in the next year was moderate or high (55.8% versus HBT, 17.1%, pharmacy, 9.1%). HIVST acceptance was 100% and 126 (69.6%) have completed tests, including 73.3% among those with >30 days on study. Overall, 100% were negative and 97% of used kits were returned. Most AYA (89.7%) tested without assistance and 53.2% received post-test counseling, with few differences by channel or age group. Most said HIVST was 'very easy' to complete, especially older AYA (18-24, 89.1% vs. 15-17, 72.9%), 70.1% would use HIVST again, and 59.1% would pay \$1-15 USD for a self-test.

CONCLUSIONS: Peer/provider led community-based HIVST distribution is a highly acceptable and feasible strategy to reach a diverse population of AYA at risk of HIV with potential to increase engagement in HIV prevention in high-burden settings.

MOPED559

Demonstration project of the First Community Led Transgender clinic in the Philippines (Manila)

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BACKGROUND: Transgender people worldwide suffer from high levels of stigma, discrimination, gender-based violence and abuse. This has a debilitating effect to their health and well-being, leading to circumstances that put them at higher risk of contracting HIV.

Discrimination in society leads a lot of transgender people to find a living as sex workers. Across the world, a relatively high proportion of the transgender population are engaged in the sex industry. In 2015 Integrated HIV Behavioral and Serologic Surveillance, condom use among transgender sex workers in the Philippines is low, with less than 40%. Stigma and discrimination, which lead to low self-esteem and disempowerment are the primary factors for transgender people to have a difficult time on insisting condom use. In the Philippines, there is no trans-specific healthcare programs.

Victoria is the First Community Led Transgender clinic in the Philippines, aims to develop two level services for its clientele: first level comprised of HIV screening, counselling services on transgender concerns, basic physical health check-ups, basic baseline laboratory procedures, screening, treatment for STIs, and referrals to specialists. The second level includes hormone management, advanced laboratory procedures, pre-SRS (sex-reassignment surgery) assessment and counseling. It will also introduce same day test result, test and treat and ART for PLHIVs.

METHODS: Victoria provides a gender-sensitive, holistic, and inclusive set of key health and wellness services to transgender people through its health clinic and counseling center.

RESULTS: For 2017, Victoria reached 1,824 individuals through its outreach and community center efforts and tested/counselled 360 transgender clients for both hormone replacement therapy and HIV testing since it opened. In partnership with companies, school and universities, were also able to deliver SOGISC (Sexual Orientation Gender Identity and Sexual Characteristics) seminars.

CONCLUSIONS: Victoria aims scale up its reach to more transgender people, people of diverse SOGISC and to develop sustainability through establishing a training center and a treatment hub that will create sustainable financing for the community center through PhilHealth in 2-3 years' time based on the experience of LoveYourself's other community center - Anglo. Victoria also aims to be a one stop shop ensuring linkage to care for clients who test reactive to HIV.

MOPED560

Impossible to become possible: A journey towards EMTCT; result from plan India's Global Fund supported Ahana project in 9 states of India

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BACKGROUND: The elimination of mother-to-child transmission of HIV and Syphilis has to be achieved by 2020 as per national and global commitments. Evidence from India suggests access to PMTCT services for pregnant women in India remained very low with 218 priority districts (0.27% to 29.8% - aggregate average of 18%) when compared with a national average of 42% in Sept, 15. Complementing India's dual elimination strategy of HIV and Syphilis, Plan India has been implemented Ahana programme supported by The Global Fund in those 218 priority districts in 9 states of India.

METHODS: A mixed method study was carried out with the State and district level health care providers using in depth interview and FGDs. In addition 888 pregnant women were interviewed using structured instrument in selected districts of 9 states in India.

RESULTS: The study shows that there are broadly five models implemented in the nine states such as community based approach at VHND, testing at PHC along with 'Camp-Mode', Sub-Centre level testing, testing up to CHC and further extend PHCs in 'camp-mode' and finally testing up to primary health centre level. Continuous capacity building on PPTCT leads to 81% of peripheral health workers had knowledge of PPTCT that leads to quality service to PPWs & exposed babies. More than 90% of ANMs acquired enhanced skills of HIV Testing. Created awareness about PPTCT through Community Mobilization Meeting and Mid media activities. ANM got trained on WBFPT and there has been substantial scaling up of HIV testing facilities in the periphery level. 10 million pregnant women have received HIV testing successfully in a period of 24 months. This resulted in increase in HIV testing among pregnant women from 18% to 70% in those districts.

CONCLUSIONS: While demand generation is an important parameter towards saturation of pregnant women with HIV testing it is equally important to strengthen the supply side mechanism. Building the capacities of health service providers and integration of HIV testing services with the existing public health facilities have laid down the pathways to EMTCT of HIV in India. The study suggests that universal coverage among pregnant women initiating through community-led approach.

MOPED561

Female volunteer community advocates perform at a comparable level with their male counterparts supporting voluntary medical male circumcision (VMMC) services at routine facilities in Tanzania

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BACKGROUND: Jhpiego with support from the United States Agency for International Development has supported the Tanzania Ministry of Health, Community Development, Gender, Elderly and Children to implement VMMC services for HIV prevention since 2009 serving over 890,000 clients to-date. In 2016, a new approach of using local volunteer community advocates (VCAs) to refer VMMC clients to routine facilities allowed phasing out of employed nonlocal community health promoters. With the change to VCAs, the AIDSFree project increased engagement of women by a female-to-male ratio of 2:3 despite previous concern that sexual taboos and busy schedules would hinder women from being effective

VCAs in promoting VMMC as it relies on male decision-making. This analysis compares the performance of female versus male VCAs in driving the successful uptake of VMMC services.

METHODS: A retrospective review of the AIDSFree project database was conducted to extract VCA performance data from 1 October 2017 to 30 September 2018. We compiled performance data on interpersonal communication activities to increase VMMC uptake in routine facilities performed by VCAs such as door-to-door campaigns targeting adults. Performance was assessed at a scheduled biweekly meeting between each VCA and a project mentor using the same scale for male and female VCAs. Scores assigned by project mentors on a scale of 1 (not implemented) to 6 (fully implemented) for each activity the VCA planned to achieve facility-level targets were converted into a collective percentage average and compared by sex.

RESULTS: 227 VCAs supported VMMC services during the review period (93F, 41%). Among these, 103 VCAs (45%) who served for the full year were selected for analysis (42F, 41%). Selected VCAs completed 2,266 biweekly assessments with an average performance score of 83% (range=57%-100%). Male VCAs scored 83% (range=62%-100%) and female VCAs scored 83% (range=57%-100%).

CONCLUSIONS: In line with field reports by project mentors, the results underline that social norms and domestic roles do not hinder female VCAs' performance as local VMMC promoters. Engaging local women as VCAs can influence VMMC perceptions positively and provides a more balanced perspective and approach to VMMC promotion.

MOPED562

Tapping into and maximizing the use of faith worship centers as entry point to HIV prevention services: The experience of Health Kiosk model in Zimbabwe

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BACKGROUND: Faith-based organizations play critical role to achieving the UNAIDS Fast-Track Targets of ending the HIV epidemic by 2030. Estimated 84 % of the world has religious affiliation and 75% of Africans trust their religious leaders. Faith based platforms, especially worship centers are un tapped as effective entry point to HIV prevention services. Leveraging the reach of a well-informed and mobilized faith community is essential in controlling the HIV epidemic. The Health Kiosk intervention explored the effectiveness of use of faith worship centres to improve access to HIV prevention services.

METHODS: Health Kiosk, at worship centers was conducted in Gwanda and Gokwe districts in Zimbabwe between February 2018 and January 2019. Ninety-one faith leaders and 93 volunteers were selected from 53 faith worship centers and trained to provide HIV information, make and track referrals for HIV testing to their members.

Worship centers received booths for information dissemination, and volunteers were trained on simplified record keeping to measure impact of the project.

RESULTS: Over 12 months period, the number of people requesting and receiving HIV information at the worship centers increase by 350% and 316% respectively. Those who got HIV test and received their test results increased by 151%. Faith centers also provided information and referral for maternal and child health services. Increased collaboration was fostered between the Pastors, church volunteers, referral health facilities and the Ministry of Health.

CONCLUSIONS: Health Kiosk at faith worship centers manned by trained lay volunteers is an essential entry point for HIV prevention services and should be mainstreamed into the general HIV prevention care and treatment programs.

The use of locally available IEC materials from the Ministry of health ensured regular access to HIV information by local churches. Model fostered collaboration, experience sharing, communication and networking among the Pastors and churches in the Project.

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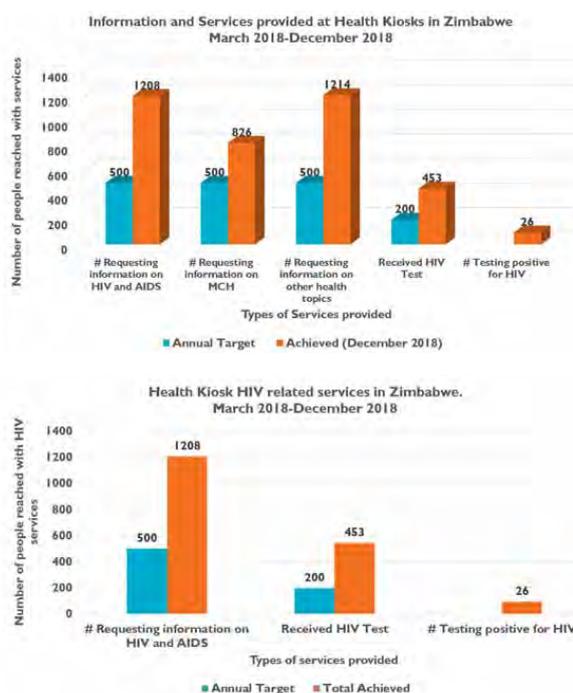
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[Chart 1- Project Outcome of Health Kiosk Model in Zimbabwe]

Feasibility and acceptability of emerging HIV prevention strategies

MOPED563

Provider and client-led partner notification service (PNS) approaches on HIV case identification in Zambia

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BACKGROUND: The government of Zambia adopted partner notification services (PNS) to complement other HIV testing strategies in improving case finding, early diagnosis and linkage to care and anti-retroviral treatment (ART). Effective PNS requires eliciting all possible sexual partners, contacting them (either through a provider or index client), offering them HIV testing, and if HIV positive, initiating ART. Provider-led and client-led PNS approaches may differ in their ability reach and improve uptake of HIV testing and receipt of results by elicited partners. We reviewed program testing data to identify these differences.

METHODS: The USAID/ZPCTIIB project implemented PNS in 40 health facilities from January - March 2018 using both provider-led and client-led approaches. In the provider-led approach, the health care worker led the process of contacting their elicited sexual partners, while in the client-led approach, the index patients established the first contact with their elicited partners. Index clients were free to select any approach of choice following counseling. PNS records were retrieved from 10 facilities with complete PNS records across three provinces of Zambia. Elicited partners successfully contacted and tested through provider-led and client-led approaches was determined. Respective testing outcomes were also documented using descriptive and inferential statistical analyses.

RESULTS: Over a three months period, 768 index clients elicited 987 sexual partners. Of the 987, 713 (72%) showed up while 274 (28%) elicited partners failed to show up for HIV testing. Of those who showed up, there was no difference in uptake of HIV testing between client led (543, 98%) and provider led approaches (154, 97%) ($p=0.45$). Of those who failed to show up, 15 (6%) refused, 6 (2%) deferred the test, while for 253 (92%), chosen approach did not establish contact. When disaggregating by con-

tact approach, 210 (27.9%) were elicited through the client led approach (CLA) and 43 (21.8%) through the provider led approach (PLA). There was no significant difference between the 2 approaches ($p=0.08$).

CONCLUSIONS: We conclude that once sexual partners are reached, both provider and client-led approaches were associated with high uptake of HIV testing. Therefore, we propose scaling up both CLA and PLA approaches in PNS.

MOPED564

Community-led assessment of awareness and willingness of HIV self-screening among men who have sex with men (MSM) and transgender women (TGW) in the Philippines

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BACKGROUND: This study focused on the assessment of the awareness and willingness of men who have sex with men and transgender women on HIV self-screening in the Philippines. Given the context of the rising HIV epidemic in the Philippines, there is still a need to explore methods to reach and test the key population. HIV self-screening is a very promising service that has a lot of potential in reaching the key population who wants to get tested for HIV.

METHODS: Survey forms were distributed to a total of two hundred fifty (250) participants for this study recruited from the online and offline channels of LoveYourself.

RESULTS: With regards to the awareness of HIV self-screening, fifty eight percent (58%) of the participants have heard about HIV self-screening. As for the willingness to avail HIV self-screening kit, about eighty eight percent (88%) of the participants are willing. As for the preference of the type of self-screening kit, about twenty three percent (23%) preferred saliva/swab method while seventy seven percent (77%) preferred blood-based testing. Purchase frequency was also measured, assuming the MSM/TG is not being exposed to HIV. About forty seven percent (47%) of the participants will purchase every three (3) months, twenty five percent (25%) of the participants will purchase annually, seventeen percent (17%) of the participants will never purchase the kit and, eleven percent (11%) of the participants will purchase annually. Moreover, the median price the participants are willing to pay for each test kit is at PhP 500.00 (US\$ 9.44).

CONCLUSIONS: Based on the results of this study, awareness on HIV self-screening exist among the MSM and TGW and that they are really willing to avail its service. The findings of this research will help the national government of the Philippines on having a basis in creating programs on self-screening and other community-based researches that focus on self-screening services to increase linkage to HIV testing services.

MOPED565

Community-led conversations on awareness and acceptability of HIV self-screening among men who have sex with men and transgender women in metropolitan Manila, Philippines

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BACKGROUND: A rapidly increasing epidemic of HIV infection is emerging among men who have sex with men (MSM) in the Philippines, where an estimated 142,000 is expected to be infected by 2022. With HIV prevention for MSM in the Philippines still in its infancy, significant investments are urgently needed to bridge the gap between current preventive practice and effective coverage. Opportunities exist to halt HIV transmission among MSM using new methods to facilitate HIV testing. While there is

interest to include HIV self-screening as an innovation to scale-up testing, questions remain about feasibility, acceptability, cost, and the model of service delivery.

METHODS: Several focused group discussions were made targeting the following: MSM who have been tested for HIV, MSM who have never been tested for HIV, and transgender women. A separate focused group discussion was done among the volunteers of LoveYourself.

RESULTS: For MSMs who have been tested for HIV, most of them noted that the contents of the kit should graphical instructions for use (IFU), what to do before and after testing, certification from an organization, messages of hope, and disposal procedures. No logos should be placed in the packaging to maintain discreetness. For MSMs who have never been tested, a "human element" of screening is needed: there is someone that personally guides you on the process. For transgender women, clients should be given options on their preferred method on obtaining the self-screening kits.

For the volunteers of LoveYourself, key messages regarding information about HIV, counseling messages, and promotion of the service through online and offline channels should be done. All informants agreed that they will go to the clinic for confirmatory testing and treatment should they turn reactive on the kit.

CONCLUSIONS: All participants of the discussions are accepting of the mechanism of how HIV self-screening works. Key messages are crucial in making the service effective in reaching the key population. Results of the conversations will be part of the efforts to establish the formative assessment to inform national and local stakeholders in the implementation of HIV self-screening in the Philippines.

MOPED566

Improving PrEP research with transgender women: Lessons from a social network adherence trial in Peru

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BACKGROUND: Transgender women (TW) worldwide have multiple unmet HIV prevention needs. While PrEP is a critical HIV prevention tool, PrEP research with TW has been limited. Addressing this gap, we conducted qualitative process evaluation interviews with TW participants in a social network-based PrEP adherence study in Lima, Peru.

METHODS: We conducted 34 evaluation interviews (participant mean age: 28 years) between April-May 2018. Study participants were recruited from numerous research stages: peer facilitators (n=4); participants who were eligible but did not enroll (n=8); participants who enrolled but dropped out (n=6); and participants who completed the intervention (n=16). Analysis was conducted using Dedoose (v.6.1.18) and guided by immersion crystallization.

RESULTS: Emergent themes were grouped to improve recruitment and retention. Participation barriers included: geographic distance between TW home/work areas and the study site, transportation difficulties (i.e., sprawling urban geography, safety concerns related to transphobia and stigma encountered in public transportation), daytime appointments and lengthy study visits that conflicted with daily routines, and opportunity costs of attending appointments (i.e., lost wages with low economic remuneration from incentives).

Despite efforts to tailor the intervention to TW, participants voiced both research fatigue and a perception that even clinical trials designed for TW are not ultimately for their benefit. Participants suggested modifications to study procedures to improve structural access within local socioeconomic contexts and to ensure culturally appropriate settings and procedures for TW, including: closer geographic proximity of assessment

sites, extended clinic hours with evening appointment times, greater representation of TW among both research and clinic staff, and streamlined research procedures that minimize time demands.

Outreach and education directed to TW not previously engaged in research was recommended to decrease negative community perceptions of clinical trial practices and social stigma associated with study participation.

CONCLUSIONS: Our results highlight the need to address local realities of safety, urban geography, social stigma, and participant lifestyles in study design to minimize the burdens and maximize the benefits of study participation. Dynamic and flexible research processes are needed to develop collaborative research relationships with TW participants and communities and address the use of PrEP as an HIV prevention tool specifically for TW.

MOPED567

Correlates of missed visits by participants enrolled in a HIV prevention clinical trial in Eldoret Kenya

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BACKGROUND: Attending scheduled clinic appointments by study participants is a key operational aspect in clinical trials. Keeping clinic appointments is not only associated with medication adherence but also improved patient outcomes. Appointment attendance may be used as a proxy to measure study drug adherence. This study sought to identify the factors associated with missing at least one visit among participants enrolled in the HSV/HIV Transmission Study, Eldoret Site.

METHODS: Descriptive statistics for categorical and continuous variables were used to summarize data. Association between categorical variables was assessed using Pearson's Chi-square test. Continuous variables were compared using two-sample Wilcoxon rank sum test. Relationship between the binary outcome (missing a clinic visit) and independent variables was assessed using logistic regression model. We reported the adjusted odds ratios (AOR) alongside the 95% confidence intervals.

RESULTS: The median age was 33 years (IQR: 28-39). More than half (57%) of participants came from formal settlements and half of them travelled more than 100 kilometers to get to the study site. Up to 96% were married and 58% had at most 8 years of education. Among 178 (39%) who were earning an income, the median monthly income was Kenya shillings 4000 (IQR: 2000-8000). 182 participants (39%) missed at least one clinic visit. The median number of missed visits was 2 (IQR: 1-4). More female participants missed at least a visit (45% vs 34%). Fifty seven percent of participants who reported social harm missed at least a visit. HIV status and distance > 100km to the clinic were associated with increased odds of missing at least 1 visit; AOR: 7.40 (95% CI: 3.95, 13.84); AOR: 4.49 (95% CI: 2.07, 9.73) respectively. Having more children (x children vs x+1 children) was associated with reduced odds of missing at least 1 visit, AOR: 0.84 (95% CI: 0.73, 0.96).

CONCLUSIONS: HIV status, distance of more than 100 kilometers and number of children were associated with missing at least one visit among individuals in HIV-1 sero-discordant relationships participating in the HIV prevention clinical trial in Eldoret.

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Operational challenges in implementing HIV services

MOPED568

Organizational structure of the HIV care continuum in Mexico: A social network analysis

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BACKGROUND: The HIV care continuum implies the existence of a HIV health care delivery system integrated with several diverse entities that collaborate and cooperate, in order for those diagnosed with HIV to reach viral suppression. This study presents a social network analysis of this complex, but essential aspect of the health care delivery. We provide a characterization of the network structure in each step of the HIV care continuum.

METHODS: We defined a network as a set of interactions formed by nodes, representing the actors and organizations that participate in the provision of HIV services, and edges, representing the relationships established within those entities. Data were collected through an online survey to in-charge HIV facility managers. The survey was designed based on the analysis of 40 semi-structured interviews with health providers in 12 Mexican cities. The survey asked facility managers to identify the set of collaborative or cooperative relations established in 2017, and to assess them in terms of their effectiveness. We analyzed and visualized each network configuration in each step of the cascade. Centrality measures were obtained and key players characterized.

RESULTS: 486 unique and diverse nodes were identified. They included: hospitals; community and social-based organizations, national and international; private and public organizations, and government institutions. In each step of the cascade, it was possible to distinguish a different type of network structure. Civil society organizations were key players for HIV testing; referral to health services and HIV treatment adherence. The National Agency for the Control of AIDS (CENSIDA) has one of the highest degree of centrality, as expected, but its closeness centrality with several HIV facilities was low. The latter indicates that farther the distance to CENSIDA, the lower the connection with other nodes and, therefore, lower their capacity to access to resources.

CONCLUSIONS: Diverse entities participate in the HIV care continuum in Mexico. The analysis of the HIV networks is a powerful tool to better understand the configuration of these entities, their roles and influence in the provision of HIV services. Moreover, this understanding will inform the design of mechanisms to enhance the efficiency and effectiveness of these services.

MOPED569

Using expert patients to Scale up HIV Viral Load testing in resource limited settings in United Republic of Tanzania

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BACKGROUND: Plasma samples remain the gold standard for monitoring HIV Viral Load (HVL) among patients on antiretroviral treatment (ART). Paucity of testing laboratories, human resource shortage and specimen transportation challenges impede access of HVL monitoring in Tanzania. Routine HVL monitoring started in 2016. The country scaled up HVL test-

ing capacity to 17 (from six) laboratories serving 1,490 health facilities (HFs). Hub and spoke system facilitates specimen referral and testing countrywide.

Tanzania Health Promotion Support (THPS) engaged people living with HIV (PLHIV) who are trained peer educators (PEs) to facilitate HVL sample transportation and results feedback in Kigoma and Pwani regions with no testing laboratories and 90 % of supported HFs in remote locations.

METHODS: Selection and training of 363 PEs, deployment of laboratory interns and standardized sample collection under one-roof care and treatment clinics (CTCs), and not at laboratory settings which had challenges of delaying clients as they had to queue with other general patients waiting for laboratory services. In addition, THPS instituted weekly data reporting on HVL to monitor progress. The PEs were introduced to spokes, hubs and testing laboratories for transporting samples and results using public transport. Average distance was 40 km, with maximum travel time of eight hours. Triple packaged samples with temperature monitors in cooler containers were used. Data on samples collected, transported, tested, rejection rate, results turnaround time (TAT) was recorded.

RESULTS: Among 42,406 current clients on ART eligible for HVL testing, samples were collected from 38,332 clients by September 2018. Coverage of eligible clients with HVL monitoring increased from 24% in 2016 to 90% in 2018 with TAT maintained within 14 days. Of the tested clients, 87% had viral suppression. Sample rejection rate was 1.4%, these were communicated to HFs for re-collection and testing; 98% of the samples were resubmitted.

CONCLUSIONS: Expert PEs can serve as reliable transport agents in remote areas; allowing health providers to dedicate time on clinical care services. Adopting this practice in resource limited settings contributes towards reaching the UNAIDS global 3rd 90 target.

MOPED570

I-SURGE, a new implementation strategy to optimize HIV services in Luanda, Angola

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BACKGROUND: With an HIV prevalence of 2% and ART treatment coverage of 26%, Angola's health system aims to improve efficiency and effectiveness of HIV service delivery towards epidemic control. ICAP at Columbia University implemented a novel strategy called I-Surge, a comprehensive multi-pronged approach to optimize health and human resources in clinics and communities.

METHODS: I-surge implementation at two ICAP-supported sites in Angola started in April 2018 based on a "pull-push-hold on" approach to enhance services across the HIV care cascade at health facilities (pull); redesign testing and treatment interventions in communities (push); and target interventions to boost retention (hold on). Efforts included daily monitoring of key data elements; expanded index case testing; deployment of patient navigators to counsel and escort patients between services; revised patient, lab, and pharmacy flows; expanded same-day ART initiation; and active phone follow-up. To assess change, we compared routinely collected aggregate data from Q2: Jan-Mar vs. Q3: Apr-Jun 2018.

RESULTS: Following implementation of the I-Surge strategy the number of people tested for HIV increased 42% from 8,465 in Q2 to 12,045 in Q3, including a 68% increase in the number of children < 15 tested, (463 to 780). There was a 125% increase in linkage to treatment among patients newly identified as HIV positive, from 32% in Q2 to 72% in Q3, and a 62% increase in the total number initiating ART, (402 to 651). The number of viral load tests increased by 85%, from 645 viral load tests to 1,192 conducted in Q3.

CONCLUSIONS: The first results of ICAP's I-Surge strategy in Angola are encouraging. Through immediate identification of missed opportunities to test, treat and retain, I-Surge allows for immediate recognition of gaps in service delivery to achieve 95-95-95 goals. I-Surge contributes by identifying efficiencies across the major components of the health systems in order to provide more effective HIV services including access, coverage and quality of service delivery. ICAP continues to work with the Angolan government to bring I-Surge to scale.

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Socio-economic challenges in implementing HIV services

MOPED571

Effects of the community responses program on HIV testing and treatment for men and women: Findings from a randomized controlled trial in informal settlements in KwaZulu-Natal, South Africa

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BACKGROUND: We report preliminary findings on the effectiveness of the *Asibonisane* Community Responses (CR) program, which aims to prevent HIV transmission, reduce intimate partner violence, and increase HIV service utilization through community outreach efforts in informal settlements, where barriers to reaching the 90-90-90 goals may differ from the rest of the country.

METHODS: A stepped-wedge randomized evaluation was conducted in 18 informal settlements in KwaZulu-Natal where the CR program was being implemented. Program rollout was randomized across evaluation sites allowing for comparisons between control and intervention areas. Using a two-stage random sampling approach, we interviewed 768 women ages 18-24 and 758 men ages 18-35 in early 2017. We conducted two cohort follow-up rounds at seven-month intervals; a final round is underway. We report results from round 3 of data collection; results will integrate data from the final round, and account for baseline levels of testing and treatment.

RESULTS: Respondents reported high levels of economic insecurity and mobility: at baseline, 40% of women and 27% of men had moved within the last two years. In control communities, women (66%) were more likely than men (66% vs. 45%) to report being tested for HIV, and being on ARV treatment (97% vs. 73%) in the last six months, among those who reported being HIV positive. At follow-up, men in intervention communities were significantly more likely than men in control communities to report having been tested for HIV (55% vs. 45%, $p=0.04$) and to report being on ARV treatment (95% vs. 73%, $p=0.02$) in the last six months. We found no effects on testing or treatment for women.

CONCLUSIONS: Levels of HIV testing indicate that both men and women fall considerably short of the 90% target of knowing their status; treatment levels for men also fall short of the 90% target. Preliminary findings from the evaluation indicate promising results in both testing and treatment for men, an often difficult to reach population. We find no significant program effects for women. This study adds to the growing evidence base on approaches to achieving the 90:90:90 targets, with a focus on a highly vulnerable population.

MOPED572

The Kanyakla study: Randomized controlled trial of a microclinic social network intervention for promoting engagement and retention in HIV care in rural western Kenya

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BACKGROUND: Up to one-third of persons living with HIV in sub-Saharan Africa experience a treatment lapse within three years of starting therapy. Existing social relationships are a potential source of "social capital" that can enhance material, psychological, and logistical support for sustained

treatment retention. Microclinics are informal social network-based groups that leverage existing social relations to support HIV treatment and prevention. Microclinics undergo education sessions led by community health workers, followed by group HIV-status disclosure. Previous studies found a 50% reduction in disengagement from care associated with an offer to join a Microclinic group. Here, we sought to understand their effectiveness in a real-world clinical environment.

METHODS: In nine rural health facilities in western Kenya, we randomized persons living with HIV with a recent missed clinic visit (defined as ≥ 3 days late to an appointment) to either participation in a Microclinic or usual care (ClinicalTrials.gov NCT02474992). Our primary outcome was disengagement from care, defined as incidence of ≥ 90 day absence from care after a missed visit, and was assessed using routine clinic records at all clinics where patients accessed care.

RESULTS: Of 351 eligible patients, we enrolled 304 (88%) into the trial. 154 participants were randomized to the intervention, of whom 107 (69%) participated in a Microclinic. Over two years of follow-up, 36 (23%) intervention participants and 32 (21%) control participants disengaged from care for ≥ 90 days (unadjusted hazard ratio (HR) 1.11, 95%CI 0.72-1.71). Limiting the analysis to the 107 persons in the intervention arm who participated in a Microclinic did not change our results (HR 0.87, 95%CI 0.58-1.31).

CONCLUSIONS: In a pragmatic randomized trial in rural western Kenya, we found no effect of the offer of Microclinic participation on disengagement. Uptake of the intervention was sub-optimal. Measurement challenges associated with use of routine clinic records may also limit conclusions. Additional assessment of implementation outcomes and qualitative data are in progress.

MOPED573

Does intimate partner violence affect implementation of HIV services? A cross-sectional analysis of HIV-infected women in Coastal Kenya

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BACKGROUND: Intimate partner violence (IPV) and HIV continue to be public health challenges worldwide and in Kenya. It is estimated that 47% of Kenyan women have experienced IPV. HIV disproportionately affects women in Kenya. The national adult HIV prevalence is estimated to be 5.2% in women as opposed to 4.5% in men. The aim of this study was to investigate the effect of IPV on implementation of HIV services among HIV infected women in Coastal Kenya.

METHODS: This was a community-based cross-sectional survey conducted in Magarini Sub-County of Coastal Kenya from July to December 2018. Multistage cluster sampling was used to recruit 385 HIV infected women on treatment from seven villages. A validated structured questionnaire was used to collect data on predefined variables. The association between IPV and selected ART services was measured using multivariable regression, after adjusting for covariates. Ethical considerations were observed in accordance with the principles of the Declaration of Helsinki.

RESULTS: Out of the 320 women that consented to participate in the study, 45% had experienced IPV in the past two years. Physical violence was the most common form (53%) followed by emotional abuse (30%). The median age of the participants was 31.6 years. Sixty percent of the respondents had completed primary level education while 25% had no formal education. HIV infected women who experienced IPV were less likely to: register for care in a HIV clinic (OR 0.29; 95% CI (0.12-0.48)), adhere to clinic appointments (OR 0.54; 95% CI (0.17 - 0.86)), take medications as prescribed (OR 0.47; 95% CI (0.09 - 0.82)), attend support group meetings (OR 0.28; 95% CI (0.13 - 0.76)) and negotiate for condom use with their partner (OR 0.60; 95% CI (0.21 - 0.90)).

CONCLUSIONS: IPV implementation of HIV services among HIV infected women. To achieve optimal treatment outcomes in this population, there is an urgent need to design context-specific evidence informed strategies

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to prevent IPV. Further studies to investigate the predisposing factors of IPV might be useful in proposing interventions that target the root causes of this vice.

MOPED574

Cost-effectiveness of index HIV self-testing to reach male partners in Malawi

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BACKGROUND: Testing high-risk men is critical to reach UNAIDS 95-95-95 targets. Index partner HIV self-testing (HIVST) increased testing among male partners in Malawi. We assessed the cost-effectiveness of index-HIVST compared to standard partner referral slips (PRS) for men using the combination of a decision analytic model and trial outcomes. Cost per male tested positive and cost per male newly initiated ART was modeled for HIVST and PRS.

METHODS: We used data from a trial comparing index-HIVST to PRS among partners of ART clients at 3 district hospitals in Malawi. Testing outcomes were measured through follow-up surveys with enrolled ART clients. ART initiation was measured through medical chart reviews at 35 surrounding facilities. We parametrized a decision-analytic model based on trial results. Cost estimates were derived from micro-costing of a companion facility-based HIVST trial in Malawi. Cost of HIVST (HIVST kit (\$2), counseling, confirmatory testing) and PRS (counseling, facility-based testing) per male partner newly aware of their status and per ART initiation were used to determine the cost per outcome for male partners.

RESULTS: Among all male partners enrolled in HIVST arm, 90%(182/204) received HIVST, 66%(135/204) tested for HIV, 14%(28/204) tested positive, and 3%(7/204) initiated ART. Among men enrolled in the PRS arm, 90%(73/81) received PRS, 22%(18/81) tested for HIV, 5%(4/81) tested positive, and 4%(3/81) initiated ART. Cost per new positive was \$14.90 for PRS and \$16.11 for HIVST. Cost per ART initiation was \$14.90 and \$68.27 for PRS and HIVST, respectively. Higher initiation costs for HIVST were due to lower rates of linkage to care and ART initiation within the HIVST arm. Threshold analysis indicated that only when linkage is 100% and the price of HIVST test kit is reduced to \$1.30 does index-HIVST become cost-saving compared to PRS

CONCLUSIONS: Cost per new positive identified is similar for index-HIVST and PRS. However, as it stands, PRS may be a more efficient way to initiate men on ART compared to index-HIVST in Malawi. In order for index-HIVST to be a competitive modality to engage men across the HIV treatment cascade, novel successful patient linking strategies and community awareness are required.

MOPED575

Characteristics of sex workers who have never been tested for HIV: Analysis of bio behavioral data from Ukraine

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BACKGROUND: Despite the progress of Ukraine towards UNAIDS 90-90-90 targets, the first target is the most worrisome: only 56% of the estimated 244 000 people living with HIV know their HIV status. National program is looking for strategies to bridge this gap. This analysis aims to examine the characteristics of the sub-group of sex workers (SW) who have never been tested for HIV.

METHODS: We analyzed cross-sectional bio behavioral study data collected in 2017-2018 in Ukraine among SW who were above 15 years old and provided sex services during the last 30 days (N=5043). We used de-

scriptive statistics to find special characteristics of SW who were never HIV tested for HIV and Chi-square test to assess the significance between groups using SPSS.

RESULTS: Out of the 5043 study participants, 22.7% reported that they have never been tested for HIV (NTHIV). The largest proportion of them (42.3%) were under 25 years old while in the group of those who reported testing, SW under 25 years old made 18.3% (p-value< 0.001). 58.7% NTHIV had wrong knowledge about modes of HIV transmission vs 45.6% of those who were tested (p-value< 0.001).

NTHIV provided sex services in entertainment facilities (24.1% vs 19.5% among tested for HIV), on the streets (23.2% vs 28.5% among tested for HIV) or escort/Internet (20.6% vs 13.7%), (p-value <0.001).

One third of SW NTHIV have not visited any medical facility during the last 12 months (28.3%) vs 46.5% who tested visited at least once (p-value <0.001). Other characteristics of the SW NTHIV were similar to the group of SW who reported HIV testing (income, migration, types of clients, group sex, injecting drug use, violence experience).

CONCLUSIONS: The study reveals that young SW of < 25 years soliciting at street; entertainment facilities; or through internet and rarely visiting medical facilities being left out of testing services. It is recommended to strengthen physical and internet outreach to effectively reach and test this population to bridge the testing gap. The medical care system may be sensitized to cover young SW.

Uptake of HIV testing

MOPED576

Acceptability of routinely offered paediatric HIV testing at paediatric outpatient clinics in an urban public hospital in Nairobi, Kenya

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BACKGROUND: Routine screening for HIV is a timely and cost-effective diagnostic strategy. Typically low uptake rates and missed opportunities have been observed among children in the outpatient setting. This study sought to determine the acceptability of routinely offered HIV testing and associated factors among children attending pediatric outpatient clinics.

METHODS: The study was conducted among children aged 0-15 years at paediatric outpatient clinics of a primary care public hospital in Nairobi County, Kenya from June 2017 to August 2017. Using a cross-sectional survey method, caregivers of consecutive children accessing out-patient care were offered study participation which included a standard interview to collect socio-demographic characteristics and routine offer of HIV testing and counseling for the child/ caregiver pair. Acceptability of HIV testing was computed as proportion of children tested. Children who were tested were compared to those who were not tested to determine factors associated with test acceptance. Quantitative data was analyzed using bivariate and multivariate logistic regression methods in SPSS 18.0 statistical software.

RESULTS: A total of 333 children/care giver pairs were recruited. The overall acceptability of routinely offered pediatric HIV testing was 8.41%. Lack of perceived risk of HIV infection (67.88%) and the need for more time to think (21.19%) were cited as reasons for not accepting testing. Caregivers disclosing their HIV status to their siblings and those with previous HIV testing were 7.6 times and 3.3 times more likely to accept child HIV testing than those disclosing to their spouses or not previously tested;(AOR=7.60; 95%CI: 1.23-46.78; p=0.029) and (AOR=3.33; 95%CI: 1.10 - 10.12; p=0.034) respectively. Children aged above 10 years were 9.85 times more likely to be tested than those less than 1 year (AOR= 9.85; 95% CI: 1.36 - 71.07, p=0.023).

CONCLUSIONS: There is low uptake of routinely offered pediatric HIV testing in the outpatient setting. Further studies are required to develop strategies to optimize uptake of HIV testing among children in this setting.

MOPED577

University clinic HIV testing services versus external service providers' HIV testing services: A study of students' preferences for HIV testing services at 2 State Universities in Zimbabwe

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BACKGROUND: Students' access to HIV testing services in tertiary institutions of Zimbabwe has remained low regardless of efforts by the Ministry of Health and Child Care to make all State University Clinics official HIV Testing Sites. Questions are raised as to what other factors are contributing to the low uptake of HIV testing services in University Clinics regardless of the availability of the service at the University Clinic. SAY-WHAT, a local Private Voluntary Organization in Zimbabwe, carried out a comparative study with the objective to establish student preferences for HIV testing between the University Clinic HIV testing and External HIV testing service providers in 2 State Universities in Zimbabwe.

METHODS: A pre-tested semi-structures questionnaire was administered to 234 randomly selected students at 2 State Universities in Zimbabwe (Manicaland State University of Applied Sciences (117) and Great Zimbabwe University (117)).

RESULTS: Out of the 234 student respondents, 201 students (86%) preferred to be tested for HIV by external HIV testing service providers to being tested by the University Clinic nurses whereas a total of 33 students (14%) preferred to be tested for HIV by the University Clinic nurses. Students who preferred external HIV testing service providers identified breach of confidentiality, lack of a youth-friendly approach to students, generation gap between student clients and nurses, and lack of professionalism by university nurses as key deterrents to accessing HIV testing services from the University clinics. They preferred external HIV service providers because of "perceived respect for client confidentiality" and because the external HIV service providers are not "in constant contact" with the university community. Those who preferred the University Clinic HIV testing services identified factors such as 'easy access' and 'convenience' compared to external service providers who only visit the university 'when invited' by the University Clinic.

CONCLUSIONS: State Universities to invest in training of University Nurses on Student Friendly HIV services provision to increase student access to HIV testing services. State Universities can consider employing younger nurses who relate better with students. State universities can also consider partnering with more external HIV service providers to provide mobile HIV testing services to students on a regular basis.

MOPED578

Persuaded HIV self-testing during community-based distribution of self-test kits: A population-based survey and nested qualitative study in Zimbabwe

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BACKGROUND: HIV self-testing (HIVST) enables novel implementation strategies that can carry unintended consequences. While introducing HIVST to rural Zimbabwe through community-based distribution, we investigated "persuaded-testing" (feeling unable to refuse a test kit).

METHODS: Trained community volunteers (CV) in 38 rural wards offered HIVST kits door-to-door to individuals aged ≥ 16 years old. A representative population-based survey 6-8 weeks after kit distribution included questions about persuaded-testing. Predictors of persuaded-testing were investigated using multivariable logistic regression, with random effects for

wards and households. 26 in-depth interviews, and 15 audio-diaries were held with CV and 31 in-depth interviews and 16 focus group discussions with community members to explore views on HIVST, with data analysed thematically.

RESULTS: Of 3,724 survey participants receiving self-test kits, 1,061 (28.5%, 95%CI 271-30.0) reported persuaded-testing, with men (33.2%), young people < 25 years (48.5%), apostolic faith (30.7%) and better educated at highest risk (figure).

Factor	N (%)	Persuaded number (%)	Unadjusted OR (95% CI)	p	Adjusted OR (95% CI)	p
Male	1,336 (35.9)	444 (33.2)	1		1	
Female	2,388 (64.1)	617 (25.8)	0.69 (0.58-0.81)	<0.001	0.82 (0.68-0.99)	0.04
Age ≥ 25 years	2,740 (73.8)	586 (21.4)	1		1	
Age <25 years	973 (26.2)	472 (48.5)	4.20 (3.43-5.15)	<0.001	3.22 (2.52-4.13)	<0.001
Married	1,392 (64.2)	605 (27.0)	1		1	
Never married	723 (19.4)	322 (44.5)	2.67 (2.15-3.31)	<0.001	1.02 (0.77-1.34)	0.002
Widowed/separated/divorced	608 (16.4)	91 (15.4)	0.46 (0.35-0.61)		0.60 (0.45-0.80)	
Not of apostolic religion	2,385 (64.0)	650 (27.5)	1		1	
Apostolic religion	1,339 (36.0)	411 (30.7)	1.21 (1.02-1.44)	0.03	1.33 (1.10-1.61)	0.003
None/primary education	1,504 (40.4)	249 (16.6)	1		1	
Some secondary education	1,014 (27.2)	375 (37.0)	3.36 (2.69-4.20)	<0.001	2.46 (1.95-3.10)	<0.001
Ordinary level & above	1,206 (32.4)	437 (36.2)	3.34 (2.67-4.17)		2.43 (1.93-3.07)	

[Factors associated with persuaded-testing (all factors in final multivariable model)]

Most persuaded (68.5%) and other self-testers (61.9%, $p < 0.001$) had previously tested for HIV. Persuading was by spouses ($n=517$), parents/caregivers ($n=272$) and CV ($n=122$) - multiple responses possible. Non-use of HIVST kits was 7.7% for persuaded-testers and 2.0% for other self-testers ($p < 0.001$). Only 37/3,593 (1%) self-testers perceived adverse consequences, including 12 persuaded-testers. However, irrespective of HIV status ($p=0.67$), 87/984 (8.8%) of persuaded-testers regretted testing. In qualitative interviews/focus groups women openly admitted pressuring their partners; CVs corroborated this. Offering HIVST to young people in the presence of caregivers affected both acceptance and refusal of kits.

CONCLUSIONS: Persuaded acceptance of HIVST kits was common among kit recipients in rural Zimbabwe, especially in groups with traditionally low uptake of HIV testing. Once accepted most kits were used, but with some regrets. While some encouragement may be welcome and have individual/public health benefits, couples need clear messages to avoid over-pressuring partners. For adolescents, HIVST may need to be offered in absence of caregivers.

MOPED579

Barriers and innovative solutions to achieve the first "90" of HIV care cascade in Ukraine

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BACKGROUND: Suboptimal HIV detection leads to poor engagement in HIV care. In Ukraine, 43% of PWID and 42% of MSM living with HIV are not aware of their status [IBBS, 2018]. These key populations (KPs) significantly contribute to continued spread of HIV infection. Exploring barriers and facilitators to HIV testing among KPs in Ukraine will inform strategies enabling them to be diagnosed and treated sooner.

METHODS: In July-September 2018, we conducted qualitative interviews with 43 PWID and 20 MSM (receiving and not receiving HIV services) and HIV care providers in Kyiv, Dnipro, and Odesa cities. Interviews were transcribed verbatim, imported into MAXQDA, and inductively analyzed for themes.

RESULTS: Median age of PWID was 38 years, and 17 (39.5%) were females; median age of MSM was 31. 12 physicians and 11 community-based organizations' staff participated in the interviews. Thematic analyses concurred that across all cities, conventional HIV testing of PWID clients of mobile clinics and needle exchange programs demonstrated very limited yield in new case finding ("we found 2 HIV cases in 8 months"), while index testing (testing of HIV-positive PWID' sexual or injecting partners in PEPFAR-funded interventions) detected "20 positives within a month". While physicians recommended engaging KPs in HIV services via TV and billboard advertising, MSM considered social networks and dating applications to be more appropriate in providing HIV testing information. For PWID, the main source of HIV-related information was their social circle (mostly peers). According to providers and KPs, the main concern for MSM

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accessing HIV services was fear of confidentiality breach, while monetary reimbursement was named as the best motivator for PWID to access HIV services.

CONCLUSIONS: These data demonstrate that traditional approaches to HIV case finding may have exhausted their capacity and are not appropriate for reaching the remaining undiagnosed subgroups of HIV-positive KPs. To find new HIV cases among KPs and engage them in care, we should implement novel testing modalities and utilize appropriate communication channels. Scaling-up targeted interventions such as Index-Testing and Enhanced Peer Outreach for PWID, as well as Index and Self-Testing among MSM, might improve the first "90" of the HIV care cascade.

MOPED580

Facility optimization: Use of safe spaces to increase access to HIV testing services among MSM in Kisumu County, Kenya

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BACKGROUND: Key populations (KPs) in Kenya have a substantially increased risk of HIV compared to the general population. Though Kenya has embraced the use of safe spaces within drop-in centers (DICs) as a means of providing HIV prevention services to KPs, gaps remain in the centers' use. The LINKAGES/Kenya program—led by FHI 360 and supported by USAID and PEPFAR—implemented a facility optimization rapid response initiative to enhance DIC attendance in Kisumu County, Kenya.

METHODS: Facility optimization is a multifaceted strategy that was piloted at a DIC serving men who have sex with men (MSM) in Kisumu, Kenya. Peer educators (PEs) mobilized their peers daily with each PE assigned a specific day for their peers to access services at the DIC. Contact was made through telephone conversations, social media, and one-on-one interactions at hot spots. At the DIC, KP members were provided with health education and offered HIV testing services (HTS). In consultation with KP members, the DIC implemented thematic days, which included PrEP days, coffee Mondays, and movie Fridays. During these days, a dedicated PE and clinician provided health talks and HTS. Informal interviews were held with MSM to determine reasons for visiting the DIC. Descriptive statistics were used to summarize uptake of DIC services.

RESULTS: From August through September 2018, 15 PEs mobilized 606 MSM to visit the DIC, of whom 582 (96%) received an HIV test—a 74% increase over the number tested at the DIC in the preceding two months. Of those tested, 121 (21%) received an HIV test for the first time. Twenty-four MSM (4%) were newly diagnosed with HIV, representing a four-fold increase compared to those diagnosed in the preceding two months. The majority of the men indicated that theme days, particularly movie Fridays, were a key attraction to accessing the DIC; 30% received an HIV test after watching a movie on Fridays.

CONCLUSIONS: Use of safe spaces at the DIC greatly increases access to HTS and identification of HTS-naïve MSM. Community participation plays a key role in uptake of DIC services and should be encouraged in KP programming.

MOPED581

Routine HIV testing and suicide risk

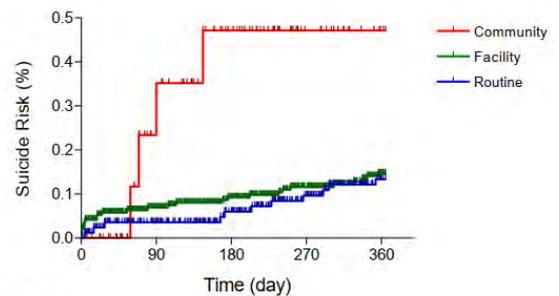
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BACKGROUND: To facilitate early detection and treatment of HIV infection, routine HIV testing was recommended by US Centers of Disease Control and Prevention in 2006 and later endorsed by US Preventive Services Task Force in 2012. However, whether routine HIV testing directly improves patient survival or, on the contrary, actually causes harm remains unclear.

METHODS: We analysed the nationwide population-based HIV/AIDS registry and follow-up database in Taiwan. We compared outcomes of patients diagnosed under routine HIV testing scenarios and that of patient diagnosed under non-routine facility-based (hospital) or community-based (outreach) testing scenarios in term of late HIV diagnosis, 5-year mortality, and 1-year suicide rate. Effects of late HIV diagnosis, age, sex, transmission categories, year of diagnosis, and social economic status on the outcomes were adjusted by multivariable logistic or Cox regression.

RESULTS: All the 28,674 Taiwanese patients diagnosed during 1984–2014 were included in the analysis. Compared with non-routine facility-based or non-routine community-based testing scenarios, routine HIV testing scenario is associated with the lowest suicide risk. After adjusting for covariates, routine HIV testing was still associated with a significantly lower likelihood of late diagnosis (aOR: 0.20, P < 0.001 and 0.61, P < 0.001), lower 5-year mortality (aOR: 0.60, P < 0.001 and 0.85, P = 0.41) and a lower 1-year suicide rate (aHR: 0.59, P = 0.26 and 0.23, P = 0.02), respectively.

CONCLUSIONS: Compared with non-routine HIV testing, routine HIV testing is associated with less harm and better clinical outcomes for people living with HIV.



	0	90	180	270	360
Community	879	845	819	783	764
Facility	19364	17816	17194	16601	16077
Routine	8431	8328	8237	8125	8028

[Kaplan-Meier estimate for suicide risk after HIV diagnosed, by different testing scenarios.]

HIV testing scenarios	Late HIV diagnosis			5-year mortality			Suicide within 1-year		
	aOR	95%CI	p	aOR*	95%CI	p	aHR*	95%CI	p
Routine vs Non-routine facility-based HIV testing	0.20	(0.18-0.23)	<.001	0.60	(0.52-0.69)	<.001	0.62	(0.25-1.52)	0.29
Routine vs Non-routine community-based HIV testing	0.61	(0.48-0.77)	<.001	0.85	(0.60-1.23)	0.41	0.23	(0.70-0.77)	0.02
Transmission routes									
MSM	1.00			1.00			1.00		
Heterosexual	1.60	(1.47-1.75)	<.001	1.50	(1.31-1.71)	<.001	0.70	(0.25-1.99)	0.50
IDU	0.14	(0.11-0.16)	<.001	2.75	(2.31-3.28)	<.001	0.62	(0.20-1.90)	0.40
Others †	1.55	(1.22-1.97)	<.001	14.85	(10.32-21.37)	<.001	2.51	(0.31-20.49)	0.39

aOR: adjusted odds ratio; aHR: adjusted hazard ratio; MSM: men who have sex with men; IDU: injection drug user
Bold font indicates statistically significant
All regression had adjusted for sex, age, living area, marriage status and occupation categories as well as matched by HIV diagnosed year
* after adjusting for late HIV diagnosis
† Other HIV transmission routes: blood transfusion (including hemophilia), mother-to-child transmission, and non-disclosure

[Outcomes after HIV diagnosis, by different HIV testing scenarios]

MOPED582

Comparison of potential effectiveness of universal testing versus index testing: Estimations from 4 years of data from the HPTN 071 (PopART) trial

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BACKGROUND: HPTN 071 (PopART) was a community randomized trial to measure the impact of offering a combined HIV-prevention package on the incidence of HIV. The HIV-prevention package included HIV-testing and was offered door-to-door (universal testing or UT) from January 2014 to December 2017.

Index testing (IT) aims to test sexual partners of patients registered at the HIV-clinic. We used data collected during the UT approach to estimate the potential impact of IT on knowledge of HIV-positive status.

METHODS: UT was offered in 8 intervention communities in Zambia in 3 consecutive annual rounds. During one annual round, all households in the community were visited at least once, all household members were enumerated and HIV-testing was offered to everyone. Re-visits were used to offer the intervention to household members that were absent at earlier visits. To estimate IT we defined an index case as a participant who self-reported being HIV-positive before testing was offered. We estimated IT by restricting data to household members of an index case. We compared acceptance and results of HIV-testing between this simulated IT approach and UT.

RESULTS: In annual round 1, the HIV-positivity rate was higher under IT (1,304/10,679, 12.2%) than under UT (9,196/126,208, 7.3%) and decreased for both IT and UT with higher testing coverage in annual round 2 and 3.

Compared to UT, IT would reduce the number of tests required by approximately 90%. However, over 80% of the HIV-positives diagnosed under UT would remain undiagnosed under IT. IT only identifies 14.2% (1,304/9,196) of HIV-positives found under UT in annual round 1, increasing to 17%-18% over subsequent rounds.

Among participants of the intervention, IT would have resulted in 61.6% of the HIV-positives knowing their status (UNAIDS "first 90") increasing to 83.6% if IT would have been done following 2 rounds of UT. UT identified 88.6% of HIV-positives in the first round, increasing to 96.7% after 3 rounds of UT.

CONCLUSIONS: Our data suggests index testing alone would be insufficient to reach UNAIDS "first 90" target and that a combination of strategies need to be deployed to increase coverage of the knowledge of HIV-positive status.

MOPED583

Utilisation patterns in male focused HIV testing services among rural men in KwaZulu-Natal, South Africa

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BACKGROUND: Male HIV testing rates (45%) are lower than women (59%). Men experience structural and gender related barriers to testing. Structural issues such as restricted access due to clinic intake cut-offs as early as 3pm and masculine norms that further inhibit access and uptake of health screening are barriers for men. In order to effectively target men in high HIV prevalence settings mobilisation and service provision has to be tailored for optimal uptake.

METHODS: The Zwakala-Ndoda study responds to structural and gender barriers in rural KwaZulu-Natal, South Africa combining male-focused mobilization, community-based mobile HTS, non-communicable disease screening (weight, BMI, cholesterol, blood-sugar and pressure assessments) and an incentive (US\$4) to encourage HTS.

RESULTS: Male focused community-based screening was offered between August 2017-December 2018 reaching 4607 individuals of whom 4596(99.8%) were men and 11(0.02%) were female. 39 men reported being on ART treatment during screening and took no further part. 4557 men participated with uptake in HTS and NCD at 96.36%(n=4391) and 97.96%(n=4464) respectively.

Men who participated were aged between 18-85, average age 29. Highest proportion of participants were aged 18-24 (n=1903, 43.34%), followed by 25-34 (n=1520, 34.62%), 35-44 (n=626, 14.26%), finally 45 and older (n=342, 7.79%). Prevalence was highest in the age group 35-44 (n=94, 15.02%) with Pearson χ^2 187.596(p.000).

Standard service availability was as early 9am to 5pm, with extended service offered as late as 7pm. The vast majority of participants accessed the service after 12 noon (n=4271, 92.9%) with peak utilisation between 3pm and 3:59pm (n=1436, 31.2%). 59.8%(n=2750) of participants accessed the service after 3pm with Pearson χ^2 52.307(p.000).

CONCLUSIONS: Men 35-44 have the highest prevalence yet are less likely to access the service. Utilisation peaks after 3pm which is outside of typical clinic access in rural KwaZulu Natal. The discrepancy between high prevalence groups among men and uptake of services; along with the demand for services outside of typical clinic access hours highlight the gender and structural barriers that remain an obstacle to men accessing health services. Continual tailoring and review of service is necessary to ensure that service demand is met.

MOPED584

Utilization of HIV testing and counselling services (HTS) among female sex workers (FSWs) in a limited resource setting

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BACKGROUND: FSWs is one of key populations at high risk of HIV infection in Nepal. The HTS is the critical component of the HIV care cascade to identify the new HIV positive cases and entry point for HIV treatment and care services. Improved accessibility and utilization of the HTS will support in reaching UNAIDS target of first 90 (90% of all FSWs living with HIV should know their HIV status) by 2020. The HTS services is provided free-of-cost to the FSWs in Nepal.

METHODS: In the study, 610 FSWs who were aged 16 years and above reporting to have been paid in cash or kind for sex with a male within the last 6 months were selected using two-stage cluster sampling method from 22 terai highway districts of Nepal. Behavioural data was collected through face-to-face interviews from 6th April 2018 to 2nd May 2018. The statistically significant associations between independent variables (age, establishment-based vs street-based, comprehensive knowledge on HIV and knowledge about the availability of HIV testing services) and utilization of HTS were computed using logistic regression.

RESULTS: The utilization of HTS was lower in the FSWs (31%). Younger FSWs (< 25 years) were less likely to non-utilization of HTS than older FSWs (25 years and above) [Odds Ratio (OR): 0.64, 95% Confidence Interval (CI), 0.42-0.97]. The street based FSWs were more likely to non-utilization of HTS compared to the establishment based FSWs [OR: 2.78, 95% CI, 1.47-5.29]. FSWs with lack of comprehensive knowledge on HIV were more likely for non-utilization of HTS [OR: 1.84 95% CI, 1.27-2.67]. Those FSWs who were not aware about the place of HTS sites were 20 times more likely for non-utilization of the HTS [OR: 20.23 95% CI, 8.77-46.69].

CONCLUSIONS: There is a need to aware FSWs about the available HTS services including improving their comprehensive knowledge of HIV and targeting more vulnerable FSWs (street based) need to be prioritized while implementing HTS in Nepal. Covering wider characteristics of FSWs will overcome the major gap of case identification in the treatment cascade in reaching first 90 of UNAIDS 90-90-90 targets by 2020.

MOPED585

Rapid test for HIV at the point of care in Buenos Aires City: A strategy for prevention and health promotion outside of the institutional walls

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BACKGROUND: Rapid Test (RT) for HIV is a simple and safe technique that can be implemented for uptake testing outside laboratories in the primary level of care, in community centres and multiple public spaces. Since 2015, the AIDS Program of the Ministry of Health of Buenos Aires City began a campaign of testing in public spaces with the aim of spread access to HIV diagnosis and decrease the late diagnosis of HIV, especially in populations that usually don't access to the health system.

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METHODS: Monthly campaigns were carried out, with the participation of the team of the testing centres in each area. The strategy includes counseling, free offer of condoms and a protected referral circuit for preliminary positive cases. Counseling about sexual health and contraceptive methods was included, with referral to the health system, and offer of emergency contraception and pregnancy test according to the needs of the consultants.

RESULTS: Up to December 2018, 6546 persons made the rapid test for HIV and in 49% of cases it was the first time. More than 60% of them made the test because they were passing through the place and 52% were male. Global Prevalence of positive cases was 1,34% and prevalence by specific groups was: heterosexual men = 0,8%; heterosexual women = 0,8%; MSM = 5,8% transgender female = 31%.

CONCLUSIONS: Offer of rapid test for HIV in public space resulted in a strategy with high level of acceptability the which could increase access to HIV diagnosis in those groups, such as heterosexual men who do not usually consult to health system.

This strategy was replicated by the teams of the testing centres who organized their own testing days in public spaces of their neighbourhoods increasing significantly the number of tests that they carried out. It's important to continue strengthening the implementation of RT for HIV in public spaces facilitating friendly circuits for people that usually do not access to the health system.

MOPED586

HIV self-testing in Zambia - an account of early lessons from multi-province program implementation scale-up

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BACKGROUND: HIV testing coverage stands at 68% among women and 64% among men in Zambia (ZAMPHIA, 2016). The Ministry of Health (MOH) made HIV self-testing national policy and launched its roll-out in August, 2018. The primary objective was to expand access to HIV testing among the less frequently tested populations, including men. While thousands of HIVST kits have been distributed in Zambia, key lessons on large-scale implementation to inform further scale-up, are yet to be documented.

METHODS: The USAID-funded USAID DISCOVER-Health project, is among the MOH partners that rolled-out HIVST between September and December, 2018. Out of 112 Project-supported sites in nine of the ten provinces of Zambia, 76 participated. Test kits were distributed to clients either as primary or secondary recipients, and clients opted for either assisted or unassisted modes of testing.

RESULTS: 4, 336 test kits were distributed during the four-month period, of these 2,932 clients (67.6 %) reported back their test results, with the majority (54.2%) being male, while 45.8% were female. A higher proportion (62.7%) opted for the assisted compared to 37.3% that chose the unassisted approach. More (58.7%) males opted for unassisted self-testing compared to 41.3% females. Among the secondary recipients, the majority (61.4%) were male, compared to 38.6% females. Overall HIV positivity yield among users stood at 4.3%, with 62.4% of the positives being female and 37.6% male. The majority (99.2%) self-reported the positive results within one week of undertaking the test compared to 0.8% that did so after one week. Majority (87.2%) of those that tested positive were immediately linked to further testing and ART (if confirmed positive) compared to 12.8% that opted to seek care elsewhere or later. Among those that opted for immediate linkage, the majority (67.9%) were female compared to 32.1% males.

CONCLUSIONS: With a higher proportion of men accessing HIV self-testing than women, HIVST has a potentially important role to play in enabling more men to get to know their status though more work needs to be done with regards to enabling men to be linked to further testing and care immediately after a positive self-test result including through differentiated service delivery.

MOPED587

Who self-reports never-testing for HIV after community-based distribution of HIV self-testing kits in Malawi, Zambia and Zimbabwe?

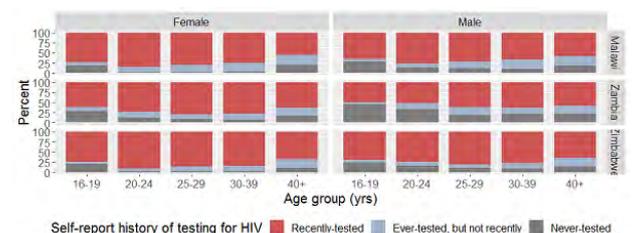
B. Hensen¹, P. Indravudh², E. Sibanda³, K. Fielding⁴, R. Chilongosi⁵, N. Handima⁶, K. Hatzold⁷, C. Johnson⁸, A. Mwinga⁹, M. Nalubamba⁹, M. Neuman⁴, L. Sigande⁶, D. Tsamwa⁶, M. Tumushime³, H. Ayles¹⁶, F. Cowan^{3,10}, E. Corbett^{1,11}

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BACKGROUND: HIV-testing is essential for entry into the HIV-treatment continuum and supports linkage to prevention services. In population-based surveys conducted after community-based distribution of HIV self-testing (HIVST) in rural Malawi and Zimbabwe and rural/peri-urban Zambia, 43%, 50% and 26% of individuals, respectively, reported ever-HIVST. We describe self-reported levels of never-testing for HIV and investigate individual-level characteristics associated with never-testing after community-based distribution of HIVST.

METHODS: Endline population-based survey data from three independent cluster-randomised trials of community-based distribution of HIVST kits in Malawi, Zambia and Zimbabwe were analysed. Analysis was restricted to data from clusters allocated the HIVST intervention in Malawi and Zambia, and all clusters in Zimbabwe, where both trial arms included HIVST distribution. We described the number and percentage of individuals never-testing by country, age and sex. We used logistic regression, adjusting for clustering by study clusters, to investigate whether sex, age, education, and marital status were associated with never-testing.

RESULTS: Self-reported levels of never-testing were: 13% (n=338/2581) in Malawi, 20% (n=487/2493) in Zambia, and 11% (n=811/7145) in Zimbabwe (overall: 13%; n=1636/12219). In all three countries, never-testing was higher among men (n=879/4865; 18%) than women (n=757/7354; 10%), and among individuals aged 16-19 (n=454/1844; 25%) and 40+ (n=663/4492; 15%) than individuals aged 25-29 (n=115/1476; 8%) and 30-39 (n=177/2501; 7%).



[Self-reported never-testing, ever-testing (but no recent-test) and recent-testing (defined as HIV-testing ≥ 1 -times in past 12-months) by country]

In all countries, levels of never-testing decreased with increasing educational attainment, and were higher among single than married/cohabiting individuals.

CONCLUSIONS: Despite distribution of free HIVST kits and availability of other HIV-testing services (HTS), 11%-20% of individuals had never-tested by country. HTS have reached women aged 20-39, but key demographic groups, including adolescents, individuals aged over 40-years, and men, remain unreached. Targeted HIVST distribution strategies that identify individuals in need of HTS within these key demographic groups and overcome specific barriers to HTS are needed to optimise the contribution of HIVST to combination HTS delivery strategies.

MOPED588

LIGHT initiative phase 1: Integration of HIV testing in glandular fever serology ordersets - simple, effective and sustainable intervention to increase HIV testing in line with UK and European guidelinesD. Hsu¹, M. Ruf², G. Leong³, S. Douthwaite¹¹Guy's and St Thomas' NHS Foundation Trust, Department of Infection, London, United Kingdom, ²Gilead Sciences, Medical Department, London, United Kingdom, ³Public Health England, London, United Kingdom

BACKGROUND: Despite guideline recommendations, concomitant HIV testing in patients who receive Glandular Fever screens (GFS) for mono-nucleosis-like illness in primary care has traditionally been poor in our area. Historically, local GFS serology ordersets included CMV, EBV and toxoplasmosis. The LIGHT (London Initiative for Glandular fever HIV Testing) phase 1, initiated in July 2014, aims to increase opt-out testing in primary care through modification of electronically requested serology ordersets in two high HIV prevalence boroughs in London.

METHODS: Primary care physicians request pathology tests either through traditional paper based requesting (PR) or electronically (ERoriginal). We created an electronic GFS orderset (ERmod) which included an opt-out HIV test for patients over 16 years (ERmod) and made this the default sign-posted electronic request. The GFS ERoriginal (without HIV) remained available to select via a searchable archive, and PR remained unchanged. Concomitant HIV testing practice with GFS requests after implementation of LIGHT, were compared to pre-LIGHT baseline data.

RESULTS: In 12 months pre-LIGHT baseline sample; 33% (295/880; 95% CI 30 to 38) of all (PR and ER) GFS requests included a concomitant HIV test; test positivity of 1.0% (3/295). The ordering behaviour and HIV detection rate post-LIGHT 20 month sample are summarized in the Table below.

Post-LIGHT (n=2342)	GFS			HIV			
	Tests ordered	No. Male	Median age (years)	Concomitant tests ordered	Positive	No. Male	Median age (years)
ERmod	1337 (57%)	574 (43%)	31	1328 (99%; 95% CI 94 to 105)	10 (0.8%)	9 (90%)	43 (range 30 - 58)
ERoriginal & PR	1005 (43%)	407 (49%)	29	250 (25%; 95% CI 22 to 28)	1 (0.4%)	1	32

[Table 1]

Where information was available, 57% of HIV diagnoses using ERmod tests were new diagnoses.

CONCLUSIONS: Our modification of laboratory requesting software significantly increased the rate of concomitantly ordered HIV tests in line with guideline recommendations. This simple, replicable and sustainable intervention targets patients presenting with an HIV indicator condition, potentially reducing onward transmission and offering an earlier diagnosis in primary care settings.

MOPED589

Uptake, knowledge, and quality of HIV testing and sexual and reproductive health services among adolescents enrolled in the girls achieve power trial: South AfricaC. Yah¹, N. Naidoo^{1,2}, A. Musekiwa¹, A. Kutwayo¹, M. Ndlovu¹, T. Mahuma¹, M. Ramadi¹, S. Mullick¹¹Wits Reproductive Health & HIV Institute (Wits RHI), Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa,²Wits Reproductive Health & HIV Institute (Wits RHI), Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa,

BACKGROUND: Gender inequalities, violence, multiple partners, intergenerational and transactional relationships, low HIV testing (HTS), uptake, and inadequate HIV prevention education keep adolescent girls at high risk of HIV acquisition. Knowledge of and access to HIV-testing-services (HTS) and sexual and reproductive health and rights (SRHR) services are key prevention strategies; however adolescent uptake of these services remains

low. This paper describes uptake, knowledge, and quality of HTS and SRHR services among adolescents' enrolled in the Girls Achieve Power-(GAP) cluster randomized trial in South Africa.

METHODS: We conducted a cross-sectional survey at baseline with grade 8 learners across 25 secondary schools in three townships in South Africa between April 2017 and September 2018. Descriptive and chi-square test statistics were used to summarize the data set using Stata 15.

RESULTS: Of the 2886 learners enrolled, 62.5% were girls; mean (SD) age of 13.6(1.0) years; and 92.1%(2772) were Black African. Over 70%(2035) knew they could get free HTS at public health facilities, accessing services without parental consent (58.4%); however 32.2%(908) were unaware of their right to access stigma-free services. Prevention knowledge was high i.e. 75% knew condoms prevent HIV/STIs (79.5% girls vs 71.9% boys; $p < 0.001$). A third of the learners knew where to access information on SRHR ($P < 0.015$) with almost half receiving family planning information. HIV/SRHR information was mainly provided by teachers(41.1%) and mothers, whilst only a small proportion reported receiving information from health-care workers(7%). Fifty nine percent of learners(1655) reported service uptake: 61.9% visiting for an acute illness; 10%(64 boys) circumcision, 3.4%(34 girls) requesting a pregnancy test, 2.5% for STIs screening and treatment and 1.9% HTS. Half of learners(817) were uncomfortable asking facility staff questions; 66.1%(1070) reported inadequate confidentiality during consultation. Only 18%(304) reported receiving education on contraceptive methods and STIs, 29.7%(492) on pregnancy during clinic visit. **CONCLUSIONS:** Knowledge of and access to HTS/SRHR services is not universal among adolescents. Prevention efforts should focus on improving knowledge and access to services through school and facility-based interventions, implement innovative linkage to care strategies and build the capacity of clinics to be more youth-friendly whilst also reducing missed opportunities to provide young people with care.

MOPED590

Too much of a good thing? Prevalence and determinants of frequent HIV testing in Zambia and MalawiM. Neuman¹, V. Cambiano², C. Johnson³, R. Chilongosi⁴, K. Fielding¹, K. Hatzold⁵, B. Hensen⁶, P. Indravudh⁷, M. Nalubamba⁸, E. Wilson⁷, H. Ayles^{9,10}, E.L. Corbett^{6,10}¹London School of Hygiene and Tropical Medicine, MRC Tropical Epidemiology Group, London, United Kingdom, ²University College London, London, United Kingdom, ³World Health Organization, Geneva, Switzerland, ⁴Population Services International, Lilongwe, Malawi, ⁵Population Services International, Johannesburg, South Africa, ⁶London School of Hygiene and Tropical Medicine, Faculty of Infectious and Tropical Disease, London, United Kingdom, ⁷London School of Hygiene and Tropical Medicine, London, United Kingdom, ⁸Population Services International, Lusaka, Zambia, ⁹Zambart, Lusaka, Zambia, ¹⁰Malawi-Liverpool Wellcome Trust Clinical Research Programme, Blantyre, Malawi

BACKGROUND: As countries approach the "First 90" of UN 90-90-90 targets, untargeted HIV testing, including frequent re-testing in low risk populations, becomes increasingly low yield. Here, we investigate frequent testing in general populations in Malawi and Zambia during 2 community-based HIV self-testing (CB-HIVST) trials.

METHODS: In Malawi and Zambia, 22 and 12 clinic catchment areas, respectively, were randomized to receive 12 months of CB-HIVST or standard clinic-based services, followed by endline household surveys. The following definitions were based on self-reported HIV testing in the past 12 months: recent testers (1-2 tests), frequent testers (3-4 tests), and very frequent testers (5+ tests). Multinomial logistic regression with standard errors adjusted for clustering was used to investigate associations with frequent and very frequent testing.

RESULTS: Of 10368 respondents with complete testing data, 6273 were recent HIV testers, including 1111 (17.7%) frequent testers and 179 (2.8%) very frequent testers. Frequent testing was associated with the highest household wealth tertile (adjusted OR [AOR]: 1.48; 95%CI: 1.10, 1.99), and with HIVST use (AOR men: 2.91; 95%CI: 2.33, 3.63; women: 1.85; 95%CI: 1.41, 2.41; interaction $p = 0.001$). Very frequent testing was associated with highest wealth tertile (AOR: 2.94; 95%CI: 1.65, 5.22), HIVST (AOR: 2.23; 95%CI: 1.25, 3.99 - no gender difference), fair or poor self-rated health (AOR: 1.43; 95%CI: 1.04, 1.97), and condom use with steady sexual partner (AOR: 1.72, 95%CI: 1.01, 2.91).

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CONCLUSIONS: Frequent testing was common and associated with greater likelihood of HIVST uptake from both men and women, and with healthier households. Very frequent testing was a potential marker of ill-health, being associated with poorer self-rated health. WHO guidelines for high HIV prevalence settings, encourage annual testing for adults at ongoing risk and 2-3 times per year for key populations in all settings. Our results suggest need to better understand individual to test frequently.

	Less frequent testers (1-2 tests/yr., N=4983) %	Frequent testers (3-4 tests/yr., N=1111) %	Very frequent testers (5+ tests/yr., N=179) %	Total (N=6273) % (N)	Frequent testers (3-4 tests/yr. v. 1-2 tests/yr.) AOR 95%CI	Frequent testers p-value	Very frequent testers (5+ tests/yr. v. 1-2 tests/yr.) AOR 95%CI	Very frequent testers p-value
Male gender (female = reference) main association	37.8	32.9	32.4	36.8 (2308)	0.68 (0.56, 0.82)	<0.001	0.91 (0.59, 1.40)	0.654
Self-tested in prior 12 months main association	22.5	41.4	44.1	26.6 (1615)	1.85 (1.41, 2.41)	<0.001	2.23 (1.25, 3.99)	0.007
Interaction - Male gender * self-tested	-	-	-	-	1.57 (1.21, 2.05)	0.001	1.04 (0.54, 2.02)	0.903
Self-reported health fair or poor	17.1	15	17.9	16.7 (1048)	1.03 (0.83, 1.27)	0.815	1.43 (1.04, 1.97)	0.029
Sexual behaviour with steady partners (no partner in 3 months = reference)* Condom always	34	30	31.8	33.2 (1919)	1.04 (0.82, 1.33)	0.745	1.72 (1.01, 2.91)	0.044
Condom sometimes or never	28.2	38.2	45.7	30.5 (2689)	0.99 (0.83, 1.20)	0.956	1.19 (0.72, 1.98)	0.493
Assets index (lowest tertile = reference) ** Second tertile	34	30	31.8	33.2 (1919)	1.06 (0.88, 1.27)	0.55	1.77 (1.16, 2.71)	0.008
Highest tertile	28.2	38.2	45.7	30.5 (1761)	1.48 (1.10, 1.99)	0.01	2.94 (1.65, 5.22)	<0.001

Additionally adjusted for age, educational attainment, having biological child, country, and study arm. Standard errors adjusted for clustered study design using the vce(cluster) of mlogit in Stata 15.1. Complete case analysis used. Missing data in the following covariates: educational attainment (n=2), self-testing status (n=230), self-reported health (n=10), sexual behaviour (n=137), assets tertile (n=819). Final n for multinomial model = 5537.
* Joint test of 2 sexual behaviour AORs among frequent testers: p=0.88; very frequent testers: p=0.12
** Joint test of 2 assets tertiles AORs among frequent testers: p=0.02; very frequent testers: p<0.001

[Sociodemographic and health characteristics associated with frequent and very frequent HIV testing among recent HIV testers, Malawi and Zambia]

MOPED591

Improving HIV testing and linkage to antiretroviral therapy among men through various male engagement strategies in Eswatini

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BACKGROUND: Men lag behind women in rates of accessing HIV services, especially HIV testing services (HTS). In Eswatini, 22.5% of men living with HIV do not know their status, compared to 11.4% of women.

METHODS: From October 2016 to September 2017, the USAID-funded AIDSFree Project implemented five initiatives targeted at testing men:

- 1) male-focused health days, wherein men, including male partners of HIV-positive women, were invited to six facilities for provision of male-focused health services, including HTS;
- 2) provider-initiated testing and counseling (PITC) skills-building among health workers at all participating facilities (n=63);
- 3) prison campaigns in three prisons, targeting HIV testing of male inmates and correctional officers;

- 4) police campaigns directed toward male officers; and
- 5) community outreach to male-dominated industries (e.g. mines, construction, plantations, etc.).

Most initiatives also provided other health services for men (e.g. tuberculosis, hypertension, and diabetes screening). Men identified as HIV-positive were offered antiretroviral therapy (ART). Using data from facility registers, each initiative was compared according to the number of men tested, the number testing HIV-positive, and linkage to care rates.

RESULTS: All strategies helped to identify men who were HIV-positive, but the yield of testing and linkage to care for those found HIV-positive differed among strategies: the facility-based PITC identified the greatest volume of men living with HIV; police campaigns had the highest positivity yield but the worst linkage to care (due likely to police having fears that being identified as HIV-positive on ART will affect promotions); and facility-based PITC had the highest ART linkage rate.

Initiative	Total Tested	Tested HIV-Positive (yield)	Linked to ART (%)
Male-focused health days	570	12 (2.1%)	7 (58.3%)
Facility-based PITC enhancement	46,875	2,478 (5.1%)	2,191 (88.4%)
Prison campaigns	700	33 (4.7%)	19 (57.5%)
Police campaigns	53	3 (5.6%)	0 (0%)
Community outreaches	3,944	186 (4.7%)	97 (52.1%)

[Comparison of Male Engagement Strategy Results]

CONCLUSIONS: Most HIV-positive men were identified through facility-based PITC, though correctional facilities campaigns, police campaigns, and community outreach initiatives did identify HIV-positive men outside of the standard facility-based testing setting. ART initiation rates were suboptimal but were better within facility than community-based models. Thus, improved interventions are needed to ensure ART linkage in community-based HIV testing services programs.

MOPED592

Partner notification as a strategy to achieve the first 90 in a high-prevalence county in Kenya

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BACKGROUND: Homabay County has the highest HIV prevalence (20.7%) in Kenya, with approximately 28,500 people living with HIV (PLHIV) who are unaware of their status. Partner notification services (PNS) were adopted nationally in June 2017 as a strategy to identify PLHIV in Homabay, in 2018.

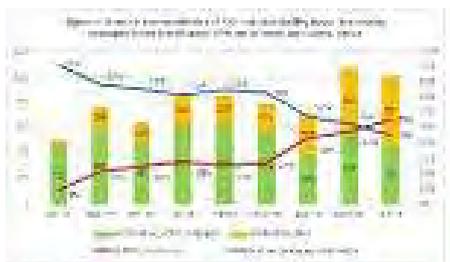
METHODS: We conducted a retrospective analysis of routinely collected HIV testing data from October 2017-June 2018 in 136 health facilities in Homabay. We calculated absolute and percent yield of PLHIV overall and by testing strategy (PNS vs. other facility-based testing), gender and age category, and assessed trends in proportional contribution of PNS.

RESULTS: During the study period, 614,122 clients were tested; 32,670 (5.3%) were tested by PNS. A total of 6,212 PLHIV were identified. HIV positivity yield was 1.0% overall, 7.5% (2,450/32,670) for PNS and 0.6% (3,762/581,452) for other strategies. PNS contributed to 39% (2,450) of all PLHIV identified. Greatest percent yield was among clients ≥15 years tested by PNS, particularly women ages 15-24 (13.4%) and 25-34 (15.7%) and men ages 25-34 (10.8%) and 35+ (11.3%). Proportional contribution of PNS to all PLHIV identified increased from 9% (44/495) in October 2017 to 55% (554/1,008) in June 2018 (Figure 1).

Age	Gender	PNS Tested (n)	Positive through PNS (n)	Positive through PNS (%)	Tested using other strategies (n)	Positive using other tests (n)	Positive using other tests (%)
0-9	Both	7,641	76	1.0%	82,012	164	0.2%
10-14	Female	2,480	13	0.5%	28,841	49	0.2%
10-14	Male	2,303	11	0.5%	26,415	43	0.2%
15-24	Female	3,748	503	13.4%	105,576	843	0.8%
15-24	Male	2,583	121	4.7%	63,810	176	0.3%
25-34	Female	3,771	593	15.7%	70,889	835	1.2%
25-34	Male	3,625	390	10.8%	41,931	561	1.3%
35+	Female	2,632	293	11.1%	55,597	512	0.9%
35+	Male	3,987	450	11.3%	38,623	579	1.5%

[Absolute and percent yield of HIV-positive patients by PNS and other facility-based HIV testing in Homabay, Kenya]

CONCLUSIONS: PNS contributed greatly to identification of PLHIV in Homabay, including young men and women, groups traditionally harder to reach for testing. Our findings suggest continued scale-up of PNS in high HIV-burden areas may accelerate progress toward epidemic control.



[Contribution of PNS and other strategies to the identification of PLHIV in Homabay county Kenya]

MOPED594

Optimizing HIV fast-track strategy in rural communities in north-central Nigeria using prioritized community symptomatic testing (P-COST) model: Impact

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BACKGROUND: Meeting the global targets towards eliminating HIV had been described as ambitious especially in the face of several challenges ranging from dwindling funds to accessibility to HIV services especially in rural settings. To reduce mortality due to late presentation and prevent continued ignorant HIV transmission to achieve epidemiological control, there is need for innovative strategies to bridge access to essential services.

The study looked at the impact of "P-COST model" implemented by AIDS Healthcare Foundation in rural, hard-to-reach communities in identifying/testing and linking HIV clients to care.

METHODS: AHF Nigeria, a nonprofit organization that ensures provision of cutting edge medicine and advocacy to persons living with HIV irrespective of location or differences, with most of her supported facilities in rural communities. The P-COST model utilizes pictorial HIV symptomatic tool to increase index of identification and ensure prioritized referral for HIV Testing Services. To ensure acceptability and understanding of the model, focal group discussions was carried out in 4 different rural facilities with a total of 66 peoples (42 females and 24 males) including HCWs, clients and community stakeholders in attendance. Community catchment area for each facility was distributed for trained focal persons residing in these communities and they conduct test for all people sent to them and link positives to HIV care especially adolescence and children.

RESULTS: Combined with partner notification services for a period of 6-months that the P-COST model was implemented, there were increased client enrollment and general acceptability of HIV testing services. Client volume in these facilities increased from 34 to 278 (4-55, 6-63, 5-68 and 19-92). No mortality was recorded as patients currently present earlier.

CONCLUSIONS: The P-COST model increase access to HIV services and awareness. Especially testing yields, leading to increased client volume, reduced mortality and increased overall quality of care.

It is recommended that this model should be adopted and expanded as part of the fast track strategies to bridge the treatment gap in rural, hard-to-reach areas in LMIC to ultimately end the HIV epidemic.

MOPED595

Traditional leaders are the game changers in attainment of 90-90-90 targets in the Sub-Saharan Africa

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BACKGROUND: With support from UNAIDS, SAfAIDS implemented the Rock Leadership 90 programme in Malawi, Swaziland, Zambia & Zimbabwe with the focus on strengthening the community response towards achieving the fast track targets for ending AIDS by 2030. This was conducted by building capacity of community leadership to champion the end of AIDS in southern Africa. The aim was to support 120 traditional leaders to mobilise 90% of men and their families to access HIV testing and treatment in 60 targeted communities

METHODS: Baseline and Endline qualitative and quantitative data was collected to establish if community leaders critical in HIV responses; 600 individuals aged 15 - 60 years were interviewed at baseline and 570 at Endline in all the four countries. Secondary HTS indicator data was also collected from selected clinics in intervention communities for both surveys. Routine monitoring & HTS related data was regularly collected and analysed.

RESULTS: Baseline (87%) and end-line (95%) indicated that they were comfortable discussing HIV with community leaders. Baseline (31%) and end-line (57%) had accessed HIV testing in the past three months. Among those who accessed HIV testing; baseline (49%) and end-line (80%) reported that they were influenced by a community leader. P-value always below 0.05 when comparing programme participants and non-participants. Programme monitoring data showed that more individuals (53%) who participated in outreach events spearheaded by community leaders accessed HTS compared to individuals who participated in other outreach events not spearheaded by community leaders (19%). Men (50%) who attended events spearheaded by community leaders accessed HIV testing compared to less than 30% of men who participated in other outreach events. Also noted that positivity rate was higher during outreach events organised by community leaders (6.3%) compared to 0.9% for other outreach events. Linkage into care of individuals who tested HIV positive was above 75% in all the four countries.

CONCLUSIONS: Results demonstrate that community leadership is critical in increasing uptake of HIV testing, treatments and care services by community members. It is therefore recommended that engagement, mobilisation and capacity strengthening of community leaders to lead HIV responses at community level should be scaled up.

MOPED596

Approaches to improving efficiency in HIV case finding: Results from the use of HIV risk assessment checklists in Kogi, North Central Nigeria

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BACKGROUND: The PEPFAR 3.0 impact agenda calls for focusing resources and finances to address the most vulnerable populations; doing the right things in the right places and at the right time. In line with this action agenda, we focused on approaches to improve HIV testing efficiency by offering HIV testing to individuals to patients screened and deemed to be at the highest risk for infection.

METHODS: To maximize the efficiency of HIV testing services, we developed and deployed a HIV risk assessment screening checklists for use in 25 comprehensive HIV treatment health facilities in Kogi state North central Nigeria. Eight clinical screening questions were prioritized through a retrospective review of presenting complaints of previously diagnosed HIV positive adults. Presenting symptoms/ signs of more 400 recently diagnosed HIV positive adults were ranked in order of frequency and the top 8 clinical signs and symptoms were included into the checklist. Similar symptoms were grouped and classified under a single category, for instance all forms of skin conditions were classified as skin rashes. Orientations on the use of the tools were given to providers in the study health

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facilities. Additional copies of the tools were printed and distributed to the 25 comprehensive HIV treatment facilities in December 2017. Any adult presenting at the clinic and responding 'Yes' to at least one question was offered an HIV test, while those that responded 'No' to all questions were not offered. Patients who present in the health facilities and request for an HIV test, receive the test irrespective of screening outcomes.

RESULTS: Before the use of the checklist (January to June 2017) 33,265 persons were tested for HIV and 1,160 (3.5%) identified as HIV positive; during the use of the checklist for screening (January to June 2018) 24,371 persons were tested for HIV and 1,308 (5.4%) identified as HIV positive.

CONCLUSIONS: The slowing global economy and dwindling donor funding for HIV programs demands more efficient approaches to identifying HIV infected persons. Conducting risk assessments prior to HIV testing may focus resources to testing those at the highest risk of infection.

MOPED597

The role of peer lay health worker programmes in supporting HIV re-testing among HIV-negative pregnant and breastfeeding women

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mothers2mothers, Cape Town, South Africa

BACKGROUND: In high HIV-prevalence areas (e.g. sub-Saharan Africa), WHO recommends provider initiated testing and counselling as a routine component of antenatal and postnatal care. Repeat HIV-testing every 3 months is recommended; however government implementation guidelines and actual practice differ owing to resource constraints. Moreover, after the initial HIV-test, continued efforts of a strained health system often focus on HIV-positive women. mothers2mothers (m2m) implements a peer-based model to deliver integrated complementary HIV-prevention, care and support services to women and their families. m2m Mentor Mothers support HIV-negative women to prevent HIV-infection and overcome barriers to re-testing, and support HIV-positive women from diagnosis onward to remain adherent and retained in care.

METHODS: Service uptake among a cohort of 4,180 pregnant and breastfeeding women, enrolled into the m2m programme in Lesotho, South Africa, Swaziland and Uganda between January and June 2017, who tested HIV-negative at enrolment and who had multiple contacts with m2m Mentor Mothers, were analysed for an observation period of up to 12 months in a retrospective cohort analysis. Women who were HIV-negative at enrolment and opted out of m2m support, were excluded from the analysis.

RESULTS: On average, women had 3 Mentor Mother contacts and were re-tested twice during the observation period. The average time to the first re-test was 3 months and the average time to the second re-test was 7 months. The rate of re-testing was inconsistent within and between m2m supported countries. Compliance to each country's respective national re-testing guidelines ranged from 71% in Lesotho, 77% in Eswatini, 83% in Uganda, to 90% in South Africa, averaging 78%. Each contact session with a Mentor Mother increased the likelihood of re-testing by 29%.

CONCLUSIONS: This analysis demonstrates the positive role that lay health workers play in supporting HIV re-testing, risk reduction and linkage to combination HIV prevention packages in the context of primary prevention of HIV among pregnant and breastfeeding women. It further suggests that HIV re-testing policy and eligibility criteria among HIV-negative women in antenatal and postnatal care need to be reinforced, particularly where country protocols vary based on government budget allocations to the HIV response.

Update of HIV prevention

MOPED598

Primary prevention of HIV among HIV-negative pregnant and breastfeeding women

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BACKGROUND: Programmes supporting the prevention of mother-to-child transmission of HIV often focus on HIV-positive women after the initial HIV test, resulting in minimal support for HIV-negative pregnant and breastfeeding women, and a dearth of information on sero-conversion rates during the PMTCT period. mothers2mothers (m2m) implements a peer-based model to deliver integrated complementary HIV-prevention, care and support services to women and their families. m2m Mentor Mothers support HIV-negative pregnant and breastfeeding women to prevent HIV-infection and overcome barriers to HIV re-testing.

METHODS: Outcomes and behaviour among a cohort of 4,180 pregnant and breastfeeding women, enrolled into the m2m programme in Eswatini (11%), Lesotho (52%), South Africa (28%) and Uganda (9%) between January and June 2017, who tested HIV-negative at enrolment and who had multiple contacts with m2m Mentor Mothers, were analysed for an observation period of up to 12 months in a retrospective cohort analysis. Women who were HIV-negative at enrolment and opted out of m2m support, were excluded from the analysis.

RESULTS: The sero-conversion rate among pregnant and breastfeeding women re-testing (78%) was 0.07%. The 3 reported cases of sero-conversion occurred in Eswatini and Lesotho, both of which recorded lower re-testing compliance rates.

Only the mother in Eswatini who sero-converted during the postnatal period transmitted the virus to her infant. Reports of sero-discordance between partners (57%) and HIV-negative women with partners of unknown status (41%) were observed. HIV negative women with HIV-positive partners or partners with unknown status had relatively high re-testing rates (72% and 80% respectively).

CONCLUSIONS: Low sero-conversion rates among m2m clients demonstrate low risk of mother-to-child-transmission of HIV. However, the high number of HIV-negative women (41%) with no knowledge of their partner's HIV-status, are at high risk of HIV-infection. Mutual disclosure of HIV-status among sexual partners, routine HIV-testing and adoption of a comprehensive package of combination HIV-prevention remain critical among this group.

Furthermore, in order to better understand the full impact of the effect of lay health worker support in HIV-prevention among pregnant and breastfeeding women, further research is required into the proportion and characteristics of HIV-negative women who decline m2m support.

MOPED599

First year of implementation of PrEP in Zambia: Service delivery roll-out and scale-up

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BACKGROUND: Zambia adopted HIV pre-exposure prophylaxis (PrEP) as an additional HIV prevention strategy in the 2016 HIV Guidelines and expanded indications for PrEP in 2018. The Ministry of Health, National HIV/AIDS/STI/TB Council, and implementing partners (IPs), with support from PEPFAR, have since significantly scaled up PrEP services. We report data on the first year of national PrEP implementation.

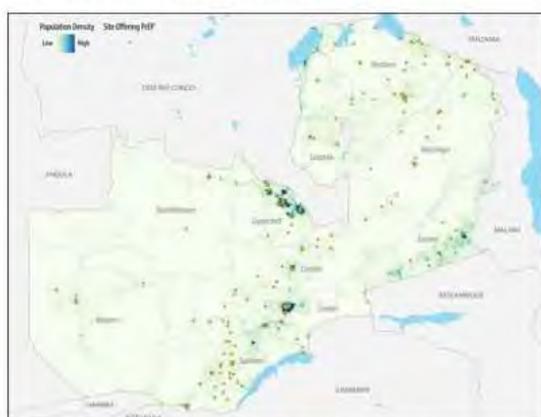
METHODS: We analyzed PrEP service delivery data including age/sex, key population type, and geographic reach as reported by IPs in the PEPFAR database. We conducted geo-mapping to overlay provision of PrEP services with population density and HIV prevalence.

RESULTS: In 2017, PrEP was only available at two sites in two of Zambia's ten provinces. In 2018, PrEP was offered in 162 sites across nine of ten provinces; 3,601 clients at risk of HIV infection were initiated on PrEP, including 1,271 (35%) adolescent girls and young women ages 15-24; 312 (9%) female sex workers, and 92 (3%) men who have sex with men. IPs reported high levels of interest and rapid uptake by clients, but poor retention in prevention services (27% are retained at 3 months). Service delivery mapping demonstrated provision of PrEP in areas of highest population density which correlated to areas of greatest HIV prevalence, with the exception of Western Province, where HIV prevalence is high but population density and PrEP service delivery is low.

CONCLUSIONS: PrEP is being rapidly rolled out across Zambia to populations most at risk of HIV infection, in line with supporting national policy initiatives. Most PrEP services are offered in urban and population-dense areas with high HIV prevalence, but rural areas with high rates of HIV are currently underserved. Further work is needed to ensure that PrEP is available to all populations at significant risk of HIV. Demand creation and awareness should complement PrEP service delivery roll-out to increase uptake.



Panel A: Zambian government health facilities providing PrEP in orange, overlaying HIV prevalence by province.



Panel B: Zambian government health facilities providing PrEP in orange, overlaying population density by province.

[Figure 1. Geographic Distribution of HIV Pre-Exposure Prophylaxis (PrEP) Sites in Zambia in 2018]

MOPED600

Challenges implementing pre-exposure prophylaxis (PrEP) for people who inject drugs in non-urban areas of the United States

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BACKGROUND: Increasing injection of opioids, stimulants, and other drugs is causing renewed concerns about HIV transmission among people who inject drugs (PWID) in several U.S. regions. A recent HIV outbreak in Lawrence and Lowell, Massachusetts, was attributed to injection drug use. Despite successful implementation of syringe service programs (SSPs) in large U.S. cities, syringe coverage in small Northeastern cities and non-urban areas is limited. Antiretroviral pre-exposure prophylaxis (PrEP) could help prevent HIV transmission among non-urban PWID in this region, but PrEP uptake remains low and implementation challenges are understudied.

METHODS: We recruited clinical and social service providers from health-care, drug treatment, and community-based harm reduction organizations in small cities and towns across Massachusetts and Rhode Island. Semi-structured qualitative interviews explored informants' perspectives on implementing PrEP for HIV prevention among PWID. Thematic analysis identified themes regarding unique challenges delivering PrEP to PWID in non-urban areas.

RESULTS: Eighteen informants had a median of 8 years of experience working with PWID (interquartile range: 5-10 years). Most described increasing concerns about HIV transmission among PWID locally and viewed PrEP as an underutilized but promising HIV prevention strategy. Mirroring findings from urban studies, informants expressed concerns relating to low PrEP knowledge and HIV risk perceptions among PWID, potential difficulty with PrEP adherence and retention, and high levels of mental illness/trauma in this population. Implementation challenges unique to small cities and towns fell into three categories:

- (1) limited healthcare availability and staff confidence in delivering PrEP;
- (2) implications of geography and distance (e.g., transportation to appointments, funding and programs spread across large areas, dispersed patient populations); and
- (3) low community awareness of and political support for HIV prevention and harm reduction services generally.

CONCLUSIONS: Along with improved coverage of essential harm reduction and drug treatment services, PrEP could help prevent injection-related HIV transmission in non-urban areas of the United States.

However, innovative strategies are needed to overcome distinct PrEP implementation barriers affecting these areas, including developing training materials and support mechanisms for staff delivering PrEP, investing in transportation infrastructure and mobile health units, and engaging communities in developing evidence-based responses to local opioid crises.

MOPED601

PrEPare for work: An intervention to increase PrEP uptake among male sex workers

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BACKGROUND: Male sex workers (MSW) are at exceptionally high risk for HIV infection. Research shows that MSW engage in frequent condomless anal sex (CAS), have a higher burden of psychosocial problems (e.g., heavy substance use), and often face unique contextual challenges (e.g. homelessness). HIV prevention interventions, including pre-exposure prophylaxis (PrEP), which address the unique life circumstances of MSW are needed.

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METHODS: MSW were recruited through local community outreach in the US Northeast and enrolled in a pilot randomized controlled trial to increase PrEP uptake. Eligible participants were HIV-uninfected, and reported 1+ male clients and 1+ CAS acts with an HIV-infected/unknown serostatus partner in the past three months. Participants were randomized to receive 1) a strength-based case management (SBCM) intervention implemented by non-clinical staff, which includes motivational interviewing, assistance with PrEP appointments and transportation, and problem-solving other barriers, or:

2) standard of care (SOC) referrals to the local PrEP clinic. Participants were followed to determine PrEP uptake (i.e., had an appointment with a PrEP provider and picked up a PrEP prescription) within two months of enrollment.

RESULTS: A total of 88 MSWs were enrolled. Among 72 completers (82%), mean age was 34 years (SD=8.2; Range:20-56). Eighteen percent identified as straight/heterosexual. Nearly a quarter identified as Hispanic/Latino, and 13% as Black/African American. One-quarter did not have a high school diploma/GED, and 56% were unemployed. Substance use was common (85%, past 12 months), and 33% had injected drugs in the past three months. On average, participants had 11.3 male clients (SD=19.9; Range:0-150), and CAS 9.8 times with male clients (SD=24.8; range:0-200) in the past three months. Participants randomized to the SBCM arm were 2.6 times as likely to initiate PrEP within two months of baseline compared to those in the SOC arm (57% vs. 22%, $p=0.002$; RR=2.64, 95% CI=1.34-5.20). Overall satisfaction with the SBCM intervention was very high.

CONCLUSIONS: A SBCM intervention has shown promise at increasing PrEP uptake among this high-risk and marginalized population, more than doubling the rate of PrEP uptake compared to standard of care.

MOPED602

Assessing HIV care outcomes among African-born people living with HIV in Seattle: An analysis of the University of Washington Electronic Medical Record

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BACKGROUND: Prior analysis of CDC surveillance data has shown that HIV care outcomes of African-born Blacks in the United States (U.S.) differ from those of U.S.-born Blacks and the general population. However, this information rests on incomplete ascertainment of country of birth and comorbid factors that may complicate HIV care. Electronic medical record (EMR) data can address these limitations. The purpose of this analysis is to examine the relationship between African birth and HIV care outcomes among individuals captured in the University of Washington EMR.

METHODS: The University of Washington EMR was queried to identify all patients who received a clinical or laboratory confirmed diagnosis of HIV from 1995-2018. Patients were identified as African-born if they reported a place of birth in or primary language belonging to an African country. African-born patients were compared to all non-African-born patients and non-African-born Blacks for initial CD4 count < 200 cells/mL, viral suppression (viral load \leq 200 copies/mL), time from diagnosis to viral suppression, and prevalence of hypertension, obesity, hyperlipidemia, depression, hepatitis B and C, and tuberculosis.

RESULTS: We identified 357 African-born and 3710 non-African-born (of which 672 were Black) patients via the EMR query. Over the time period, more African-born patients presented with initial CD4 counts below 200 cells/mL than all non-African-born patients and non-African-born Blacks (35% CD4 < 200 vs 29% and 28%, $p=0.017$ and 0.010), but had higher rates of viral suppression (95% suppression vs. 90% and 85%, respectively, $p=0.010$ and < 0.001 in 2017). Time to viral suppression similarly favored African-born patients (HR=1.23 and 1.23, $p=0.022$ and 0.040). Compared to all non-African-born patients, African-born patients had higher rates of hepatitis B and tuberculosis (12% vs. 8% $p=0.012$ and 13% vs. 3% $p<0.001$) and lower rates of depression and hepatitis C (10% vs. 25%, $p<0.001$ and 6% vs. 17% $p=0.009$).

CONCLUSIONS: African-born patients living in Seattle area have better HIV care outcomes than other populations but also have distinct medical needs. Low initial CD4 counts in African-born patients are consistent

with reported low testing rates in African-born communities. Increased efforts to engage this population in HIV, hepatitis B, and TB screening are warranted.

MOPED603

Navigating to scale: Results from a national programme for key populations in Kenya

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BACKGROUND: HIV epidemic in Kenya is predominantly concentrated among key populations such as female sex workers (FSWs), men who have sex with men (MSM) and people who inject drugs (PWIDs) who collectively contribute 33% of new HIV infections (MOT 2009). Coordinated programming at scale is important if the objective of Kenya AIDS strategic framework (KASF :2014/15-2018/19) of reducing new HIV infections by 75% is to be achieved.

METHODS: In 2012, the National AIDS & STI Control Programme (NASCO) set up a Technical Support Unit (TSU) to support the government in scaling up effective and efficient programming with key populations in Kenya. The TSU was implemented by University of Manitoba and Partners for Health and Development in Africa (PHDA) with funding support from Bill & Melinda Gates Foundation (BMGF). The TSU supported NASCO in developing standard national tools for data collection. 95 implementing partners report data on critical programme indicators on a quarterly basis to NASCO. This data for the period July - September 2013 to July - September 2018 was analyzed. All data reported by the partners is in aggregate form, unlinked and anonymous.

RESULTS: Program contacts increased from 68% to 132% for FSWs, 48% to 218% for MSM and 21% to 90% for PWIDs when measured against national size estimates of 133,675, 19,857 and 18,327 for FSWs, MSM and PWIDs respectively. This can be partly attributed to improvement of peer ratios from 1:132 to 1:79 for FSWs, 1:89 to 1:69 for MSM and 1:203 to 1:74 for PWIDs against nationally recommended ratios of 1:80, 1:40 and 1:40 for FSWs, MSM and PWIDs respectively. Uptake of HIV testing and counselling services improved from 29%, to 57% for FSWs, 18% to 136% for MSM and 7% to 66% for PWIDs against national size estimates. Cases of violence which were addressed within a 24-hour window increased from 38% to 88% for FSWs, 74% to 84% for MSM and 79% to 93% for PWIDs respectively.

CONCLUSIONS: Government leadership with concerted technical support can scale up key population programmes even in an environment where some of the behaviours are criminalized.

MOPED604

Awareness of PrEP and drivers and barriers to use among men aged 20-34 in Mpumalanga and KwaZulu-Natal, South Africa

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BACKGROUND: In 2016 South Africa broadened the guidelines on access to pre-exposure prophylaxis (PrEP) beyond key populations. To date, however, there has been no research on how best to position PrEP for high-risk young men.

This study aims to understand perceptions of PrEP among South African men aged 20-34 and barriers to and enablers of uptake, so that messages and services can be better targeted to this demographic.

METHODS: This study comprised qualitative and quantitative research conducted in urban and rural settings in KwaZulu-Natal and Mpumalanga, South Africa. The qualitative phase consisted of two-hour interviews with purposively recruited men (n=58). Interviews were transcribed and analysed thematically. The quantitative phase consisted of one-hour interviews with randomly selected men (n=2019). Data were analysed using

descriptive and inferential statistics. Across both stages, eligibility criteria included age (20-34), ethnicity (black only) and education (high school education or below).

RESULTS: The study found that awareness of PrEP is low (12%) in this population. However, once informed, 62% of respondents indicated that they are likely or very likely to take PrEP. The most common reasons for interest in taking PrEP were to maintain an HIV negative status (32%) and to be carefree (24%).

This initial enthusiasm is moderated by practical concerns, psychological uneasiness and social pressures. 52% said that they would stop taking PrEP if they had side effects and 50% said they would struggle to take it every day.

Respondents were also concerned about going to the clinic to collect pills (43%) and expressed the need to keep the fact they are taking PrEP secret from their partner (39%) friends (44%) and family (41%).

CONCLUSIONS: The research provides preliminary data on barriers and enablers to rolling out PrEP among high-risk young men. Future campaigns should centre their messaging on the peace of mind that PrEP can bring, as this is a key motivator for this group.

Barriers related to practical concerns should be addressed through counselling and communications materials. The desire to keep PrEP a secret reflects a broader barrier rooted in social attitudes and cultural norms and may require communications targeting communities more generally.

Adherence to HIV treatment

MOPED605

Impact and heterogeneous effects from behavioral economic incentives for improving antiretroviral (ARV) medication adherence in Uganda

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BACKGROUND: Behavioral economic incentives have successfully improved health behaviors across a wide range of settings. However, this beneficial impact may not be experienced equally by all study participants. In this study, we investigate the full impact of the Rewarding Adherence Program (RAP), behavioral economic incentives promoting proper antiretroviral (ARV) medication adherence, and additionally identify socioeconomic barriers to the efficacy of this intervention technique.

METHODS: RAP was implemented at Mildmay Uganda, an HIV clinic in Uganda's capital Kampala that provides ARV medications to over 11,000 clients. Clients were eligible for participation if they were at least 18 years old and were on ARVs for at least 2 years. Recruitment was from March to August 2013, and the intervention was delivered over 20 months.

155 HIV-infected men and women ages 19-78 were randomized into one of two intervention groups and received small prizes of US \$1.50 awarded through a drawing conditional on either attending scheduled clinic appointments or achieving at least 90% mean ARV adherence. The control group received the usual standard of care. We conduct an impact analysis by comparing the mean ARV adherence between the intervention groups and the control group using ordinary least squares, and heterogeneous treatment effects are estimated by interacting a treatment group indicator with different measures of participants' socioeconomic status recorded at baseline.

RESULTS: We find that on average the RAP treatment increases mean ARV adherence by 10.3 percentage points (SD 4.3 pp; p-value = 0.017) from an average mean ARV adherence in the control group of 68.9% (SD 25.8%) to 79.2% (SD 21.8%) in the combined treatment group.

However, regression models of treatment heterogeneity find that this treatment effect (T) is significantly reduced for participants reporting food insecurity (T = 7.6 pp; SD 1.3 pp, p-value = 0.032) or below-average financial health (T = 7.8 pp; SD 1.4 pp, p-value = 0.074).

CONCLUSIONS: Behavioral economic incentives are an effective mechanism for increasing many patients' mean ARV adherence, but additional support is needed for those facing pronounced economic hardships.

MOPED606

Mobile health technology, a revolution towards improving adherence to clinic appointment among PLHIV on antiretroviral therapy in Njombe and Morogoro regions in Tanzania

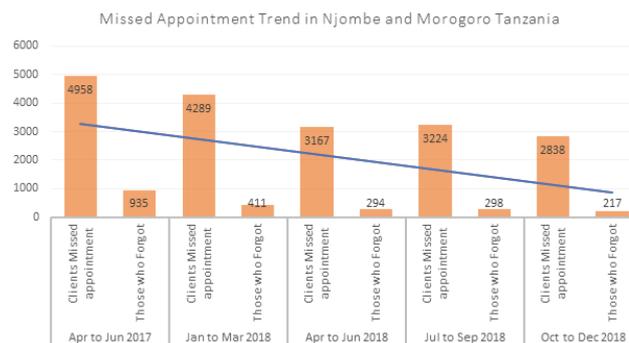
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BACKGROUND: Adherence to Antiretroviral Therapy (ART) is critical in achieving HIV viral suppression among HIV/AIDS clients. This requires adherence to clinic appointments for Antiretroviral (ARV) medication refills. There many reasons including 'forgetfulness'. MHealth initiatives have been deployed to support clients on ART for improved adherence. In this study, the project assessed effect of use of mobile phone reminders system on missed clinic appointment among PLHA in Njombe and Morogoro regions, Tanzania.

METHODS: Ten health facilities from two regions with 21,550 HIV-infected individuals who receives ART and exist on databases for twelve months were selected. In FY 18 (Jan-March 2018), SMS reminder system were deployed in facilities.

The consent of HIV clients on ART registered in the CTC2 database were sought and their mobile numbers were registered on SMS reminder system. Clients enrolled receives one-way two types of adherence SMS reminders on their mobile phones, one SMS three days in advance and the second on the day of appointment. Visits were captured and stored inside project database. For confidentiality, system only extracts patient ID and telephone ID. Data were analyzed using Excel.

RESULTS: Prior to deployment of the system in FY18, (April- June 2017), there were 935 (19%) missed appointments due to 'forgetfulness'. After system deployment in FY 18 quarter 2, number of missed appointments declined by 127% (411) which is 10% lower. In FY 18 (April - June 2018), number of clients missed appointments decreased by 40% (294) which is 9% from missed appointment rate. In FY 18 (July- Sept 2018) rate remained at 9%, but in FY 19 (Oct - Dec 2018) number of clients missed declined by 37% (217) which was 8% missed appointment rate.



[Trend Analysis, 'Before and After' SMS Reminder System Deployment]

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CONCLUSIONS: Personalized SMS system reduced the number of clients that missed appointments. System will be scaled up to HVL sample collection and EAC for clients with high HVL.

MOPED607

A successful individualized communication strategy to enhance retention and ART uptake in naive individuals

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BACKGROUND: Individualized communication strategies (ICT), such as calls or electronic messages after ART initiation, have shown increased retention in care and viral suppression (VS) in persons living with HIV (PLWHIV). However, in an RCT for naive patients prescribed ART, randomized to ICT or Standard of Care in Argentina, we found similar VS and retention across arms (Adjusted RD was 0.10, 95%CI: -0.02, 0.23).

In a post-hoc analysis, we wanted to assess if the number of successful established contacts (NEC), defined as messages or calls answered by participants, was associated with these outcomes.

METHODS: Among those randomized to receive the intervention, we measured NEC during the first year after randomization. Poor NEC (PNEC) was defined as ≤4 contacts, and fair NEC (FNEC) as four or more. The main outcome within a year after randomization was successful linkage defined as 1-successful retention with no ART interruption; or 2-VS: HIV-RNA <200 cps/ml in the last measurement. Descriptive statistics were used for baseline characteristics. Risk differences (RD) and 95% confidence intervals (CI) were estimated using linear regression for primary outcomes obtaining crude and adjusted estimates.

RESULTS: Overall, 100 participants were randomized to the intervention arm. Median age was 31 yrs (IQR 26,40), 83% were male, 64% were MSM, 29% were immigrants. Mean baseline HIV-RNA log was 5.1 and median CD4 count/mm³ was 398 (IQR 220,576).

477 contacts were established. Mean number of contacts was 4.91. 64 participants had FNEC and 36, PNEC. FNEC and PNEC subgroups had not significant difference across age, sex, transmission category, migration status, informal working, and clinical characteristics. Successful linkage was 0.4 higher among FNEC than among PNEC (FNEC:0.81; PNEC:0.41; 95%CI: 0.21,0.58). Adjusted RD was 0.35 (95%CI: 0.17,0.53; FNEC: 0.59; PNEC: 0.24).

CONCLUSIONS: In a mostly male MSM cohort of PLHIV offered ICT in Argentina, only two thirds received FNEC. FNEC was associated with higher probability of being retained in care, not suspending ARV and reaching viral suppression within a year of randomization.

This difference is sustained after considering demographic and clinical factors. Specific interventions may be needed to target the hard-to-reach subgroup to maximize the effect of this type of intervention.

MOPED608

Evaluation of an Enhanced Adherence Counseling Model to achieve viral suppression among patients with initial virologic failure: A case study from South-Eastern Nigeria

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BACKGROUND: Enhanced Adherence Counseling (EAC) is a model to improve adherence to antiretroviral medications after initial virologic failure. The model involves targeted adherence intervention for clients on antiretroviral therapy (ART) with viral load results over 1000 copies/ml (Log₁₀ 3.0) [defined by World Health Organization (WHO) as virologic failure]. Re-

peat tests were done three months' post-intervention. Our study aimed at evaluating the impact and factors associated with EAC in achieving viral suppression.

METHODS: A retrospective cohort analysis of clients on ART who received EAC was done. A total of 280 clients who had virologic failure were included in the study. These patients were those who received viral load testing in health facilities in one southeastern state in Nigeria between October 2017 and September 2018. Viral load results before and after the intervention were analyzed using summary statistics and chi-square. Data analysis was done using SPSS version 25.

RESULTS: Mean age of the study participants was 38.4 years (SD=14.2). Majority were females (68.6%). The mean duration of EAC was 3.15 months (SD=0.78). The mean of the initial viral load result was 67,856 copies/ml of blood (Log₁₀ 4.8). About a third (33.8%, n=95) had initial viral load result less than 10,000 copies/ml, with 66.1% above 10,000 copies/ml. At the follow up viral load testing, only 31.4% (88/280) of the participants achieved viral suppression, while 63.2% remained unsuppressed. Our results also show that virally unsuppressed results less than 10,000 copies/ml were significantly associated with viral suppression after EAC (X²=30.37; p<0.01). Age, sex, treatment regimen, and duration of adherence optimization were not significantly associated with viral suppression after adherence optimization.

CONCLUSIONS: Viral suppression after Enhanced Adherence Counseling (EAC) was less than 50% in this study. Jobanputra et al. (2014) had reported 62% suppression rate at retesting after 6 months of EAC. Patients with viral load less than 10,000 copies/ml prior to adherence intervention were more likely to achieve virologic suppression. There may be need to interrogate the content of adherence intervention as currently provided. It will also be good to evaluate different cohorts at various duration of Enhanced Adherence Counseling (3, 6, 9, 12 months).

MOPED609

Integrating mobile phone interventions for adherence support in people living with HIV infection: Contextual difference affects the dynamics

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BACKGROUND: Consistency and persistence in taking antiretroviral therapy (ART) improves health outcomes in People Living with HIV/AIDS (PLHIVA). Pill burden and forgetfulness affect adherence behavior and adherence supporters were introduced early in Ghana to minimise nonadherence to ART. Mobile phones have enable text messaging to be included as a strategy for prompting and motivating medication and follow-up adherence. However, the use of mobile phones in supporting adherence varies contextually. This study sought to determine how mobile phone intervention improves treatment adherence among PLHIVA.

METHODS: An explanatory integrated mixed method approach was employed in a three-phase study. Data was collected from June 2014 to October 2015 at two hospitals in Accra, Ghana. Phase I involved a randomised control trial that compared the effect of mobile phone intervention (daily alarm, weekly text message and monthly voice call) on adherence in two equal groups (Intervention and Control, n = 362). Primary outcome (overall adherence: Self-report, visual analogue, pill identification, pill count) and secondary outcome (CD4 count and Body Mass Index) were measured at baseline, third and sixth month. Linear mixed modelling was done according to the original group assignment. In phase II, interview and focus group discussions were conducted with the intervention group and health professionals. Phase III involved data synthesis and engagement with stakeholders. Ethical approval was obtained and the right of participants protected.

RESULTS: Baseline overall adherence score was below 95% in both groups. Self-report (CI = 95.6 -100), Visual analogue (CI = 99.9 -100) Pill identification (CI = 99 -100) and Pill count (CI = 98.9 -100) scores increased. No significant effect was observed in CD4 count and BMI levels. Mobile phone integration had no effect on adherence behaviour. Respon-

dents lost to follow-up was 142(39.%) third month and 92 (25%) at sixth month. Qualitative findings revealed preference for alarms and voice calls with skepticism about text messages because of stigma. Resource availability, technology and literacy gaps pose major barriers to the use of mobile phones in adherence support.

CONCLUSIONS: Mobile phone use in adherence intervention may not be effective unless cultural dynamics are understood and included in the integration process.

MOPED610

Depressive symptoms and ART adherence among caregivers of vulnerable children in Southern Malawi

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BACKGROUND: Despite evidence that adults affected by HIV have increased risk of mental health disorders such as depression, and depression is associated with ART nonadherence, few studies have explored these relationships among adult caregivers of vulnerable children. The objective of this study was to examine depressive symptoms and explore their relationship with ART adherence among caregivers of vulnerable children living with HIV in Malawi.

METHODS: In a cross-sectional study, we interviewed 820 caregivers of children aged 0-17 in vulnerable households in 24 randomly selected health facility catchment areas in five districts in southern Malawi. Vulnerable households were defined as having at least one of: 1) economic insecurity, 2) food insecurity, and/or 3) chronic illness. Responses from five depression screening questions (coded 0-2) adapted from the PHQ-9 were summed and standardized. We used multivariable logistic regression to explore the association between depressive symptoms and ART adherence, controlling for caregiver sex, age, wealth, marital status, and education. We also controlled for HIV-related stigma and social support, which were also associated with depression. Standard errors were clustered by enumeration area.

RESULTS: Most caregivers were women (86.5%), caring for a median of three children, and about one third had no spouse or live-in partner. Depressive symptoms were high, with 62% of caregivers reporting three or more depressive symptoms sometimes or often. Among caregivers who knew of their HIV positive status (n=308), nearly all (98.4%) reported currently using ART medication. Of those on treatment, 90.8% reported never forgetting or missing a day of ART in the past 7 days. In a multivariable logistic regression of adherence on depressive symptoms, a 1-SD increase in depressive symptom score was significantly associated with 33.8% lower odds of ART adherence (OR=0.662, 95% CI=0.454-0.966). HIV-related stigma and social support, though associated with depression, and other socio-demographic characteristics were not associated with ART adherence.

CONCLUSIONS: Addressing mental health among caregivers of vulnerable children may be an important step toward achieving consistent ART use and viral suppression among adults living with HIV in Malawi. Integrating depression screening programs into HIV primary care could be a promising intervention modality that should be considered in medicalized interventions.

MOPED611

Peer navigation improves HIV care and viral suppression outcomes among South African men who have sex with men; results from a randomized controlled trial

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BACKGROUND: A majority of men who have sex with men (MSM) in South Africa are not linked or retained in HIV care and have not achieved viral suppression. We designed a peer navigation (PN) intervention and examined its effect on HIV treatment and viral suppression outcome measures.

METHODS: In a randomized controlled trial, we recruited 103 persons in 2017. After eligibility verification (18 years or older, MSM or transwoman diagnosed with HIV) and collecting informed consent, we randomly assigned participants to a standard-of-care control group (n=48) or a PN treatment support intervention group (n= 55). Control group participants were referred directly to an MSM-friendly health center for treatment initiation or continuation. They received monthly text message reminders from study staff to refill ART prescriptions. Intervention group participants underwent the same procedures. In addition, they met with an assigned PN at least monthly to discuss treatment related issues including medication access, side effects, adherence, stigma or discrimination related to HIV or ART. The primary outcome was change in viral suppression (< 1000 copies/ml) over 6-months, assessed by panel-data generalized linear model.

RESULTS: Mean age (SD) was 30.9 (9.4) years, 89.9% were MSM, and 41.7% were single. At baseline, 64% in the intervention group and 47% in control group reported being on ART. The probability of being on ART increased significantly over 6 months in both intervention (from 63.5% to 94.4%) and control groups (from 46.7% to 74.3%), resulting in an intervention effect of 6.5% (p-value=0.528). At 6 months, 26 (74.3%) of 35 participants in the control group and 32 (82.1%) of 39 participants in the intervention group were virally suppressed, for a significant intervention effect of 26.9% (p-value=0.008). The intervention effect remained about the same after multiple imputation of missing (22.9%) and under the plausible scenario assumption (22.5%).

CONCLUSIONS: We found that among MSM living with HIV in South Africa, peer navigation can improve the HIV treatment and viral suppression outcomes over a 6-month period in comparison to standard of care. This study provided tools and preliminary efficacy results for a full community-level trial to assess the impact of peer navigation services.

Retention in HIV services

MOPED612

Patient feedback surveys about healthcare workers among women attending PMTCT services in eSwatini

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BACKGROUND: Healthcare worker (HCW) attitudes towards and interaction with patients may be important barriers to patient retention in HIV services, particularly for pregnant women in prevention of mother-to-child transmission programs.

METHODS: We collected feedback from women attending antenatal care (ANC) services at seven health facilities in eSwatini over three months. All pregnant women attending ANC were eligible and those providing verbal consent completed anonymous tablet-based audio assisted computer

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self-interview (ACASI) surveys with symbolic responses (agree/happy, neutral, disagree/sad). The 24-question survey asked about women's interactions with facility staff (nurses, peer supporters, receptionists and lab workers) including whether women felt respected and if nurses spent enough time and answered questions. Women self-reported HIV status and age. Monthly quality improvement sessions with HCW were held to review feedback data and used to identify strategies to improve patient-provider relationships. Chi-square tests of proportions reporting the different response options were performed to compare surveys from month 1 and 3, and between HIV-positive and HIV-negative pregnant women.

RESULTS: From October to December 2017, 1,483 surveys were completed; 508 (34.3%) women self-reported to be HIV-positive, 710 (47.9%) HIV-negative status and 265 (17.9%) declined to report HIV status. Median age was 25 years (interquartile range 21-30), 35.0% completed the survey at their first ANC visit for the current pregnancy. The questions with the highest proportion of "agree" responses overall were whether peer supporters treated woman with respect (97.4%), whether the nurse cared about the woman (96.3%) and whether nurses answered all questions (96.2%). The question with the highest disagreement was whether the woman was satisfied with her wait time (26.0% disagreed). The only significant change in responses was for whether nurses listened for which agreement increased from 88.3% to 94.8% ($p < 0.01$) from month 1 to month 3. HIV-positive women had significantly higher agreement with most questions compared to HIV-negative women. However 43.9% of HIV-positive women reported feeling that HCW treat HIV-positive women worse than HIV-negative women compared to 24.5% of HIV-negative women ($p < 0.0001$).

CONCLUSIONS: Women reported overall high rates of favorable patient-provider interactions, HIV-positive women felt more strongly that HCW treat HIV-positive women worse than HIV-negative women.

MOPED613

Reasons for defaulting and prolonging return to care in a cohort of pregnant women reinitiating HIV treatment under Option B+

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BACKGROUND: In 2011, Malawi pioneered the Option B+ program whereby HIV positive pregnant and breastfeeding women are offered lifelong antiretroviral therapy (ART) regardless of CD4 count. Reduction of HIV-related morbidity and mortality depends upon the retention of women in treatment.

Defaulters from care are a key population to study to improve our understanding of the factors precluding lifelong ART and re-initiation after defaulting. We describe the reasons for defaulting in urban HIV positive pregnant women and investigate contributors to prolonging return to care.

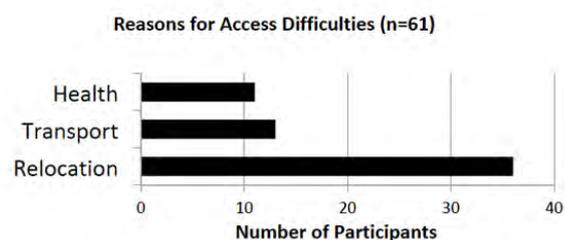
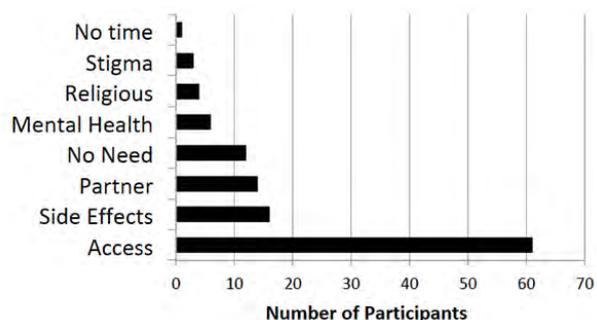
METHODS: We recruited HIV positive women, previously on ART but off treatment greater than three weeks, attending a first antenatal visit in Lilongwe, Malawi from 2015-2019. We performed t-test and ANOVA analyses to elucidate risk factors for prolonged time to reinitiating treatment.

RESULTS: We enrolled 128 women, of median age 26, 87.5% married, 45% completing primary school, and 67% unemployed (Table 1). Primary reasons for defaulting were treatment access, largely due to relocation (Figure 1). We found a significantly longer time to reinitiate treatment in women who did not disclose to their partners ($p=0.036$), had side effects from ART, or reported a religious reason for stopping treatment ($p < 0.005$). We found no significant difference in time to reinitiate by distance to the clinic, reason for prior ART initiation, or experience of intimate partner violence.

CONCLUSIONS: While access difficulties were reported as the primary reason for defaulting, we found that broader cultural issues such as disclosure to a partner or religion were associated with failure to return to care in a timely manner. Therefore, re-engagement at a first antenatal clinic visit provides an opportunity to address such barriers.

Baseline Characteristics	Mean (SD) or Number (%)	Baseline Clinical Characteristics	Median (IQR) or Number (%)
Months until Re-Initiation	14.14 (17.13)	CD4	369 (236-545)
Reason for prior ART	PMTCT: 85 (64%); Health: 47 (36%)	Viral Load	22081 (5102-80957)
Disclosure to Partner	81 (74%)	WHO Stage 1	109 (89%)
Intimate Partner Violence	21 (17%)		
Distance to Clinic	1-2 hours: 82 (64%)		

[Table 1: Participant Characteristics at Initiation (n=128)]



[Figure 1: Free Response Reason for Defaulting (n=117)]

MOPED615

Suboptimal engagement in HIV care among persons who inject drugs and their partners in Nairobi, Kenya

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BACKGROUND: Injection drug use is increasing in Kenya, and persons who inject drugs (PWID) are a key population disproportionately affected by HIV. Awareness of HIV status and successful engagement in HIV/AIDS care are critical.

METHODS: We are evaluating assisted partner services (APS) among PWID to identify undiagnosed individuals living with HIV and to promote engagement in HIV care. Index participants (indexes) are recruited from needle and syringe programs (NSPs) throughout Nairobi. Indexes confidentially provide contact information for all injection and sexual partners in the past 3 years. Community-embedded peer educators attempt to contact all named partners, by phone and community tracing. Contacted partners are notified of their possible HIV exposure and offered HIV counseling and testing. All participants complete questionnaires and are offered HIV testing.

RESULTS: As of January 2019, 196 HIV-infected PWID have been enrolled as indexes, of whom 111 (57%) are men and 85 (43%) are women. Most (n=182, 93%) were aware of their HIV status prior to study participation and 166 (85%) reported ever being on ART. Overall, 146 (74%) were currently on ART, with women significantly less likely to be on ART (67% vs 80%, p=0.002). Younger age was associated with not being on ART (OR=0.9, p=0.01). Among women, those who reported concerns about their safety were over 5-fold more likely to not be on ART (OR=5.5, p=0.01). 32% of women and no men reported sex work as a source of income and 79% of women and 23% of men reported receiving money or goods in exchange for sex. Through APS, 434 unique partners were successfully traced and enrolled, of whom 82 (19%) were HIV-infected, 9 (2%) were unaware of their HIV status, and 21 (5%) were not currently on ART. Of traced partners, 16% were sexual partners of an index, 68% were an injection partner, and 17% were a sexual and injection partner.

CONCLUSIONS: HIV status awareness is high among PWID linked to NSPs in Nairobi; however 26% of indexes and HIV-infected partners are not currently on ART. ART treatment is particularly low among female PWID, among whom transactional sex is common, posing a high risk of HIV transmission.

MOPED616

Improved HIV treatment retention among patients enrolled in a differentiated care model at Kenya General Reference Hospital in Haut Katanga province of the Democratic Republic of the Congo

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BACKGROUND: Differentiated care is a client-centered approach accommodating preferences of people living with HIV (PLHIV) while reducing burdens like long distance travel and waiting times that might negatively affect retention in care. The Integrated HIV/AIDS Project in Haut Katanga and Lualaba (IHAP-HK/L) introduced three differentiated care models (DCM) in 2016.

We conducted a review of programmatic data to compare retention outcomes between patients who opted to enroll in a DCM and those who continued with the traditional facility-based care model.

METHODS: Three DCMs were implemented to decongest Kenya General Reference Hospital (HGR):

- Community-based treatment support groups
- Community-based points of treatment distribution (PODI+)
- Facility-based fast-track refill circuits

Stable PLHIV—patients older than 18 years of age, with no opportunistic infections and an undetectable viral load for at least six months—enrolled in treatment at Kenya HGR were offered to transfer to a DCM of their preference or remain in the traditional model (and provided with multi-month stocks of antiretroviral medication). From October 2016 to December 2018, 920 PLHIV from Kenya HGR were eligible and selected for the evaluation. Using a multivariate analysis, we compared 12-month retention outcomes for PLHIV enrolled in DCMs versus those who remained in the traditional model.

RESULTS: 70% of participants were female. 57% of participants opted for a DCM (46% PODI+; 9% fast-track circuit; 2% treatment groups). 98% of PLHIV in DCM were still in care after 12 months compared to 89% who remained in the traditional model. PLHIV enrolled in a DCM were 5.7 times more likely to remain in care 12 months following enrollment (OR = 5.69-95% CI = 2.9-11) compared to those who opted to stay with the traditional model after controlling for sex (Female: OR = 3.1-95% CI = 1.7-5.3) and age at treatment initiation (OR = .9-95% CI = .9-1).

CONCLUSIONS: PLHIV who transferred to a DCM had better retention in care than those who did not. DCM and sex were independent predictors of retention among PLHIV treated at Kenya HGR. As DRC moves towards achievement of epidemic control, expansion of DCMs to retain PLHIV in treatment is critical.

MOPED617

Mortality and loss to follow-up among HIV positive adolescents and young adults in program settings in Kenya

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BACKGROUND: Mortality among HIV-infected adolescents in sub-Saharan Africa remains high compared to other age-groups. Within programs, little is known about characteristics of adolescent mortality.

METHODS: As part of an ongoing trial (NCT03574129), we abstracted routine adolescent and young adult (AYA) (ages 10-24 years) records from 87 HIV clinics in Kenya, randomly selected from a national pool of clinics using electronic medical records. Records of AYA who had ≥1 clinic visit between January 2016 and December 2017 were reviewed to identify AYA outcomes among AYA with at least 6 months potential follow-up time. AYA who died or were LTFU were compared to AYA continuing follow-up using logistic regression.

RESULTS: Of 6537 AYA with ≥1 clinic visit between January 2016 and June 2017, 191 (3%) died, 1654 (25%) were lost to follow-up, 601 (9%) transferred out and 4091 (63%) continued to attend clinic. Among 191 AYA who died, median age was 18 years (IQR 14, 22), with 30%, 32% and 38% in the 10-14, 15-19 and 20-24 year age-groups, respectively. Fifty percent were female, 84% were single, and 54% reported a parent as a support person.

Comparing those who died to those in follow-up, those in the 15-19 and 20-24 year age-group had 1.35 (95% CI 0.93, 1.94; p=0.11) and 1.97 (95% CI 1.38, 2.81; p < 0.001) higher odds of death than those in the 10-14 year age-group. Male AYA were more likely to die (6% vs. 4%; OR: 1.48 95% CI 1.20, 1.99; p =0.009). Comparing lost to follow-up to those still in follow-up, those in 15-19 and 20-24 year age-groups had a significantly higher odds of becoming lost to follow-up than those in the 10-14 year age group (p < 0.001 for both). In contrast to mortality, females were more likely to become lost to follow-up (32% vs. 23%, p < 0.001).

CONCLUSIONS: In this programmatic analysis, mortality and loss to follow-up among AYA in HIV care was high. Mortality was higher and retention lower among older AYA (ages 15-24). Males were more likely to die while females had higher non-retention. Defining determinants of mortality and non-retention in youth will be important to tailoring interventions.

MOPED618

Characteristics of oral pre-exposure prophylaxis (PrEP) clients with periodic use in the Jilinde program, Kenya

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BACKGROUND: While oral PrEP represents a significant biomedical addition to HIV prevention, efficacy depends on persistent use. Daily use is recommended by WHO for those at substantial risk. Given the vast typology of risky sexual behaviors, no single PrEP dosing regimen suits all, and many clients may be expected to take PrEP episodically for intermittent risk. The objective of this abstract is to characterize Jilinde clients with non-continuous PrEP refills as a proxy for episodic use in Kenya.

METHODS: Prescription and de-identified client data routinely collected by the standardized national PrEP medical record form were included in our analysis from those starting PrEP between February 2017 - June 2018. We evaluated the characteristics of clients with single and multiple uses, the latter defined as those with an elapsed duration of > 45 days between prescriptions, indicative of non-daily use. A generalized linear model was used to compute the beta coefficient with number of use episodes.

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RESULTS: Jilinde initiated 16,291 PrEP clients: 74% female; 53% aged ≥ 25 years; 69% single/never married; and, 60% female sex workers (FSW). Seventy-two percent (11,734) had only a single use (of varying duration); whereas, 3,062 (19%), 982 (6%) and 505 (3%) had 2, 3 and ≥ 4 use episodes. The maximum number of use episodes observed was 8. Users with multiple uses had a mean elapsed duration of 76 days (standard deviation (SD)=195) between the first and refill prescriptions. The mean duration of use for the first use episode was 67 days (SD=40). Independent predictors of increasing number of use episodes included being older, referral channel within facility, being a FSW and having an HIV positive partner.

CONCLUSIONS: Approximately 25% of those starting PrEP had some interruption in daily use followed by at least one restart at a later date. Though we found statistically significant predictors of repeated use, effect sizes were minimal, suggesting the phenomenon of multiple use episodes is not unique to any particular sub-group. Therefore, all clients should be counseled about the importance of daily use throughout periods of risk, and effective non-daily dosing regimens and complementary counseling should be explored for those with intermittent risk.

MOPED619

The role of peer lay health worker programmes in improving retention in HIV services

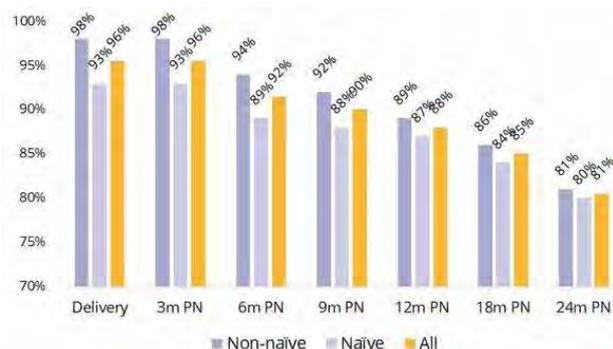
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BACKGROUND: Early identification and linkages to HIV care, supported by strategies to retain clients in care and support adherence to ART, are the cornerstones of universal testing-and-treating - a fundamental component of the global effort to control the HIV epidemic. mothers2mothers (m2m) implements a peer-based model to deliver integrated complementary HIV prevention, care and support services to women and their families by training and employing local HIV-positive women as frontline health-care workers in health facilities and communities.

METHODS: A retrospective cohort analysis was conducted among a sample of 691 HIV-positive pregnant women (79% of whom were treatment-naïve) who enrolled in the m2m programme between September 2014 and February 2015 in Eswatini, Kenya, Lesotho, Malawi and Uganda. Retention-in-care on ART was assessed by reviewing ART pick-up histories using health facility records. Medication pick-ups were tracked from time of enrolment with m2m until December 2017.

RESULTS: Amongst treatment-naïve clients, 85% started ART within 3 months of m2m enrolment. By time-of-delivery, 92% of treatment-naïve clients were on ART, and 96% were retained on treatment 3 months after initiation. While treatment-naïve clients are less likely to be retained at all points (see Figure 1), the gap between treatment naïve and non-naïve clients narrows over time from 5 percentage points to 1 percentage point. The retention rate among all clients is above 90% until six months post-delivery, and above 80% at 24 months post-delivery. Among treatment-naïve clients each additional Mentor Mother contact increased the chance of being retained by 30% before delivery, and 15% after delivery. A similar incremental effect of additional Mentor Mother contacts was not observed among non-naïve clients.



[Fig 1. Retention on ART among m2m supported clients]

CONCLUSIONS: This analysis demonstrates the role that peer-to-peer lay health care workers play in improving retention in HIV services, particularly among treatment naïve clients, who require support to overcome barriers regarding remaining-in-care and being adherent to treatment.

MOPED620

Same day ART initiation: Retention into HIV care remains a challenge, a TASO Mbarara experience

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BACKGROUND: WHO recommended test and treat for all following evidence from clinical trials on the efficacy of early ART initiation. Uganda launched the policy in 2016 and efforts have been put in place to identify new positives and start them on ART. Some studies have shown that same day ART initiation increases retention into care however this seems to be different in our setting. The objective of this analysis was to determine the retention levels for patients initiated on ART using same day initiation.

METHODS: Using the surge campaign since February 2018, we reached to targeted populations in the community by through peers, staff or VHTs. Approaches like small groups, moonlights, Bar to bar, index partner testing, VMMC platform were used. Pre and Post test counseling done by a team of staff that included counselors, laboratory technician and clinicians. Newly identified positives would immediately be initiated on ART after counseling and a next clinic appointment given. Those who would decline would be given an appointment within two weeks to come for ART initiation. Risk reduction interventions, PrEP, referral and linkage to other facilities would be offered. Follow ups would be made through phone calls or physical follow ups for missed appointments

RESULTS: February to September 2018, the facility initiated 615 on ART. An early monthly retention analysis shows that of the 615 enrolled, by August 2018 74% were still in care, worse trend being observed in July of 57%. Reasons for low retention 6 (1%) died, 35(5.7%) transferred out, 42(6.8%) were already in care at another facility, 12 declined to continue with ART, while 83 are lost to follow up. 437 are still in care.

CONCLUSIONS: Same day ART initiation is beneficial in reaching out to targeted populations, however there is need for adequate pre-ART preparation and understanding the dynamics of the different populations.

MOPED621

Is loss to follow up (LTFU) as defined by HIV treatment programs a true reflection of client retention in Northern Nigeria?

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BACKGROUND: Low client retention in care as a quality indicator across treatment programs remains a major concern. How LTFU which contributes largely into facility-based retention rates reflect into the national treatment quality of care remains to be fully understood. This study aims to demonstrate whether facility based LTFU rates is a true reflection of retention in care.

METHODS: A review of 3471 client LTFU in 17 ART clinics in north central Nigeria between September 1, 2014 and September 1, 2018. LTFU was defined as not coming for ART refill for a period of 90 days or longer from the last attendance for refill and not yet classified as 'dead' or 'transferred-out'. Clients were tracked via phone calls and a set of standardized questionnaires used to evaluate reasons for LTFU was documented. Multivariate analysis examined socio-demographic factors associated with LTFU.

RESULTS: 82% of clients who were tracked had relocated outside the locations of their clinics but are accessing ART in other facilities closer to their new settlements, while 8% discontinued based on faith healing.

LTFU were more among Christians than Muslims (87.3%-12.7%), female than males (55.3% - 44.7%), businessmen than artisans (37.3%-21.3%), clients with tertiary education than those with secondary school education (44%-41.3%), Married than never married (52.7%-41.3%).

CONCLUSIONS: Facility based retention rates as a quality indicator is not reflective of the National treatment retention rates as majority of the clients LTFU were accessing medication elsewhere. Treatment programs need to review this indicator to accommodate self-transfer and further strengthen the use of transfer out letters.

MOPED622

Open access program to improve engagement in HIV treatment and care services at an urban community health center

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BACKGROUND: Callen-Lorde, a community health center in New York City, provides primary care to the lesbian, gay, bisexual & transgender (LGBT) community and people living with HIV (PLWH). In 2016, we determined that 80% of no-show appointments were by 20% of our patients. Challenges to visit adherence may include biopsychosocial factors (depression, substance use, secrecy/stigma) and structural factors (health service-related barriers) that may be amenable to interventions. In 2017, we created open (same-day) access to patients for whom the standard model of scheduled appointments was not working as a strategy to improve engagement in care and quality of care outcomes.

METHODS: We used a combination of chronic illness indicators and social determinants of health to identify patients at risk for poor health outcomes. Of high-risk score patients, those that had missed three or more appointments in six months were placed in a program named Open Access (OA), and eligible for same-day walk in appointments. The OA eligible patients were flagged in the medical record and nurses scheduled them for same-day primary care visits. We analyzed trends in utilization and outcomes before and one year after OA implementation.

RESULTS: 160 patients accessed the OA program. Compared with the Callen-Lorde patient population (n=17,654), OA patients were more likely to be PLWH (89% (144/160) versus 31%), less likely to achieve viral suppression (67% (97/144) vs 85% and more likely to use methamphetamines (32% vs 4%). The OA cohort also experienced higher rates of homelessness (18% versus 8%). Fewer OA patients identified as transgender (18% versus 32%) but were more likely to use methamphetamines. After implementation viral suppression rates increased in the OA program from 67% (97/144) to 78% (113/144) (p-value .03).

CONCLUSIONS: The OA program improved engagement in care of patients with high-risk scores predictive of poor health outcomes. It has been successful at increasing HIV viral suppression rates by 11%. Flexible scheduling in an approach providers can use to significantly increase engagement with PLWH, those using methamphetamines, and transgender populations.

MOPED623

Differentiated service delivery using a "community pharmacy art drug pickup" model: An evaluation from Lusaka, Zambia

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BACKGROUND: To remain engaged on ART, people living with HIV (PLHIV) face barriers related to transportation costs, time away from work, competing life priorities, and long wait times in congested ART clinics. In response to these barriers, in 2015, WHO recommended providing high-quality, client-centered HIV care using differentiated service delivery (DSD) approaches that adapt HIV services in ways that better meet the needs of PLHIV. We developed a new DSD model, the Community Phar-

macy Dispensation (CPD) model, which we implemented within a large PEPFAR-funded HIV prevention, treatment, and care program in Lusaka, Zambia. We describe the model and early results herein.

METHODS: We implemented the CPD model in the catchment areas of 3 urban, high-volume (>4,500 patients in care) ART clinics beginning in August 2018. CPD enables community retail pharmacies to be used as ART collection points for patients struggling with ART refill collection from health facilities during normal operating hours. Stable in-care patients (defined as HIV-positive, on ART >6 months, not acutely ill, CD4 >=200/ μ l and viral load < 1,000 copies/ml) were eligible for CPD and were assigned a neighboring retail pharmacy for collecting a 3-month ART supply. CPD model refills alternated with refills provided by the main facility pharmacy to encourage 6-monthly clinical follow-up. We use descriptive statistics to report CPD model uptake and retention.

RESULTS: Over August–December 2018, we engaged 5 retail community pharmacies to join the CPD model. During this time, 237 clients enrolled, with increasing monthly enrollments over time. Enrollment was highest among PLHIV 25–49 years (67%) and lowest among those 15–19 (0%). Enrollments were significantly higher among females 144 (61%) than males 93 (39%) (p < 0.001). All 237 patients presented for their scheduled ART collections across all 5 participating community pharmacies suggesting 100% retention.

CONCLUSIONS: The CPD model was acceptable to ART-treated PLHIV, particularly adult females, with increasing enrollments across facilities with time. The CPD model also appears to support care retention for established, stable patients on ART. To improve enrollment and maximize the public health benefits of this model, further community sensitization and integration with facility-based clinical services are needed.

MOPED624

Clinical outcomes of adolescents living with HIV after transitioning to adult care: A systematic review

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BACKGROUND: Adolescents living with HIV (ALWH) who undergo health-care transition (HCT) from pediatric to adult care face several challenges that increase their risk of experiencing treatment interruptions and being lost to HIV care. To date, few studies have examined their outcomes post-HCT, precluding the development and dissemination of evidence-based interventions aimed at retaining ALWH in HIV care both during and after HCT. We conducted a systematic review to synthesize the outcomes of ALWH post-HCT to provide suggestions for future directions.

METHODS: We systematically searched several electronic databases through April 2018 using keywords for HIV, HCT and ALWH. We categorized studies by target population, country (i.e., upper-high income and low-middle income), study design (i.e., descriptive, mixed methods, quantitative), outcomes measured, and follow-up period.

RESULTS: Of 882 articles identified, 14 studies met inclusion criteria. These studies were categorized according to the following HCT outcomes: retention in HIV care post-HCT (n = 11), changes in CD4+ count and viral load post-HCT (n = 8), and mortality among ALWH post-HCT (n = 6). Most of the studies (79%) were focused on youth from high-income countries with the remainder focusing on youth from low-middle income countries. Most studies (n = 11) indicated that more than 75% of ALWH were retained in care 1-2 years post-HCT while the remaining studies (n = 3) reported retention rates less than 50%. Most studies showed that CD4+ counts and viral loads worsened for ALWH during the first few years post-HCT; however, these differences were often not statistically significant. Regarding mortality rates, relatively few ALWH died within their first seven years post-HCT.

CONCLUSIONS: Results indicate that ALWH have fair to good outcomes post-HCT. However, differences in operational definitions across studies and populations limit our ability to best characterize ALWHs' transition outcomes.

Therefore, we make the following suggestions:

1) implement standardized definitions of treatment retention and virologic failure to facilitate cross-study comparisons;

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2) conduct adequately powered clinical trials, which could lead to the dissemination and implementation of evidenced-based interventions for ALWH, and;
3) conduct more studies in low-middle income countries to provide better characterizations of the ALWHs' HCT outcomes.

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MOPED625

Lost to follow-up tracking drive - Mission 'SAMPARK' in Gujarat

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BACKGROUND: Mission "SAMPARK was launched on 1st December 2017 by Hon. Minister of State, Ministry of Health and Family Welfare, Govt. of India to reach out to all the Lost to follow-up(LFU) clients and linking them back to Anti Retro-viral therapy. In Gujarat It has been observed that more than 50% of LFU cases occurred in first three to six months of ART therapy. But before that the duplication removal and cleaning of the list of nearly 16954 PLHIVs under LFU category to arrive at accurate figures was needed. The outcomes of Mission Sampark Drive will help to understand challenges and possible reason of lost to follow-up cases and to develop strategy for improving retention.

METHODS: During the Mission Sampark drive, total 16836 LFU Clients were contacted in person by Vihaan staff in Gujarat. Out of which 5706 were LFU before 2010 and remaining were after 2010.

RESULTS: Definite outcome (Brought back, transferred out, death or opted out) was received for 3587(21%) of them, while indefinite outcome (migrated or wrong address) was 11406(68%). while results of visits were pending for remaining 1843(11%) of the cases. It was evident that definite outcome was higher for the recent LFU (51% for those LFU during 2016) in comparison to old LFU (10% for those LFU before 2010). The increasing trend of definite outcome was observed over the years of LFU reported. Some reasons for LFU like ART side effects (15.9%), Self-stigma and disclosure related issues (12.5%), HIV status not accepted (12%), Superstitious belief (2.3%) were also identified during this drive. Most of them are counselling related issues.

CONCLUSIONS: It is clearly evident that the definite outcome is higher in recent LFU. The focus on ART preparedness, continuous health education, adherence to ART and its side effects can improve retention by preventing LFU. Address verification and periodically updates of contact details should be done by CSC staff on regular basis to prevent indefinite outcomes.

Linkage between HIV testing and treatment services

MOPED626

Partner notification services optimize HIV case identification and linkage to treatment among key populations in Kenya

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BACKGROUND: Despite constituting less than 1% of the population, key populations (KPs) in Kenya are disproportionately affected by HIV and contribute up to one-third of new HIV infections in the country. However, identification of HIV-positive KP individuals continues to be a challenge, with the national KP program reporting case identification rates of 2% per annum. LINKAGES Kenya, a USAID- and PEPFAR-funded KP project, implemented the partner notification services (PNS) strategy to identify and link to treatment HIV-positive KP individuals in Kenya.

METHODS: Health care workers (HCWs) from 11 implementing partners across eight counties were trained on PNS. Data were analyzed to identify and flag HIV-positive KPs within the program, with priority given to newly identified HIV-positive KP individuals or KP individuals with high viral loads (above 1000 copies/ml). The HIV-positive KP individuals were contacted and asked to return for a visit or were followed up at routine visits during which they were asked to disclose their social and sexual contacts over the preceding 12 months. HCWs, in collaboration with the HIV-positive index individuals, made efforts to offer an HIV test to contacts identified. Descriptive statistics were used to summarize case identification outcomes.

RESULTS: From October 2017 to November 2018, 19 HCWs screened and offered PNS to 288 HIV-positive members of KPs (223 men who have sex with men [MSM], 65 female sex workers [FSWs]). The majority of MSM (70%) were ages 15-29 years, while the majority of FSWs (46%) were ages 30-49 years. A total of 587 contacts (544 male, 43 female) were elicited, of whom 72 were known HIV positive individuals (69 males, three females). Of the 507 contacts eligible for HIV testing, 71% were tested for HIV (338 males, 21 females), of whom 51 (14%) were newly identified as positive (37 males, 14 females), representing a fivefold increase in case identification compared to the previous year. All but two males were successfully linked to treatment.

CONCLUSIONS: The use of PNS substantially increased HIV case identification among KPs. PNS should be scaled up in KP programs to attain the global 95-95-95 goals and for public health impact.

MOPED627

Lottery incentives decrease time to ART initiation for South African men: Results from a randomized pilot study

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BACKGROUND: Among PLWH in South Africa, viral suppression is lower among men (45%) than women (65%). Conditional lottery incentives, which reward current behavior with a chance to win a prize, are hypothesized to motivate present-day engagement in HIV care for future health gains.

METHODS: We conducted a randomized, prospective trial of lottery incentives in the context of community-based HIV testing and linkage in rural KwaZulu-Natal, South Africa. HIV-positive men were randomly allocated to: lottery incentives and text messages or motivational text messages only at each step of the care continuum (clinic registration, ART initiation, and viral suppression). After completing each step, participants in the lottery arm were notified whether they had won and were encouraged to continue in care. Lottery prize eligibility was conditional on clinic registration, ART initiation, or viral suppression by 1, 3, and 6 months, respectively. Lottery prizes were either a mobile phone, data, or a gift card (valued at R1000/\$100). Relative risks were generated using modified Poisson regression for binary outcomes, adjusted for age. The primary outcome was viral suppression at 12 months.

RESULTS: Between November 2017 and December 2018, we tested 741 persons for HIV and enrolled 131 eligible HIV-positive men. At baseline, 62% of participants were 30 years and older, 73% were unemployed, and the median CD4 count was 472 cells/mL. At study exit, 83% (110/131) of participants had visited a clinic and 61% (81/131) were virally suppressed. Compared to text messages, lottery incentives decreased the median time to ART initiation from 126 to 66 days ($p=0.004$, age-adjusted Cox regression) among all participants, and, from 134 days to 20 days ($p=0.008$) among participants who were not virally suppressed at baseline. Lottery incentives had a small but non-significant effect on clinic registration ($RR=1.21$, 95% CI: 0.83-1.76) and on viral suppression at 12 months ($RR=1.13$, 95% CI: 0.73-1.75) compared to text messages.

CONCLUSIONS: Conditional lottery incentives shortened the time to ART initiation among South African men, with a trend towards increased viral suppression. Short term behavioral economics strategies can decrease time to ART initiation, but require strengthening or adaptation to engage men in care to achieve and sustain viral suppression.

MOPED628

Use of mHealth to improve linkage to care outcomes and documentation in population based household surveys

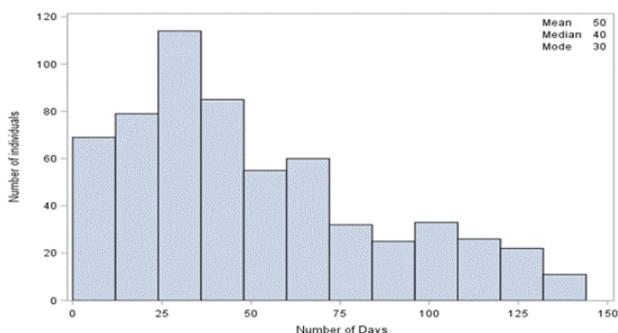
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BACKGROUND: The Nigeria AIDS Indicator and Impact Survey (NAIS), a population-based household survey, identified people who did not previously know their HIV-positive status. We developed a smartphone model to confirm they were linked to care and documented outcomes.

METHODS: NAIS participants received HIV home-based testing and counselling. HIV test results were returned immediately. NAIS participants newly diagnosed HIV-positive were linked to care through (1st) a referral letter to any healthcare facility of their choice from a directory of healthcare facilities providing HIV care and treatment services in Nigeria and (2nd) active linkage to care with consent for direct support from a designated Community Based Organization (CBO). A combination of Unstructured Supplementary Service Data (USSD) code and participant identification (PTID) was dialed by a facility focal person to notify NAIS that a participant enrolled for care at the facility. Active linkage was initiated if participants did not enroll for care at their facility of choice within seven days of receiving their HIV-positive diagnosis. A CBO focal person followed up with the participant to complete linkage and start antiretroviral treatment (ART). Status was registered in a database and a Linkage to Care Dashboard.

RESULTS: From July 17 through August 31, 2018, of 1,085 HIV-positive individuals identified in 12 states, 687 (63.3%) were people who were newly diagnosed HIV-positive. Among the newly diagnosed, 663 (96.5%) were actively linked to a healthcare facility, over 1/3rd within the first 30 days (fig 1). Among those linked to care, 442 (66.7%), started on ART.



[Figure 1: Time to linkage to care for newly diagnosed HIV-positive participants, NAIS 2018]

CONCLUSIONS: NAIS incorporated a successful active linkage model, using focal persons, USSD codes, and a dashboard to confirm linkage to care for newly diagnosed HIV-positive participants. The NAIS active linkage model could be used beyond surveys to improve linkage to care from community-based activities to healthcare facilities in comprehensive HIV programs.

MOPED629

Human resources for health increases linkage between HIV testing and treatment in Zimbabwe

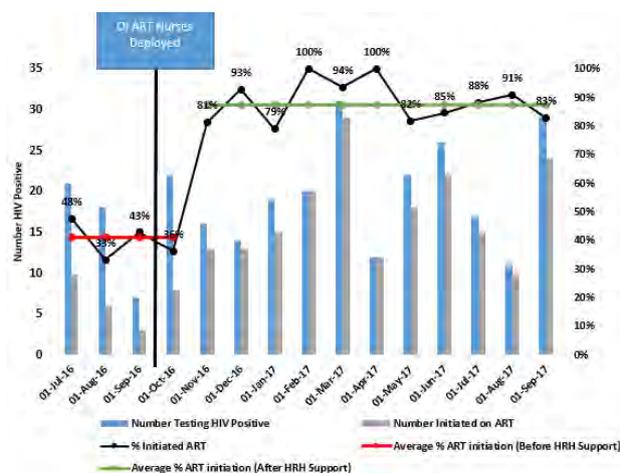
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BACKGROUND: With an adult HIV prevalence of 14.6%, Zimbabwe is committed to UNAIDS 90-90-90 global fast track targets. However, linkage between HIV testing and treatment accounts for greatest 'leakage' across the HIV service cascade. Shortage of human resources for health (HRH) is an acknowledged obstacle to scale-up and quality of HIV services. Our objective was to examine the effect of HRH support for PLHIV' access to quality and sustained HIV treatment.

METHODS: Purposive selection of 27 high burdened health facilities in five districts of Manicaland province were provided HRH support (OI/ART nurses and primary care counsellors) in November 2016. An assessment was conducted in January 2018 at five facilities. Retrospective cohort data of adults (15 \geq years) diagnosed HIV positive at facilities, July 2016 to September 2017 was abstracted and analysed descriptively using STATA v12. Nurse in charge perspectives were sought qualitatively to understand observed trends.

RESULTS:

General increasing pattern in linkages to HIV treatment from a low of 56% (99/177) from July-September 2016 to 72% (138/193) in January-March 2017. This further increased to an average of 81% and 82%, April-June and July-September 2017, respectively. Impact was significantly greater at high volume facilities as compared to low volume facilities attributed in part to small numbers at low volume facilities (unstable proportions). Improvements were attributed to: consistent availability of dedicated staff for adequate and quality counselling, improved efficiencies and reduction in waiting times for newly diagnosed clients to initiate HIV treatment.



[Figure 1: Improved Linkages to HIV treatment at a high volume facility, Gaza Clinic, Chippinge Distri]

CONCLUSIONS: We demonstrate positive impact of supporting HRH in a low resource, high burden setting. Impact of HRH on linkages was greatest at high volume facilities with multiple service entry points for HIV diagnosis. Findings have been disseminated across the national HIV care and treatment program and used to prioritise HRH placement at high volume facilities in Zimbabwe towards achieving the second 90.

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MOPED630

Optimizing individual and public health benefits of assisted HIV self-testing through effective linkages to services for men who have sex with men and transgender women in LaosK. Sayabounthavong¹, V. Keokhamsone², O. Souphavanh³, V. Phonelameuang³, C. Ounaphome³, P. Philakone³, R. Vannakit⁴, P. Southalack¹, P. Girault⁵¹National Center for HIV/AIDS and STI, Lao PDR Ministry of Health, Vientiane Capital, Lao People's Democratic Republic, ²Lao Positive Health Association, Vientiane Capital, Lao People's Democratic Republic, ³FHI 360, LINKAGES Laos Project., Vientiane Capital, Lao People's Democratic Republic, ⁴USAID Regional Development Mission Asia, Bangkok, Thailand, ⁵FHI 360, LINKAGES Laos Project., Bangkok, Thailand

BACKGROUND: Since the inception of the USAID- and PEPFAR-supported LINKAGES project in Lao PDR in 2016, assisted HIV-self-testing (HIVST) has been implemented by Lao Positive Health Association (Lao-PHA), a community-based organization, in coordination with governmental health authorities and facilities. Community-based supporters (CBS) refer those screened reactive to HIV testing and counselling (HTC) services and, if confirmed HIV positive, to care and treatment (CT) services for anti-retroviral treatment (ART) initiation. To optimize linkages to these services, CBS conduct systematic follow-up through regular contacts via phone or social media (private message) and offer navigation assistance to services. Using program monitoring data, the project explored whether current strategies used to strengthen linkages between community and facility were effective for optimizing individual and public health benefits of HIVST in project context.

METHODS: Data were collected between October 2017 to September 2018 from men who have sex with men (MSM) and transgender women (TGW) reached by the project in three targeted provinces. CBS and health care providers of the referral network used the CommCare application to enter data and confirm the linkages between community and facilities. Data were then merged using tracking referral codes generated by the CommCare system. A cross-sectional descriptive analysis was conducted to estimate proportions summarizing successful linkages to services for those screened reactive.

RESULTS: A total of 2,985 MSM and TGW (de-duplicated) undertook unassisted HIVST, of whom 173 (6%) were screened reactive and referred to HTC services. Out of the total referred to facilities, 156 (90%) accessed HTC services for confirmatory HIV testing, were diagnosed HIV positive, and referred to CT services. Out of the total referred to CT services, 151 (97%) accessed these services, of whom 128 (85%) were initiated on ART. Using the total number of MSM and TGW screened reactive as the denominator, almost three fourths of them (74%) were linked to HTC and CT services and initiated on ARV.

CONCLUSIONS: Effective linkages to confirmatory testing and CT services remained optimal during the observed period. Systematic follow-up contacts and navigation services for people screened reactive are critical strategies for maximizing individual and public health benefits of HIVST.

MOPED631

Calculating HIV reactivity rates amongst deferred blood donors at a tertiary hospital in Ghana to exemplify how health services limit progress towards 90-90-90S. Chitty^{1,2}, R. Gyere³, R. Sewornu³, M. Wells², T. Barber⁴, H. Tagbor²
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BACKGROUND: At Volta Regional Hospital (VRH), Ho, Ghana, deferred blood donors with reactive HIV, Hepatitis B (HBV), Hepatitis C (HCV) and syphilis (VDRL) screens are not currently given their results or linked to care. By describing infection prevalence amongst this cohort, we can show how this practice impedes progress towards even the 'first 90' of UNAIDS 90-90-90.

METHODS: Infection screen results of all prospective donors at VRH between 1st December 2017 and 30th November 2018 were analysed to calculate rates of each infection and co-infections.

RESULTS: The total 2783 screens included 1997 'fixed' (attending the blood bank) and 786 'mobile' donors (17 community sessions). 8% (n=168) of fixed and 38% (n=296) of mobile donors were female.

2.4% of fixed donors were reactive for HIV (n=48, 1 female), 5.1% for HBV (n=102, 6 female), 1.6% for HCV (n=37, 0 female) and 3.0% for VDRL (n=60, 2 female), with mean ages of 32, 30, 28 and 28 years respectively. 0.75% (n=15, 0 female) had dual reactivity, mostly HCV/VDRL (n=7). 0.05% (n=1, male) had triple reactivity: HBV/HCV/VDRL. 8.3% (n=4) of fixed donors reactive for HIV have potential co-infection, most commonly VDRL (n=2), and 27% (n=13) reactive for VDRL have potential co-infection with at least 1 blood-borne virus.

3.6% of mobile donors were reactive for HIV (n=28), 2% for HBV (n=16), 1% for HCV (n=8) and 2% for VDRL (n=16), though screen data for 5 sessions were not found. Total cohort prevalences were 2.9%, 4.2%, 1.6% and 2.7% for HIV, HBV, HCV and VDRL respectively.

On average there was 1 reactive HIV result per week, and 2, 1 and 1 per week for HBV, HCV and VDRL respectively.

CONCLUSIONS: Current deferred donor care at VRH limits progress towards even the 'first 90' by denying significant numbers of asymptomatic people the opportunity to know their HIV (and other infection) status and be linked to care. Providing results and care-linkage would not create significant additional demand for the hospital's HIV or medical services. Optimising deferred donor care in all relevant healthcare facilities would improve Ghana's progress towards 90-90-90.

MOPED632

Alcoholic venue screening: A novel point of engagement with a hard-to-reach population of men for HIV testing and linkage to care in rural South AfricaK. Choi¹, J. Jones², R. Brooks³, A. Moll⁴, G. Friedland³, S. Shenoi³
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BACKGROUND: Men in Sub-Saharan Africa are a hard to reach population for HIV testing and prevention efforts. In rural, resource-limited areas such as KwaZulu-Natal, South Africa, shebeens (local bars) are important social settings for this demographic, where alcohol consumption contributes to disinhibition of risky sexual behaviors. We report on the outcomes of engaging men at the shebeens in a community-outreach program, with capacity building with local government for linkage-to-care.

METHODS: From July-December 2018, a male community health worker team, stationed outside shebeens, engaged members of the community for screening. Individuals were tested using a fingerstick rapid diagnostic test and confirmed with a separate rapid diagnostic test. Those identified with HIV were counselled and linked to their preferred clinic or the local district hospital for antiretroviral therapy. The local Msinga District of Health transported patients from remote areas to the local district hospital.

RESULTS: Among 1177 participants at 156 shebeens, 72.6% were male, the median age was 29 (IQR 22-49), and 10.9% were HIV positive. Among men, 8.6% were HIV positive and 40% were new diagnoses; among women, 16.6% were HIV positive and 28% were newly diagnosed (p=0.15). Of 30 newly diagnosed men, 20% had never before tested for HIV. Among 33 men referred to care, 15 (45%) were linked to care and initiated on ART, and 18 were lost to follow up (54%). Barriers to linkage to care included transportation, lack of trust of clinic staff, and alcohol use.

CONCLUSIONS: Targeting shebeens is feasible for engaging men in rural South Africa for HIV testing. Linkage to care remains problematic; innovative community-based models of care are needed to improve HIV outcomes for this hard-to-reach population.

MOPED633

Early results from Test and Start implementation in Luanda, Angola

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BACKGROUND: With an HIV prevalence of 2% and ART treatment coverage of 26%, Angola faces significant challenges to ensure timely HIV diagnosis and access to treatment for people living with HIV (PLHIV). As part of a national effort to improve treatment coverage, the Angolan National AIDS Institute (INLS), with the support of ICAP at Columbia University, designed a phased implementation plan of the Test and Treat (T&T) strategy launched at 15 Health Facilities (HF) in Luanda province in January 2018. As part of the phase 1 scale-up plan, INLS conducted an evaluation of early implementation results and identified lessons learned to inform national roll-out.

METHODS: INLS reviewed retrospective aggregate data from the HTS and ART registers at the 15 HF. Data from pre and post implementation (November 2017 and August 2018 respectively) were analyzed to assess changes in HIV diagnosis, linkage to care and treatment among those tested HIV positive and timing of ART initiation.

RESULTS: The number of individuals with a new HIV diagnosis was comparable pre and post T&T [837 in Nov 17 and 843 in August 18]. Following T&T implementation, linkage to care increased from 59.7% (500/837) in November 2017 to 80.9% (682/843) in August 2018. Linkage to treatment improved from 51.9% (435/837) to 75.1% (633/843). Following the launch of T&T, 60% of all patients initiating ART did so on the same day as diagnosis, and 88% initiated ART within 15 days of diagnosis.

CONCLUSIONS: Results of T&T implementation demonstrate important improvements in linkage to care and treatment, including rapid ART initiation, aligned with the WHO guidance. Further evaluation of the impact of T&T implementation on health facility burden and patients' outcomes is needed, including impact of T&T on retention and viral suppression, considering INLS is scaling up T&T implementation to 2 new provinces by January 2019.

MOPED634

Interventions to improve linkage to HIV care in the era of "Treat All" in sub-Saharan Africa: A systematic review

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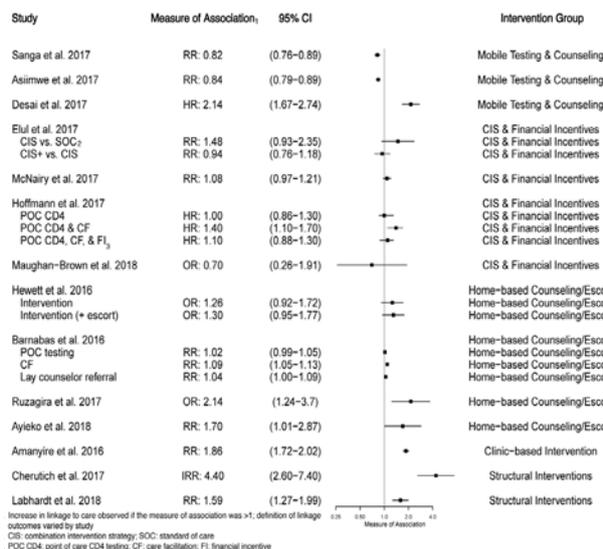
BACKGROUND: In 2015, the World Health Organization (WHO) recommended antiretroviral therapy (ART) for all people living with HIV (PLHIV) regardless of CD4 count and/or WHO clinical staging ("Treat All"). This policy shift created a much larger, diverse group of PLHIV in Sub-Saharan Africa who now require linkage to HIV care, including new diagnoses, formerly treatment ineligible PLHIV, and those who are lost to follow-up (LTFU). To better understand how to bolster linkage to care in this new era, we conducted a systematic review of studies evaluating interventions to enhance linkage to care in sub-Saharan Africa after Treat All was recommended.

METHODS: In August 2018, we searched PubMed/MEDLINE, EMBASE, CENTRAL, and Web of Science for relevant articles. We grouped included studies by intervention type and qualitatively analyzed the effectiveness of their interventions on linkage to care.

RESULTS: The search yielded fourteen eligible articles which reported interventions that varied widely, but were categorized into four groups: mobile/home testing and counseling, combination intervention strategies and financial incentives, home-based counseling and/or clinic escort, and supply-side interventions (Figure 1). Increases in linkage were reported by sup-

ply-side interventions (e.g., same day ART initiation, improved clinic training and procedures, and accelerated partner tracing) and counseling interventions (e.g., structured phone calls and home-based counseling). Mobile HIV testing and economic incentives did not increase linkage (Figure 1).

CONCLUSIONS: Given the recent nature of the ART guidelines and the lag time between adoption and implementation, only two of the studies were conducted in a setting that had implemented Treat All, and none of the interventions specifically focused on re-linking PLHIV who were previously on ART and had disengaged from care. Future studies must design linkage interventions that target not only PLHIV who are newly diagnosed or who have never been in care, but should also explicitly focus on PLHIV who have disengaged from care.



[Figure 1. Relative changes in linkage to care associated with each intervention, Sub-Saharan Africa 2014-2018]

MOPED635

Non-linkage to care after same-day ART initiation - reasons and acquisition of drug resistance: 24-month follow-up of non-linkers to care from the CASCADE trial in Lesotho

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BACKGROUND: The CASCADE trial, conducted in Lesotho, compared the offer of same-day antiretroviral therapy (ART) initiation (SD; one-month supply of ART dispensed upon on-site counselling) with usual care for individuals diagnosed with HIV during home-based testing. The SD arm had significantly higher linkage to care and viral suppression after 12 months (Labhardt et al. JAMA.2018;319(11):1103). In this follow-up study, we assessed reasons for non-linkage and the acquisition of drug resistance among non-linkers in the SD arm.

METHODS: SD participants who had not linked within 12 months were traced at 24 months. Those refusing care were interviewed, and their 24-month and baseline blood samples were analysed by Next-Generation Sequencing considering mutations prevalent at $\geq 1\%$.

RESULTS: At 24 months, of 37 SD non-linkers, 2 (5%) were dead, 15 (41%) were lost to follow-up, 13 (35%) were refusing care, and 7 (19%) had linked >12 months after testing. Among the 7 late linkers, 6 had viral load results and 5 were suppressed to < 1000 c/mL.

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8/13 (62%) participants refusing care were interviewed. Of these, 2 (25%) reported initial adherence to the one-month ART supply but subsequently did not link, citing transport costs and perceived ill-treatment by health-care professionals, respectively, as reasons. At 24 months, both had acquired drug resistance (patient_1: K103N, V106M; patient_2: K103N, P225H). The remaining 6 (75%) claimed never to have started ART, citing as reasons: fear of being on medication (n=3), uncertainty of own capacity for adherence, unreadiness for lifelong treatment, reliance on traditional medicine (n=2), not feeling well-informed about the ART regimen, working in South Africa, and doubting the HIV diagnosis. Among those who self-reportedly had not started ART, the non-acquisition of new drug resistance could be confirmed in all 4 who had available blood samples.

CONCLUSIONS: Despite a small sample size, our data suggest that many non-linkers never take ART and are thus not exposed to the risk of acquiring drug resistance. Moreover, most with delayed linkage achieved viral suppression. However, two participants initially took ART and developed drug resistance. During same-day ART initiation, patients should be cautioned as to the risk of drug resistance upon non-linkage after ART exposure.

Indicators of quality of care

MOPED636

Rapid initiation of ART through a Quality Improvement Collaborative in Zimbabwe

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BACKGROUND: Rapid initiation of ART, including on the day diagnosis, among clients with no contraindications has potential clinical and programmatic benefits. The benefits may not be realized due to structural, client and provider related barriers[1]. We implemented a Quality Improvement Collaborative with the aim to initiate ALL PLHIV on ART, on the same day where feasible, improve early retention in care and expand access to viral load monitoring in Zimbabwe.

[1] BIBLIOGRAPHY Pilcher, C. et al., 2017. The Effect of Same-Day Observed Initiation of Antiretroviral Therapy on HIV Viral Load and Treatment Outcomes in a U.S. Public Health Setting. *Journal of Acquired Immune Deficiency Syndrome*, 74(1), pp. 44-51.

METHODS: A modified QIC model in which 27 multidisciplinary teams worked together in a structured way to improve performance using the model for improvement was employed. Learning sessions, wherein teams shared experiences and exchanged ideas were followed by action periods of testing and implementing rapid cycles of change. Supported by quality improvement coaches, the teams reviewed data, conducted root-cause analysis and tracked progress using simple tools and run charts.

RESULTS: 26,665 clients were newly diagnosed during the period of implementation of which 71% were initiated on ART on the same day and 79% within a week of diagnosis.

The proportion of clients initiated on ART on the day of diagnosis per month increased from 54% to 81%.

More females were initiated on the day of diagnosis than males.

There were no significant differences between adults and children.

The proportion of clients who missed scheduled appointments by more than three days within the first three months of ART decreased by 7%. Viral load testing at 6 months of ART increased from 16% to 40% whilst 92% were suppressed at 6 months.

82% of the clients who were initiated on ART were still active in care and at the same site by the end of the Collaborative.

CONCLUSIONS: Rapid initiation of ART is feasible and acceptable in resource constrained high-prevalence settings. However, an individualized approach to client preparation and readiness assessment should be employed and systems should be strengthened to support early retention, adherence and viral suppression

MOPED637

Adam's Love 7-Milestones positive journey map: A novel online-to-offline (O2O) HIV care strategy for early linkage to treatment and optimal retention in care among Thai HIV-positive MSM

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BACKGROUND: Despite rapid proliferation of digital 4.0 technologies, Thailand lacks an integrated online linkage support system, a key factor behind delayed linkage to antiretroviral treatment (ART) and lower rates of viral suppression among Thai HIV-positive men who have sex with men (MSM). Novel models that overcome barriers in traditional face-to-face outreach and transform HIV care delivery are critical to optimizing HIV cascades.

METHODS: Adam's Love (www.adamslove.org/wecare), leading technology-based MSM health initiative leveraged a 7-Milestones positive journey map built upon its novel online-to-offline (O2O) model. Seven key milestones included

- 1) enrolled newly diagnosed MSM registering at Adam's Love instant-messaging platforms (LINE/Messenger) and receiving eCounseling,
- 2) completing healthcare insurance procedures/formalities,
- 3) successful referral and early linkage to care,
- 4) ART initiation,
- 5) optimal ART adherence achieved through individualized eCounseling support and daily-personalized ART reminders,
- 6) retention in care, and
- 7) MSM successfully achieving an undetectable viral load (UVL).

We measured the impact of the innovation on the milestones accomplished.

RESULTS: Between March 2017-December 2018, Adam's Love referred 1,350 MSM and linked 997 (73.9%) to HIV testing sites across Thailand. Of 219 Thai MSM diagnosed HIV-positive, 96 MSM located in Bangkok (68.1%) and other provinces (31.9%) enrolled in the study. Median (IQR) age was 26 years (24-30), 89.6% self-identified as gay and 10.4% bisexual. Majority (61.5%) had attained a bachelor's degree. Almost half (46.9%) had sought sex online. Participants located outside Bangkok were comparatively younger (< 25 years) (49%vs.30%). All 96 MSM were successfully linked to care, 94 initiated ART and 91 accepted daily ART reminders. Majority 48/94 MSM (51%) accessed treatment through social security scheme, 34 (36%) via universal health coverage, 5% were self-paid and others 8%. At month 6, self-reported mean score of daily ART adherence was 97.23 (SD 5.72). By December 2018, 45 MSM successfully achieved an UVL and median (IQR) time between enrollment and UVL was 7 (6-9) months. Fifteen MSM shared success stories through www.myundetectablestory.org. Adam's Love user-driven platform to empower future participants.

CONCLUSIONS: Our innovation simplified post-diagnosis procedures for HIV-positive MSM and outlines practical pathways for providers and communities in resource-limited settings to overcome barriers in conventional service delivery.

MOPED638

Patient satisfaction feedback (PSF) for ART services in Cambodia

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BACKGROUND: Cambodian ART services have been successful in identifying and initiating HIV+ clients on ART, but the country still faces challenges in meeting the UNAIDS 90-90-90 targets. In 2018, 3,734 new HIV cases were diagnosed and 59,164 PLHIV were on ART (83% of all estimated PLHIV). However, 118 (3.2%) of the newly diagnosed PLHIV were lost to follow-up after 6 months of ART, representing 6% of the total ART cohort of 1,877 dropping out of care. To better understand these losses, the PSF survey of ART services was implemented to assess patients' perceptions and possible service-related reasons for dissatisfaction and drop-out.

METHODS: The National Center for HIV AIDS Dermatology and Sexually Transmitted Infections selected 8 ART facilities to assess the feasibility and acceptability of the PSF tool. A pad-based tool was developed based on the USAID- and PEPFAR-supported LINKAGES project's electronic client feedback system employed in other countries. It was designed to be self-administered by ART clients to elicit perceptions and experiences regarding all aspects of care and perceived stigma. Steps included pre-testing tablet use; monthly monitoring for feedback from facility staff; data review meetings with ART sites to support interpretation of findings and discuss challenges and solution of implementation

RESULTS: 3,062 ART service clients completed the questionnaires from July- December 2018. Low literacy made self-completion difficult for some (10%) requiring staff time to assist, possibly influencing client comments. 86% were satisfied with HIV clinic services, felt their information was kept confidential; needs were met. However, 37% reported long waits and repeat visits were bothersome. During survey results discussions, staff were responsive to client comments and addressed modifications of clinic SOPs to reduce wait times and repeat visits which were thought to contribute to drop-out rates.

CONCLUSIONS: The PSF tool enabled PLHIV to provide feedback on their perceived quality of the HIV-related services they received. The data were used to improve service delivery aimed at increasing satisfaction, reducing loss to follow-up and increasing the number of PLHIV achieving viral load suppression. PSF provides NCHADS information to inform policy and guidelines to address the needs of clients and improving service delivery systems.

Use of e-health/m-health

MOPED639

Feasibility and acceptability of a biometric mHealth system for monitoring retention in HIV services and delivering financial incentives to adults initiating antiretroviral therapy in Tanzania

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BACKGROUND: Growing evidence demonstrates the effectiveness of financial incentives for increasing retention in HIV services. However, these findings derive primarily from interventions with complex and rigidly administered protocols, which may prove difficult to widely implement within overburdened health care systems.

METHODS: In preparation for a large field trial and future scale-up of financial incentives, we designed and evaluated a biometric mHealth system to monitor, summarize, and display real-time HIV clinic attendance and to deliver incentives via mobile banking. Deployed using tablet computers and fingerprint scanners within the pharmacy, the system was designed by a local technology firm to automatically disburse payments upon patient recognition at monthly visits. We assessed the feasibility and acceptability of the system among pharmacy staff and adults who had recently initiated ART (< 30 days) at four facilities in Shinyanga, Tanzania (2 hospitals, 1 health center, 1 dispensary).

RESULTS: From April to December 2018, 98% of patients approached about the study (600/615) expressed interest in participating and 98% of those eligible (530/543) provided informed consent including fingerprint registration. Overall, 62% of participants were female and the median age was 35 years. Most participants had access to a mobile banking account (77% overall; 78% female; 76% male) of whom 99% consented to mobile payments. Over 8 months, the system automatically disbursed 78% of 1138 total payments via mobile banking; 2.8% required manual re-sending due to network failures and 20% were cash payments to par-

ticipants without registered mobile banking. Fingerprint recognition succeeded for 63% of visits while 37% required manual entry of the patient's unique identification number due to poor image quality. The system was acceptable to pharmacy staff, however a minority had difficulty operating the tablet, overseeing high quality fingerprint scans, or incorporating the technology into their daily workflow.

CONCLUSIONS: Biometric identification and mobile payments were acceptable to most patients and staff in this semi-rural region of Tanzania. Fingerprint recognition encountered some feasibility limitations in the first months of testing, however payments via mobile banking were highly successful. Biometric identification and mobile payments may provide a scalable mechanism to improve patient tracking and efficiently implement financial incentives in low-income country settings.

MOPED640

Viral suppression among HIV patients who receive SMS reminders for clinic appointments: Experience from USAID Boresha Afya program in Southern Tanzania

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BACKGROUND: Successful HIV care and treatment essentially depends on adherence to life-long Antiretroviral Therapy (ART) requiring regular clinic appointments for medication refill, HIV Viral Load (HVL) sample collection and adherence counseling. Missed clinic appointments is one of the challenges faced by HIV care and treatment centers in Tanzania, leading to treatment interruption, poor adherence, persistent HVL and ultimately poor patient outcome. Forgetfulness has been identified as one of reasons causing patients to miss their appointments. In this study, HVL suppression rate of patients who successfully received Short Message Services (SMS) reminders for clinic appointments was compared with overall program suppression rate.

METHODS: In April 2017, the program deployed SMS reminder system in 50 health facilities and scaled up to 190 facilities by end of September 2018. Patients received SMS message three days before their appointment date and in the morning of their appointment reminding them to attend clinics as scheduled. Analysis of routine collected patient data from electronic patient database (CTC2 database) and SMS reminder database was done for July-September 2018 period. Data analyzed was from 5 high volume facilities in 3 program supported regions. Using STATA, data analysis of patients aged 15 years or more who successfully received SMS reminders was done for the outcome of viral suppression and comparison with the overall program viral suppression was done.

RESULTS: Out of 3,470 patients analyzed, females were 2,232 (64%) and males were 1,238 (36%). Females tested were 1,049 and males tested were 611. Overall, viral suppression rate among patients on SMS reminder system was 90% (1,501/1,660) which was higher than program viral suppression rate of 85% (p = 0.00001). Suppression rate among female patients was 91% (955/1049) while that of males was 89% (546/611), which were also high compared to program suppression rate of 86% (p=0.0000) and 84% (p=0.0008) among females and males respectively.

CONCLUSIONS: Use of SMS reminder to ensure patients adhere to their clinic appointment dates improves adherence to treatment, viral suppression and ultimately patient outcome. Achieving viral suppression is key to achieving HIV epidemic control. There is need to scale up SMS reminder services coverage in order to ensure better patient outcome.

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MOPED641

Effectiveness of short message service (SMS) reminders on timely pick-up of antiretroviral therapy (ART) among consenting HIV-positive adults in Zambézia province, Mozambique

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BACKGROUND: Informed by mHealth interventional studies showing improved ART appointment attendance with cellphone messaging, an SMS reminders service was rolled out to eight health facilities (HF) in Zambézia province, Mozambique; beginning in July 2016. We assessed effectiveness by comparing ART pick-up rates among adult patients sent SMS reminders.

METHODS: All HIV-positive adult patients (≥ 15 years) enrolled in ART services reporting cellphone access were offered SMS reminders. Consenting patients were sent messages 15, 7, and 2 days prior to scheduled ART pick-up dates. Using routinely-collected program data (July 2016-May 2018), mixed effect logistic regression was used to determine adjusted odds ratios (aOR) of ART pick-up within 2, 6, and 59 days of scheduled appointments (i.e. on-time, prior to defaulting, and prior to loss-to-follow-up, respectively), adjusting for gender, age, adherence support group, partner status, pregnancy, education, occupation, years on ART, HF, weekday of appointment, and week of pick-up.

RESULTS: We compiled data regarding 18,941 scheduled ART pick-ups for 3,222 patients reporting cellphone access. Among these patients, 47.2% of males and 45.9% of females consented to SMS service. Females who declined SMS were more likely to pick up ART within 2, 6, and 59 days of scheduled appointments than males who declined SMS (Table). Males sent SMS reminders were 22% more likely to pick up ART within 2 days of scheduled appointments than males not sent SMS reminders. Females sent SMS reminders had similar ART pick-up rates when compared to females not sent SMS reminders. Older adults were more likely to pick up their ART compared to those that were younger.

CONCLUSIONS: In Zambézia province, SMS reminders provide a short-term positive effect on timely ART pick-up among consenting males, although this effect attenuates over time. Additional context-specific strategies need to be implemented to secure timely ART pick-up and improve retention in care.

		ART pick-up within 0-2 days of scheduled		ART pick-up within 6 days of scheduled		ART pick-up within 59 days of scheduled	
Factor		Adjusted OR [95% CI]	p-value	Adjusted OR [95% CI]	p-value	Adjusted OR [95% CI]	p-value
Sex	Male	REF		REF		REF	
	Female	1.49 [1.34-1.66]	<0.001	1.74 [1.50-2.00]	<0.001	1.93 [1.55-2.40]	<0.001
Age	15-24 years	REF		REF		REF	
	25-49 years	1.15 [1.04-1.28]	0.01	1.28 [1.11-1.47]	<0.001	1.72 [1.40-2.12]	<0.001
	50+ years	1.43 [1.20-1.71]	<0.001	1.75 [1.38-2.22]	<0.001	2.61 [1.82-3.75]	<0.001
SMS effect on Males		1.22 [1.09-1.37]	<0.001	1.09 [0.95-1.25]	0.2	0.90 [0.74-1.10]	0.29
SMS effect on Females		0.94 [0.85-1.05]	0.28	0.90 [0.79-1.03]	0.12	0.89 [0.72-1.10]	0.28

[ART pick-up results]

MOPED642

Online and now within reach: Survey results for online populations at-risk for HIV in Cambodia

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BACKGROUND: In Cambodia, traditional physical HIV outreach to key populations (KPs) uses surveillance and community-level survey data to guide implementation; however, less data are available about populations at risk for HIV who are reachable online. Cambodia's National Council on HIV/AIDS, Dermatology and STDs (NCHADS), with the USAID- and PEP-FAR-funded LINKAGES project, developed a programmatic online survey to better understand this historically hard-to-reach population to guide future online HIV programming.

METHODS: The online survey included 40 questions covering demographics, HIV risk factors, use of online and mobile platforms, and preferences for receiving HIV information and services - all to better identify, reach, prioritize, and communicate with KPs online. For respondents, this survey was branded broadly for anyone wanting to provide feedback on Cambodia's HIV services; it was put on SurveyMonkey and advertised through social media and ads on dating apps March-May 2018. STATA statistical software was used in the analysis.

RESULTS: Among 1,056 complete responses, 670 (38%) reported experiencing an HIV risk factor in the past 6 months, 150 men reported same-sex sexual behavior, and 171 identified as transgender women. Table 1 includes some survey results segmented by MSM, TG, and respondents at risk for HIV. The audience reached by this survey was young, experienced many HIV risks, did not test for HIV frequently, actively used online platforms to find partners, and preferred to access HIV information and services online compared to physical peer outreach.

CONCLUSIONS: Our survey revealed a potentially large segment of people at risk for HIV, including KPs, who can be best reached through online and mobile platforms, which the national response now plans to implement. The survey did not successfully reach cis-gender women at risk for HIV, for whom future iterations of this tool will seek to learn more about.

Category	Data Point	All Respondents (N=1,056)	All at-risk (N=670)	MSM (N=150)	TG (N=171)
HIV risk factors in last 6 months (of 9 options)	Most common	35% - Sex without a condom	62% - Sex without a condom	49% - Sex without a condom	44% - Sex without a condom
	2nd most common	15% - Sex with multiple partners	27% - Sex with multiple partners	36% - Sex with multiple partners	33% - Sex with multiple partners
Access to HIV services	% never tested for HIV	43%	35%	30%	36%
	% of HIV+ on treatment	12% (N33)	9% (N22)	17% (N6)	20% (N5)
HIV service preferences: Channels to learn about HIV (of 6 options)	Most preferred	43% speak in person with a doctor	42% speak in person with a doctor	47% speak in person with a doctor	42% speak in person with a doctor
	2nd most preferred	41% social media or web search;	39% social media or web search;	41% chat online with a doctor	41% chat online with a doctor
	Least preferred	13% speak in person with peer worker	13% speak in person with peer worker	17% speak in person with peer worker	12% Hotline support
HIV service preferences: Channels to find HIV services (of 4 options)	Most preferred	66% Find services and book appointments online	67% Find services and book appointments online	65% Find services and book appointments online;	70% Find services and book appointments online
	Least preferred	8% friend referral	7% friend referral	9% friend referral	9% friend referral

[Cambodia's online survey results segmented by population]

Tuesday 23 July

Oral Abstract Sessions

TUAA01 HIV vaccines: Light at the end of the tunnel?

TUAA0101

Two-year post-vaccination follow-up from APPROACH: Phase 1/2a randomized study evaluating safety and immunogenicity of prophylactic HIV vaccine regimens combining Ad26.Mos.HIV and gp140 envelope protein

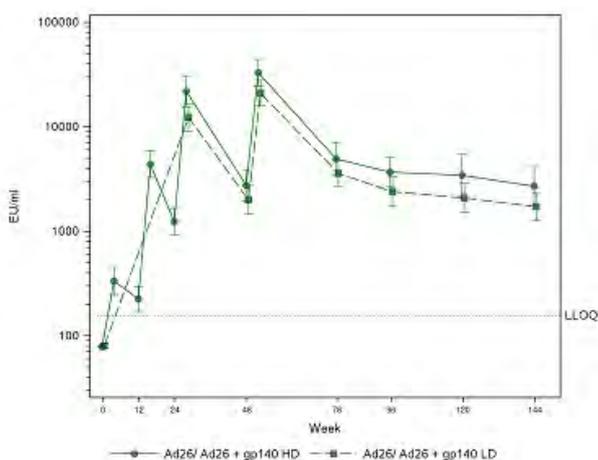
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BACKGROUND: Despite increased availability of new options for HIV prevention, the epidemic remains insufficiently controlled, highlighting the need for a prophylactic vaccine. In APPROACH we evaluated seven combinations of viral vectors expressing mosaic HIV-1 Env/Gag/Pol antigens and high-dose (HD) or low-dose (LD) aluminum phosphate adjuvanted clade C Env gp140 protein. All regimens were well tolerated and immunogenic. Two regimens were selected for longer-term follow-up.

METHODS: In this unblinded follow-up of APPROACH (phase 1/2a randomized, double-blind, placebo-controlled study) long-term safety and immunogenicity were evaluated at Wk120 and Wk144 in healthy uninfected adults who had received Ad26.Mos.HIV (week [Wk]0 and Wk12) and Ad26.Mos.HIV, gp140HD or LD (Wk24 and Wk48).

RESULTS: 65 participants (18-49 years) vaccinated with Ad26.Mos.HIV, gp140HD (32) or LD (33) entered the long-term follow-up (from Thailand, Rwanda, Uganda, South Africa and USA).

No serious adverse events were reported during follow-up. Immune responses were maintained in both groups with 100% responders to autologous Clade C ELISA at Wk120 and Wk144, in the HD group. Geometric mean titres were 3.5 and 3.3 Log₁₀ at Wk120, and 3.4 and 3.2 Log₁₀ at Wk144, in the HD and LD groups, respectively. Maintained responses were observed over the second year post last vaccination, remaining in the same range as those measured at Wk78 and Wk96. Comparison to a parallel NHP challenge study showed that Wk120 and Wk144 ELISA titers remained higher than NHP responses at Wk72 when they were protected against SHIV challenge.



[Env ELISA IgG-t gp140- Clade C (C97ZA.012)]

CONCLUSIONS: In this 2-year post-vaccination follow-up of APPROACH, we observed durable humoral immune responses over 2 years with 100% response rate in the participants receiving the Ad26.Mos.HIV, gp140HD vaccine regimen. No safety issues were seen. Additional immunological analyses and follow-up will continue (approximately 6 year post-vaccination).

TUAA0102

Protein-supplemented DNA/MVA vaccines: Preclinical immunogenicity and protection for transmitted/founder (B.63521Δ11mutC) and CD4-induced gp120 (rhFLSC) proteins

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BACKGROUND: In Phase 1 and 2a trials, a Clade B DNA/MVA HIV vaccine has elicited antibody (Ab) primarily directed to the gp41 subunit of Env. The only HIV vaccine to achieve some protection (RV144 trial in Thailand) induced antibodies exclusively against the gp120 subunit of Env and antibody to the V1V2 loop of gp120 correlated with reduced risk. Therefore, to enhance gp120 antibodies, including to the V1V2 loop of gp120, gp120 protein boosts are being added to the DNA/MVA vaccine.

METHODS: 72 rhesus macaques have been used in 3 trials testing B.63521Δ11mutC and rhFLSC protein boosts. Animals were primed IM with pGA2/JS7 DNA (3 mg) at weeks 0 and 8 and boosted IM with MVA/HIV62B (1x10⁸ TCID50) with or without IM or SC alum-adjuvanted protein boosts (100 or 300 µg) at weeks 16, 24 and 40. A repeated SHIV-162P3 challenge was delivered intra-rectally at 3 or 6 months post the last immunization. Animals were monitored for responding T cells, Ab to gp120, the V1V2, V3 and inner domain (ID2) regions of gp120, gp41 and infection.

RESULTS: Both gp120 proteins enhanced Ab responses to gp120 and V3 achieving hyperimmune sera of >1mg per ml for gp120. However, the CD4-induced rhFLSC protein was needed to enhance Ab to the V1V2 and ID2 regions of gp120. Ab to V1V2 peaked at estimated titers of 300 to 400 µg per ml after the 2nd boost whereas peak levels of Ab to ID2 increased with the 3rd boost. The protein boost enhanced CD4+ T cell responses to Env but not Gag. The vaccinations did not prevent infection but did increase control of post challenge viremia. The best control was achieved by the DNA prime and two boosts with MVA plus B.63521Δ11 plus rhFLSC. This protection correlated with the peak levels of binding Ab for gp120 (p=0.02, r= -0.5).

CONCLUSIONS: The gp120 protein boosts elicited high levels of Ab to gp120. Of the two tested gp120s, the CD4-induced gp120 elicited the highest Ab to V1V2 and the ID2 regions of gp120. Despite high levels of elicited Ab, protection was limited to post challenge control of viremia.

TUAA0103

A vaccine targeting HIV maturation protects Cynomolgus monkeys against vaginal SIVmac251 acquisition

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BACKGROUND: HIV-1 primarily infects a critical component of the human immune system, CD4+ T cells. It mutates rapidly, giving rise to extensive genetic diversity. These inherent characteristics underscore the greater challenges in developing a prophylactic HIV vaccine compared to those for other pathogens. Because activated CD4+ T cells are the primary targets

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of HIV-1, virus infection induces inflammation and immune activation that enhances susceptibility to HIV-1 infection by attracting target cells to the site of infection. These specific characteristics of HIV-1 infection suggest that effective vaccines to HIV-1 should:

- 1) reduce the likelihood of the virus finding its target cells;
 - 2) prevent the virus from entering target cells;
 - 3) destroy virally infected cells;
 - 4) cripple infectivity of the progeny viruses released from infected cells to abrogate infection, and;
 - 5) tackle the two important characteristics of HIV-1 that pose a challenge to designing effective HIV-1 vaccines, i.e. diversity and rapid mutation rate.
- With funding from NIH's "Innovation for HIV Vaccine Discovery" program and CIHR bridge fund, we conducted a more comprehensive evaluation of the efficacy of an HIV vaccine targeting HIV maturation (PCS vaccine) in female Mauritian *Cynomolgus* macaques.

METHODS: The PCS-vaccine delivers 12 20-amino acid peptides using two approaches, a modified recombinant vesicular stomatitis virus (rVSV-pcs) and nanoformulations (NANOpcs). Female Mauritian *Cynomolgus* macaques (8/group) were immunized 5 times at weeks 0, 6, 16, 52 and 72 with control rVSV vector or PCS-vaccine intramuscularly or intranasally. Six months after the last boost the macaques were intravaginally challenged with 250 TCID₅₀ of pathogenic SIVmac251 every two weeks. Viral load was monitored 6, 10 and 14 days after each challenge.

RESULTS: The PCS vaccine confers >80% risk reduction per SIVmac251 intravaginal challenge. The 75% of monkeys in the control group were infected after 4 challenges and it took only 2 challenges to infect 50% of control monkeys. It took 11 challenges to infect 50% of PCS vaccine vaccinated monkeys.

CONCLUSIONS: We showed for the first time that a candidate HIV vaccine targeting sequences surrounding the 12-protease cleavage sites, other than full Gag and Env can provide significant protection against pathogenic SIVmac251 intravaginal challenges.

TUAA0104

A helical structure in the V2 domain of gp120 that localizes to the site of immune pressure in the RV144 vaccine trial is conserved in HIV and SIV envelopes

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BACKGROUND: Integrin $\alpha_4\beta_7$, which binds with high affinity to both HIV and SIV gp120, mediates trafficking of both naive and memory CD4⁺T cells to gut tissues. A sieve analysis of the viral quasi-species in RV144 vaccine recipients, who became infected with HIV identified two residues (K¹⁶⁹, I¹⁸¹) in the V2 region of gp120 as sites of vaccine-mediated immune pressure. These residues overlap the binding site of integrin $\alpha_4\beta_7$ -specific mAbs derived from an RV144 vaccinee, that map to this site, block binding of gp120 to $\alpha_4\beta_7$. A prior study demonstrated that an $\alpha_4\beta_7$ mAb reduced the efficiency of SIV transmission in a macaque model of vaginal transmission.

These findings prompted us to characterize the nature of both HIV and SIV antibodies that block V2- $\alpha_4\beta_7$ interactions.

METHODS: SIV and HIV V2 mAbs derived from infection and vaccination were evaluated for their capacity to inhibit gp120- $\alpha_4\beta_7$ interactions using a cell-based adhesion assay. High-resolution structures of two of these antibodies were obtained by X-ray crystallography. mAb-gp120 affinities were measured by surface-plasmon-resonance (Biacore).

RESULTS: Non-neutralizing HIV and SIV V2 mAbs blocked gp120- $\alpha_4\beta_7$ adhesion. Unlike neutralizing mAbs that recognize a b-sheet that is present in stabilized HIV SOSIP gp120/41 trimers, $\alpha_4\beta_7$ -blocking mAbs recognize a helix structure that is present on unconstrained forms of V2. Remarkably, one of the SIV V2 blocking mAbs cross-reacted with HIV gp120, which is unusual, but consistent with a conserved $\alpha_4\beta_7$ -reactive helical structure in both HIV and SIV.

CONCLUSIONS: The capacity of non-neutralizing V2 domain antibodies to correlate with reduced risk in the RV144 vaccine trial has generated interest in alternative mechanisms of protection from infection. We find that the region of V2, that was linked with protection presents a structure that is distinct from the structure targeted by neutralizing mAbs, is conserved in both HIV and SIV, and encompasses the $\alpha_4\beta_7$ binding site. This conservation raises the possibility that V2-derived immunogens that present this structure may elicit broadly cross-reactive non-neutralizing antibody responses that block the interaction between HIV and $\alpha_4\beta_7$, and thus may play a role in vaccine-induced protection against HIV acquisition.

TUAA0105

Lessons from the Research in Viral Eradication of Reservoirs (RIVER) study: Impact of a therapeutic vaccine targeting conserved HIV epitopes on T cell function in treated primary infection

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BACKGROUND: RIVER is the first randomised controlled trial to assess an HIV eradication 'kick and kill' strategy: 60 participants who commenced ART within 4 weeks of confirmed primary HIV infection (PHI) were assigned to one of two groups ≥ 24 weeks later: ART-alone or ART plus therapeutic vaccines encoding conserved HIV sequences ('ChAd63.HIVconsv prime' followed by 'MVA.HIVconsv boost'), together with vorinostat, a latency-reversing agent over 4 weeks (ART+V+V). The lack of impact of ART+V+V on the viral reservoir, over ART-alone was measured by the frequency of CD4⁺ T cells harbouring HIV DNA, has been reported previously. Here we describe the trajectories of HIV-specific T cell responses in the two study arms.

METHODS: HIVconsv-specific T-cell responses were quantified in cryo-preserved peripheral blood mononuclear cells from all subjects by intracellular cytokine staining for IFN γ , TNF α , IL-2, CD154 (an activation marker) and CD107a, which indicates lytic potential. CD8⁺ T cell killing was assessed in virus inhibition assays (VIA), using elimination of HIV-super-infected Gag-positive CD4⁺ T cells as a read-out. Responses were measured at enrolment and randomisation to assess the effect of early ART and post-randomisation (PR) weeks 9 and 12 to assess the effect of V+V.

RESULTS: Polyfunctional HIVconsv-specific IFN γ +CD154⁺ CD4⁺ T cell frequencies declined markedly between enrolment and randomisation (medians 0.02% and 0.009%; $p=0.0001$, Mann-Whitney) but were significantly boosted after vaccination compared with ART-alone (PR_12 median 0.11% vs. 0.006%; $p<0.0001$). HIVconsv-specific IFN γ +CD107a⁺ CD8⁺ T cell frequencies declined marginally between enrolment and randomisation (medians 0.08% and 0.07%; $p=0.65$) and were also increased after vaccination (PR_12 median 0.26% vs. 0.06%; $p=0.0001$). ART+V+V-arm subjects also maintained CD8⁺ T cells with viral inhibitory capacity whereas these waned in ART-only subjects (3.4-fold difference in viral inhibitory activity at PR_12, $p=0.026$).

CONCLUSIONS: Along with suppression of plasma viraemia, early ART significantly reduces HIV-specific effector T cell frequencies and lytic capacity, likely by reducing antigenic drive. These responses were recovered to pre-therapy levels by vaccination targeting conserved HIV sequences demonstrating the potential for recovery of immune function with prime boost vaccination with ART in early treated PHI. This approach may enhance future combination HIV eradication strategies.

TUAA02 50 shades of reservoirs

TUAA0201

Preferential infection of $\alpha 4\beta 7$ + CD4+ T cells in early acute HIV-1 infection

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BACKGROUND: CD4+ T cells show differential susceptibility to HIV-1 infection, and better defining initial viral targets could have important implications for understanding pathogenesis and formation of viral reservoirs. We previously showed that CD4+ T cells expressing the gut homing integrin $\alpha 4\beta 7$ were associated with HIV acquisition and disease progression, and were rapidly depleted from the gastrointestinal mucosa during acute HIV infection. In non-human primates, preferential SIV detection in $\alpha 4\beta 7$ + CD4+ T cells was observed in the first 10 days of infection, but not subsequently; these data have not been confirmed in humans.

METHODS: PBMC were obtained from the RV254 acute HIV-1 infection cohort in Bangkok, Thailand. CD4+ T cells were FACS sorted on the basis of integrin-beta (clone: FIB504) surface expression into the following three subsets: CD45RA- $\alpha 4\beta 7$ -high, CD45RA+ $\alpha 4\beta 7$ -intermediate, and CD45RA- $\alpha 4\beta 7$ -negative. Cells were analyzed in triplicate for total and integrated HIV DNA by quantitative PCR. Correlation analyses were performed using non-parametric statistical tests.

RESULTS: Participants were all Thai men (median age 28) sampled during Fiebig stage II- III (n=6 each). All but one was infected by subtype CRF01_AE and identified a median of 14 days following HIV exposure, with a median plasma viral load (pVL) of 4.9×10^5 RNA copies/ml. Total and integrated HIV DNA from all subsets correlated strongly with each other and with pVL. CD4+ T cells expressing high $\alpha 4\beta 7$ levels were enriched in total and integrated HIV DNA compared to $\alpha 4\beta 7$ -low cells (p=0.03 and p=0.003, respectively). For integrated HIV DNA, $\alpha 4\beta 7$ -high CD4+ T cells harbored 8-fold more DNA than $\alpha 4\beta 7$ -negative cells on average, with increased $\alpha 4\beta 7$ -high HIV DNA in 10/12 participants. This effect did not differ by Fiebig stage, nor did it correlate with HIV exposure timing, pVL, CD4 count, or age. $\alpha 4\beta 7$ -intermediate (CD45RA+) cells contained 1-2 logs less HIV-1 DNA than both $\alpha 4\beta 7$ -negative or -high CD45RA-negative subsets.

CONCLUSIONS: These data support a role for $\alpha 4\beta 7$ + CD4+ T cells as preferential targets during very early HIV-1 acute infection, which may contribute toward seeding of gut HIV reservoirs. Efforts to better understand the causes and consequences of this effect may help to inform future HIV cure efforts.

TUAA0202

Cellular proliferation maintains genetically intact and defective HIV-1 over time

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BACKGROUND: An understanding of the mechanisms maintaining replication-competent HIV will be needed to design eradication therapies. We examined the role of cellular proliferation in maintaining intact and defective proviruses within memory CD4+ T-cell subsets from individuals on prolonged ART.

METHODS: Naïve, central (CM), transitional (TM), effector (EM), HLA-DR+ and HLA-DR- memory CD4+ T-cells were sorted from the peripheral blood of eight participants on long-term ART. Additional sequences from four participants were obtained four years later. Full-length individual proviral sequencing, which amplifies 92% of the genome, was used to characterise proviruses as intact or defective. Expansions of identical sequences (EIS) were classified as ≥ 2 identical sequences.

RESULTS: At the early time-point, 1041 sequences were obtained with 4% considered intact. The proportion of intact proviruses was different across cell subsets (p<0.001), with the highest in EM and HLA-DR+ cells. The proportion of intact and defective proviruses in an EIS was similar. When stratified by treatment duration, the proportion of all sequences in an EIS was higher in those on therapy for >14 years (n=6 participants). No intact expanded sequences were observed in participants on therapy for <5 years (n=2 participants). Expanded intact sequences were predominantly found in EM and HLA-DR+ cells, representing 24% and 17% of all intact sequences respectively. These intact expanded sequences were observed in two participants four years later. In two participants where no intact provirus was observed, large expansions of defective sequences predominated. In one participant these sequences expanded over four years, representing 41% (28/68) and 78% (167/215) of sequences at each time-point. The expansion in the second participant was stable, with 46% (110/241) and 45% (91/202) of sequences belonging to this EIS at each time-point.

CONCLUSIONS: Cellular proliferation contributes to the expansion of both intact and defective proviruses. Expansions of defective proviruses may dilute the number of intact proviruses and lead to difficulty in their identification. Genetically identical intact proviruses are enriched in HLA-DR+ and EM cells - cells with a higher proliferation potential - and these proviruses are stable over time. This indicates that the latent HIV reservoir is maintained in these peripheral blood T-cell subsets by proliferation.

TUAA0203

Adipose tissue contributes to viral persistence in ART-treated SIV.sab infection in pigtailed macaques

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BACKGROUND: Antiretroviral therapy (ART) effectively suppresses viremia in HIV-infected patients and SIV-infected RMs. Yet, ART does not restore immune integrity and is not curative, with the virus persisting in a latent reservoir and rebounding upon ART cessation. An increasing body of evidences suggests that adipose tissue (AdT) is a key anatomical reservoir that contributes to both viral persistence and chronic immune activation/inflammation. We used our new model of highly pathogenic SIV.sab infection of PTMs, treated with a coformulated combination of Emtric-

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itabine [FTC], tenofovir disoproxil fumarate [PMPA] and Dolutegravir [DTG] to address the role of AdT during viral infection.

METHODS: Six SIVsab-infected PTMs received the coformulated regimen for 14 months from 48 days post-infection (dpi). Plasma viral loads (pVLs) were quantified by qRT-PCR assay. Cells isolated from the AdT were immunophenotyped by flow-cytometry and immunohistochemistry (IHC). DNAscope and cell-associated DNA (CA-DNA) were also performed to evaluate viral persistence in the AdT.

RESULTS: ART resulted in a robust viral control between 16 and 164 days post-treatment (dpt), with only rare blips occurring during the follow-up. Large numbers of T cells were observed in both white and brown AdT and they were located both perivascularly or diffuse in the fat. The majority of the CD4+ T cells isolated from the AdT was of central memory phenotype and expressed low levels of Ki-67 and HLA-DR suggesting low levels of activation. DNAscope showed virus persistence in the blood vessels cells from AdT. CA-DNA measurements in cells isolated from AdT and on snap-frozen tissue fragments of abdominal skin, peritoneal fat and pericardial fat collected at the necropsy confirmed AdT as a virus reservoir. By IHC we showed that the cells infiltrating the AdT produce IL-6 and have an increased expression of MXA-1, indicating AdT as a source of residual INFL. **CONCLUSIONS:** Our study shows that the AdT is a major anatomical site of virus persistence and immune activation/inflammation in a new model of ART-treated SIV infection in Pigtail macaques. These findings confirm that AdT should be targeted by the HIV/SIV cure strategies.

TUAA0204

Selective death induction of HIV-1 infected myeloid reservoirs

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BACKGROUND: Existing antiretroviral therapy (ART) cannot efficiently eliminate HIV within the CNS. HIV persistence in myeloid sanctuaries represents a major barrier to eradication, and drives HIV associated neuro-cognitive dysfunction (HAND), which occurs in up to half of HIV-infected individuals even with well-controlled viremia. Safe, specific agents that selectively eliminate key cells harboring the myeloid reservoir are urgently needed. Our group has identified two safe, FDA approved agents rufinamide and bergenin (non-HIV indication) that demonstrate selectivity for killing of only HIV-infected macrophages.

METHODS: *Cell isolation:* Primary human macrophages were isolated from healthy donors and differentiated with GM-CSF. Memory T cells or activated CD4 T cells were isolated with magnetic beads (Miltenyi).

HIV infections: Macrophages were infected with HIV-1_{baal} (MOI 0.5) for 72 hr in the presence of 1 or 10 µM rufinamide or bergenin, HIV alone, or HIV+VPX (positive control). Effect on HIV infection was quantified (intracellular/extracellular p24, 2-LTR circles). Effect on cell killing of HIV-infected cultures+drug versus HIV infection alone, and HIV uninfected cells were quantified (FACS live/dead stain and MTT assay). Effect on dNTP pools and SAMHD1/pSAMHD1 were quantified.

RESULTS: Rufinamide and bergenin do not kill uninfected macrophages. Both agents demonstrate selectivity for killing HIV-infected macrophages, and increase cell killing in HIV-infected cultures 3-4 fold versus HIV-infected cultures without drug. Both agents significantly accelerate HIV replication in macrophages (intracellular and extracellular p24, and 2-LTR circles) versus HIV infection alone. Both agents increase dATP levels in macrophages, but do not modulate SAMHD1/pSAMHD1 levels.

CONCLUSIONS: Rufinamide and bergenin demonstrate selectivity for killing only HIV infected macrophages, and increase cell killing in HIV-infected cultures at least 4-fold versus HIV infected cultures without drug. Agents accelerate HIV replication in macrophages, implying acceleration results in selective cell death of infected macrophages. Acceleration of replication is coupled with increase in dATP, but not SAMHD1/pSAMHD1; regulation of acceleration and cell death is conferred by increased dNTPs but not directly by SAMHD1. Bergenin and rufinamide demonstrate selectivity towards killing of only HIV-infected macrophages, warranting further mechanistic studies to evaluate the use of these agents towards elimination of myeloid derived viral sanctuaries systemically and within the CNS.

TUAB01 HIV and pregnancy, beyond Dolutegravir

TUAB0101

Periconceptional antiretroviral exposure and central nervous system (CNS) and neural tube birth defects - data from Antiretroviral Pregnancy Registry (APR)

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BACKGROUND: Preliminary data from Tsepamo Botswana birth defects surveillance study identified potential neural tube defect (NTD) teratogenic signal in infants born to HIV-infected women receiving dolutegravir (DTG)-based antiretroviral therapy (ART) during the periconceptional period (before conception and into first trimester), compared with periconceptional non-DTG ART or women without HIV (0.67%, 0.12%, and 0.09%, respectively) (Jul2018 IAS Conference). This analysis aims to 1) describe CNS defect cases reported to APR, a voluntary, international, prospective exposure registry and 2) determine any increased risk by ART drug class.

METHODS: Data on prospectively enrolled pregnancies (Jan1989 through Jul2018) with birth outcome are summarized. Birth defects are reviewed by a dysmorphologist, coded by modified Metropolitan Atlanta Congenital Defects Program criteria, classified by organ system and assigned exposure timing for each antiretroviral. CNS defects include NTD (myelomeningocele/spina bifida, anencephaly) and encephalocele which is reported separately from NTD.

RESULTS: 20,064 pregnancies resulted in 20,413 fetal outcomes including 19,005 live births. Reported pregnancies are from North America (75%), Europe (8%), Africa (7%), South America (6%) and Asia (4%). Of the 19,005 live births with any ART exposure, 8,040 had periconceptional exposure, including 222 birth defect cases and 20 CNS defects (2 NTD and no encephalocele). See Table for drug class data.

Drug Class	Live Births N=19,005	Birth Defect Cases	Central Nervous System ^{1,2}	Neural Tube ¹	Encephalocele ²
Any ARV	8040	222	20	2	0
NRTI	7478	211	19	2	0
PI	3533	102	8	1	0
NtRTI	3269	72	7	2	0
NNRTI	2169	54	5	1	0
InSTI	604	16	1	0	0
PKE	226	6	0	0	0
EI	46	1	0	0	0

Note: A defect case with drug exposures to multiple classes is counted once in each applicable row.

¹Neural tube cases are a subset of CNS defects and are counted in both columns; NTD cases include myelomeningocele with hydrocephalus/chian malformation (US) and meningocele without hydrocephalus (US)

²Encephalocele cases are a subset of CNS defects and are counted in both columns

EI=entry inhibitor (enfuvirtide, maraviroc);

InSTI=integrase strand transfer inhibitor (dolutegravir, elvitegravir, raltegravir);

NNRTI=non-nucleoside analog reverse transcriptase inhibitor (delavirdine mesylate, efavirenz,

etravirine, nevirapine, rilpivirine);

NRTI=nucleoside analog reverse transcriptase inhibitor (abacavir, didanosine, emtricitabine,

entecavir, lamivudine, stavudine, telbivudine, zalcitabine, zidovudine);

NtRTI=nucleoside analog reverse transcriptase inhibitor (dolutegravir, tenofovir

alafenamide, tenofovir disoproxil fumarate);

PI=protease inhibitor (amprenavir, atazanavir, darunavir, fosamprenavir calcium, indinavir,

lopinavir/ritonavir, nelfinavir, ritonavir, saquinavir, tipranavir);

PKE=pharmacokinetic enhancer (cobicistat)

[Table. Number of CNS and NTD defect cases with periconceptional exposure by drug class. Antiretroviral Pregnancy Registry, Jan 1989 through 31 Jul 2018]

CONCLUSIONS: Twenty CNS defects (2 NTD) were observed among 8,040 birth outcomes with periconceptual ART exposure. Overall and drug class frequencies are consistent with observed low NTD prevalence (0.01%-0.1%) in developed countries where food folic acid fortification and antenatal folic acid supplementation are prevalent, reducing overall NTD occurrence. However, the number of pregnancies enrolled in the APR with exposure to newer drug classes such as integrase inhibitors (InSTIs) are insufficient to rule out or confirm any potential association with NTD. Healthcare providers are encouraged to continue to report pregnancies with prospective antiretroviral exposures to the APR, especially those involving newer antiretrovirals.

TUAB0102

Adverse pregnancy outcomes among HIV-positive women in the era of universal antiretroviral therapy (ART) remain elevated compared with HIV-negative women in Lesotho

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BACKGROUND: Prior to the ART era, adverse pregnancy outcomes were more common among HIV-positive than HIV-negative women. In the universal ART era, most HIV-positive pregnant women are receiving ART, many prior to pregnancy. There are conflicting data whether adverse pregnancy outcomes among HIV-positive women on ART in the current era of "test and treat" remain higher than among HIV-negative women.

METHODS: Pregnancy outcomes data were collected from an ongoing prospective study (started 2016) evaluating a multidisciplinary "Integrated Management Team to Improve Maternal-Child Outcomes (IMPROVE)" intervention to improve maternal-child health and HIV service uptake/retention. HIV-positive and HIV-negative pregnant women at 12 facilities in Lesotho were enrolled at their first antenatal visit (ANC) in a cluster randomized evaluation of the IMPROVE intervention vs standard of care, with prospective follow-up through 12-24 months postpartum. We used combined data from both randomized groups on delivery outcomes. Chi-square tests were used to test for statistical significance of differences between outcomes of HIV-positive vs HIV-negative women.

RESULTS: 1,002 women were enrolled, with delivery data captured for 903 women to date (563 HIV-positive and 340 HIV-negative). Mean gestational age at enrollment was 20 weeks regardless of HIV status. Among HIV-positive women, 74% knew their HIV status prior to their first ANC visit, with 92% already receiving ART (88% TDF+3TC+EFV); among women first diagnosed with HIV during pregnancy, 95% started on ART (98% TDF+3TC+EFV). HIV-positive women were more likely than HIV-negative women to experience a miscarriage or have a premature or low birthweight infant (mean 2.8kg vs 3.0kg, respectively) (Table). Stillbirths and congenital anomalies were non-significantly higher in HIV-positive than HIV-negative women (3.7% vs 2.1% and 2.0% vs 1.2%, respectively). Among HIV-positive women, timing of ART initiation was not associated with any of the measured outcomes.

CONCLUSIONS: Despite nearly universal ART, with most women on ART before pregnancy, adverse birth outcomes remained elevated among HIV-positive compared to HIV-negative women.

Adverse Birth Outcomes	HIV-Negative (n=340)	HIV-Positive (n=563)	P value
Miscarriage(<28 weeks gestation)	1/340 (0.3%)	15/563 (2.7%)	0.009
Stillbirth (>28 weeks gestation)	7/340 (2.1%)	21/563 (3.7%)	0.173
Prematurity (<37 weeks)	14/330 (4.2%)	45/541 (8.3%)	0.020
Low birth weight (<2500 g)	28/303 (9.2%)	75/487 (15.4%)	0.012
Congenital abnormality	4/332 (1.2%)	11/545 (2.0%)	0.470

[Pregnancy Outcomes among a cohort of women in Lesotho]

TUAB0103

Vaginal inflammation is associated with initiating antiretroviral therapy in pregnancy and with spontaneous preterm birth

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BACKGROUND: HIV infection and timing of ART initiation are associated with spontaneous preterm birth (sPTB) in some studies. Whether maternal immune mechanisms underpin this risk remains unclear. We evaluated plasma and vaginal inflammation by HIV serostatus (HIV+ vs. HIV-) and pre-conceptual ART exposure (ART+ vs. ART-) and assessed their association with sPTB.

METHODS: Peripheral plasma and mid-vaginal swab specimens were collected in the Zambian Preterm Birth Prevention Study cohort. Panels of 13 plasma and 14 vaginal fluid analytes were measured using a multiplex immunoassay from 241 paired baseline specimens (16-20 gestational weeks) of all HIV+ and sPTB women and a random subset of HIV- term birth women, using inverse-probability weighting to account for sampling. We repeated paired panels in 56 HIV+ women with repeat specimens (24-34 weeks). We used confirmatory factor analyses of plasma and vaginal inflammation to score inflammation and compared by HIV and ART sub-groups using linear regression. We assessed associations between 16-20 week pro-inflammatory scores in plasma and vaginal fluid and the risk of sPTB <37 weeks using univariate and multivariate logistic regression, excluding pregnancies with multiple gestation and short cervical length (strong sPTB predictors).

RESULTS: At baseline, HIV+ART- women (coef 0.33; p=0.02) had greater vaginal inflammation than their HIV- counterparts, but no significant difference was observed between HIV+ sub-groups. In repeat specimens, HIV+ART- women (most of whom started therapy between baseline and repeat) had greater vaginal inflammation than HIV+ART+ women (coef 0.57; p<0.01). In multivariate logistic regression, 1-2 prior preterm births (coef 1.4; p=0.02), 3 or more prior preterm births (coef 2.0; p=0.02), and vaginal inflammation (coef 1.04; p=0.03) positively correlated with sPTB. Plasma inflammation did not differ between HIV and/or ART sub-groups and was not correlated with sPTB in univariate or multivariate analyses.

CONCLUSIONS: Vaginal, but not systemic, inflammation in the midtrimester is associated with sPTB. In apparent contrast to epidemiologic reports of higher PTB risk among women on pre-conceptual ART, women newly starting ART in our cohort had higher vaginal inflammation than those who were on it at baseline. Further studies are underway to confirm these data with a larger sample size of our highly relevant African cohort.

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TUAB0104

Characterizing viral load burden among HIV-infected women at time of delivery: Findings from four tertiary obstetric units in Gauteng, South AfricaF. Moyo^{1,2,3}, A. Haeri Mazanderani^{4,5}, T. Murray^{4,6}, K.-G. Technau⁷, S. Carmona⁸, T. Kufa^{2,4}, G.G. Sherman^{4,6,7}

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BACKGROUND: In the South African public sector, antiretroviral therapy (ART) coverage amongst antenatal clients is estimated at >95% and 90% of all women on ART are virologically suppressed. We describe maternal viral load (VL) burden at four tertiary obstetric units in Gauteng, South Africa.

METHODS: Between June–December 2018, routine point-of-care VL and early infant diagnosis (EID) PCR testing was introduced at four tertiary obstetric units in Gauteng—three in Johannesburg (subdistricts B, D, F) and one in Tshwane. Testing was restricted to 08h00–16h00 during weekdays. All HIV-infected women and HIV-exposed neonates were eligible for HIV VL and EID tests respectively around time of delivery using Cepheid Xpert®. Proportions of viraemic women at delivery were calculated. Percentage testing coverage of maternal VL and neonatal EID were calculated using live-births to HIV-positive women, obtained from routine records. Programmatic laboratory data were used to determine intra-uterine (IU) transmission rates per unit.

RESULTS: Overall, there were 5764 live-births to HIV-positive women of whom 1892 (32.8%) women had a valid VL result and 3188 (55.3%) neonates had a valid EID test result. Overall median VL at delivery was < 40 copies/mL (IQR: 0–483). The proportion of women with a VL ≥50, ≥400 and ≥1000 copies/mL was 37.1%, 25.4% and 22.7%, respectively (Table 1). Both a higher proportion of viraemic women and intrauterine infected neonates were observed for the Tshwane unit (p=0.001). Percentage positivity rates amongst study participants were comparable to overall intra-uterine rates calculated from routine data suggesting generalisability.

CONCLUSIONS: Overall, >20% (n=429) HIV-infected women at time of delivery had a VL ≥1000 copies/mL suggesting higher VL burden compared to women on ART in general. Although testing coverage varied, % neonatal positivity approximated programmatic IU-transmission rates. Scale-up of VL monitoring and improving quality of antenatal care is required for elimination of mother-to-child transmission of HIV.

Site of Tertiary Obstetric Unit	Live births to HIV-positive woman	Maternal PoC VL				Neonatal PoC EID		Programmatic % IU transmission per Unit
		Valid VL result N (%)	Median VL cps/ml (IQR)	VL ≥50 cps/ml N (%)	VL ≥400 cps/ml N (%)	VL ≥1000* cps/ml N (%)	Valid EID result N (%)	
Johannesburg B	1529	914 (59.8)	<40 (0–269)	318 (34.8)	218 (23.9)	194 (21.2)	987 (64.6)	16 (1.6)
Johannesburg D	2297	376 (16.4)	<40 (0–242)	131 (34.8)	85 (22.6)	81 (21.5)	955 (41.6)	13 (1.4)
Johannesburg F	1173	268 (22.8)	<40 (0–258)	92 (34.3)	62 (23.1)	52 (19.4)	663 (56.5)	8 (1.2)
Tshwane Metro	765	334 (43.7)	<40 (0–7650)	160 (47.9)	115 (34.4)	102 (30.5)	583 (76.2)	19 (3.3)
Total	5764	1892 (32.8)	<40 (0–483)	701 (37.1)	480 (25.4)	429 (22.7)	3188 (55.3)	56 (1.8)

N, number VL, viral load EID, early infant diagnosis cps/ml, copies per millilitre PCR, polymerase chain reaction IU, intra-uterine PoC, point-of-care * Median VL= 26 000 cps/ml (IQR: 7 490–87 900)

[Maternal Viral Load and Early Infant Diagnosis PCR testing at delivery. Results from four tertiary obstetric units in Gauteng, South Africa.]

TUAB0105

Dual epidemics: The impact of HIV and obesity on pregnancy outcomes among women in South AfricaA. Bengtson¹, T. Phillips², S. le Roux², E.J. Abrams³, L. Myer²

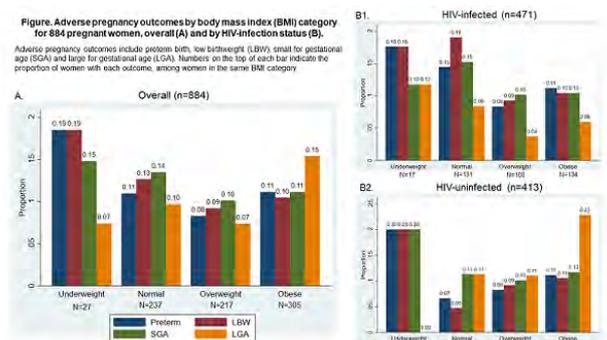
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BACKGROUND: South Africa faces dual epidemics of HIV and obesity. However, little research has explored the impact of HIV and obesity on pregnancy outcomes.

METHODS: We followed HIV-uninfected and HIV-infected pregnant women initiating antiretroviral therapy (ART) from first antenatal visit (ANC; baseline) through 12-months postpartum. At baseline, gestational age (GA) was estimated using ultrasound. Maternal anthropometry was measured at baseline and 12-months postpartum. Body mass index (BMI) was categorized as underweight (< 18.5 kg/m²), normal (18.5–< 25.0), overweight (25.0–< 30.0) and obese (≥30.0). We used modified Poisson regression to estimate associations between BMI category and adverse pregnancy outcomes, and explored modification by HIV-status.

RESULTS: We included 884 women (HIV-infected 53% and HIV-uninfected 47%). At baseline, 39% of women were obese and 3% underweight. Overall, 11% of infants were preterm (< 37 weeks' gestation, n=96), 11% were low birthweight (LBW, < 2500 g, n=100), 12% were small for GA (SGA, < 10th percentile for GA, n=102) and 11% were large for GA (LGA, >90th percentile for GA, n=95). In multivariable analyses, overall obesity was not associated with preterm birth (RR 0.89, 95% CI 0.53, 1.50) or LGA (RR 1.39, 95% CI 0.86, 2.25). Among HIV-uninfected women, obesity was associated with LGA (RR 2.15, 95% CI 1.15, 4.02), while being underweight increased the risk of LBW (RR 3.55, 95% CI 0.76, 16.60) and SGA (RR 1.86 95%, CI 0.49, 6.99), although estimates were imprecise. Among HIV-infected women, normal BMI women had the highest risk of LBW (19%) and SGA (15%) and few infants (6%) were LGA (Figure).

CONCLUSIONS: In our population, associations between BMI and adverse pregnancy outcomes differed by HIV-status. Among HIV-uninfected women, being obese or underweight may have increased the likelihood of several adverse pregnancy outcomes. Conversely, HIV-infected women at normal BMI were at higher risk of adverse outcomes, including LBW and SGA.



[Figure. Adverse pregnancy outcomes by body mass index (BMI) category for 884 pregnant women]

TUAC01 Prioritizing services for transgender populations

TUAC0101

Transgender people's experiences in HIV testing, sexual partner based violence and mental health in Malawi

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BACKGROUND: This study set out to establish the experiences of transgender people in relation to health seeking in Malawi. It focused on experiences with the health system in relation to HIV testing; partner sexual based violence; and mental health.

METHODS: The study was conducted in August 2018 in four administrative districts of Malawi. These were cities in the three regions and in addition, a rural district in the southern region. This was a cross sectional study utilizing mixed methods. The study population was people who identify themselves as transgender in Malawi. Data collection was conducted using a structured questionnaire that included a depression scale as well as Focus Group discussion (FGD) guide. Descriptive data analysis was conducted using SPSS v.22. Thematic content analysis using NVIVO was used for FGDs.

RESULTS: A total of 117 transgender people, comprising of self-reported transwomen (55.5%), transmen (41.0%) and genderqueer / non-binary (3.4%) participated in the study. Demographically, the sample was relatively young (mean age = 23.3, SD 4.0); and mostly out of school (70.7%). More than 80% were or had gone to high school. Regarding HIV testing, majority (91.5%) reported ever testing for HIV. It was established that majority had accessed HIV testing in nongovernmental transgender friendly drop in centres. However, their experiences with the health system was not good, with 42%, reporting ever feeling afraid to seek health care, 24% being ever denied health care by a health care provider because they were transgender. Almost a third (30.7%) reported being abused by their sexual partner. In terms of mental health, 64.8% reported features of common mental disorder while 23% had considered committing suicide in the past 12 months.

CONCLUSIONS: The study reveals that transgender people experience various difficulties that make them avoid seeking health care including HIV/AIDS related services; they experience partner sexual based violence and considerably high rates of mental health problems. In order to enhance HIV prevention and treatment, there is need for the creation of transgender safe spaces in Malawi.

TUAC0102

Acceptability of HIV and syphilis domiciliary testing among transgender women in Buenos Aires, Argentina

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BACKGROUND: HIV and syphilis, although easily diagnosed by simple laboratory low-cost methods, remain important health problems for transgender women (TGW), who face numerous barriers to access to the health system. This study aimed at assessing the acceptability of a domiciliary-provider-initiated HIV and syphilis testing strategy.

METHODS: From 5/2018 to 12/2018, a multidisciplinary team tested TGWs in rooming-houses and other venues. Inclusion criteria were: self-identified as TGW; ≥14 years old; previous HIV-negative >3 months or un-

known status; non-history of syphilis or previous episode with >6 months after treatment. Acceptability survey included 5 items with a 5 point-Likert scale, a satisfaction question, and comments. SD BIOLINE HIV/Syphilis Duo rapid tests (provided by Abbott) was used (detects antibodies to HIV-1 including subtype-O, HIV-2 and Treponema pallidum). HIV+ was confirmed by VL and positive treponemal tests were complemented with quantitative VDRL to identify active syphilis or past infection. All confirmed cases were referred for treatment initiation and follow-up.

RESULTS: A total of 68 TGW were tested with a median age of 26 (IQR: 25.7-29.8). Most of them were sex workers (77.9%). HIV prevalence was 4.4% and 50% had syphilis antibodies (26.5% indicating incident syphilis and 23.5% showing adequate response to previous treatment). Almost all (98.5%) considered the domiciliary rapid test as a very good/good strategy. Participants strongly agree that they: prefer simultaneous HIV and syphilis diagnosis test (60.3%), prefer to receive results the same day (85.3%), think this rapid test is safe and reliable (77.9%) and would be willing to repeat it in the future (95.6%). All participants strongly agreed that they would recommend this test to another TGW. The main comment was to include other STIs in rapid test (i.e., HBV, HCV, etc.).

CONCLUSIONS: TGW have a high prevalence of syphilis and HIV. Research activities constitute a fundamental input to inform evidence-based policies on the feasibility and acceptability of new strategies for the diagnosis of STIs that contributes to the development of appropriate and effective interventions to promote access to health services. Our pilot study showed that domiciliary rapid testing of STIs is a feasible, acceptable and a successful approach for this hard-to reach population.

TUAC0103

Evaluation of syndemics in transgender women using pre-exposure prophylaxis (PrEP) for HIV prevention: Preliminary findings

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BACKGROUND: Despite advances in HIV prevention, transgender women (transwomen) remain at increased risk for HIV infection. As seen in other key populations, syndemics, defined as synergistic psychosocial comorbidities, may exacerbate this risk. There are few studies describing Syndemics for transwomen in low-and-middle income countries (LMIC). We aimed to assess the prevalence of syndemics and high-risk behavior among transwomen in Rio de Janeiro, Brazil.

METHODS: This is a cross-sectional analysis of data collected at the screening visit of PrEPParadas, a pre-exposure prophylaxis (PrEP) demonstration trial designed for transwomen. Using standardized and validated questionnaires, participants were screened for a history of substance abuse, binge drinking, depression, sexual compulsive behavior and intimate partner violence. We considered the presence of 2+ aforementioned conditions as syndemics. We compared sexual behavior, substance abuse, history of child abuse and victimization among transwomen with and without evidence of syndemics using Chi-square tests.

RESULTS: Of 165 transwomen surveyed, 135 had valid results and were included in the present analysis. The median age was 30 years (interquartile range 24-26) 25.4% were black, 28.4% completed an elementary school education, and 44% were currently unemployed. The prevalence of syndemics was 46.6%. Transwomen presenting syndemics had statistically significant higher prevalences of tobacco abuse, alcohol abuse, cocaine abuse, sexual and violence victimization, child abuse and suicidal risk, as compared to non-syndemic transwomen (Table 1). There were no statistical differences between groups regarding transactional sex (overall prevalence 73.5%), unprotected anal sex (82.6%), and history of sexually transmitted infections (24.2%).

CONCLUSIONS: The prevalence of syndemics was high in Brazilian transwomen. Improvements in targeted interventions for mental health and social vulnerabilities are necessary in this population, Syndemics must be considered when designing PrEP engagement and adherence strategies for transwomen in order to improve and reduce the prevalence of HIV infection.

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Characteristic	No Syndemic (n=71)	Syndemic (n=63)	Total (n=135)	P value
Age - median (IQR)	31 (26, 36.5)	27 (23, 35.5)	30 (24, 36)	0.031
Black color/race	12 (16.9)	22 (34.9)	34 (25.4)	0.007
High school education or higher	52 (73.2)	42 (66.7)	94 (70.1)	0.337
Currently unemployed	28 (39.4)	31 (49.2)	59 (44)	0.014
Tobacco abuse	23 (32.4)	39 (61.9)	62 (46.3)	<0.001
Alcohol abuse	4 (5.6)	17 (27)	21 (15.7)	<0.001
Cocaine abuse	1 (1.4)	17 (27)	18 (13.4)	<0.001
Child abuse	29 (40.8)	39 (61.9)	68 (50.7)	0.015
Suicide risk	2 (2.8)	21 (33.3)	23 (17.2)	<0.001
Victimization	29 (40.8)	49 (77.8)	78 (58.2)	<0.001

[Table 1. Characteristics of transwomen assessed at PreParadas study, according to syndemics, Rio de Janeiro, Brazil, 2017-2018.]

TUAC0104

Regular consumption of alcohol and risk of HIV infection in transgender women in Fortaleza, Northeast Brazil

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BACKGROUND: According to the Brazilian National Health Survey, the prevalence of regular alcohol consumption (RAC) is 24%. The World Health Organization warns: this level of consumption significantly impacts morbidity and mortality, increases the risk factor of HIV infection, and compromises adherence to antiretroviral treatment. Among transgender women (TW), alcohol consumption is much higher (50%-70%) compared to the general population. In addition, TW are 13 times more likely to contract HIV compared to women in the general population. We aimed to analyze factors associated to regular consumption of alcohol among TW in Fortaleza a large capital city (2,609,716 inhabitants) in Northeast Brazil.

METHODS: A cross-sectional research study "Divas Research" recruited 348 TW by Respondent Driven Sampling (RDS) between November 2016-March 2017. Participants were interviewed and the association of RAC (Daily/Weekly) during the last 3 months with HIV was analyzed. The estimates were weighted using RDSII estimator and we analyzed data by STATA 12 complex survey procedure. Descriptive statistics was used to describe the general characteristics and logistic regression to estimate odds ratios and 95% confidence interval.

RESULTS: Among 348 TW the proportion of regular consumption of alcohol in the last three months was 44.9% (95% CI: 39.3-50.5); 20.5% (95% CI: 13.6-27.4) tested positive for HIV. The profile of women that had RAC: 55% are more 25 years old, black (15,6%) or brown (69%), depressive symptoms (92%), low income (49%), without formal employment (85%) and with low schooling (97%). The odds of HIV infection was 2.1 times higher among TGW who consumed alcohol regularly (OR=2.1[95% CI: 1.04-4.2] and after adjusting have risco for RAC: smoking habit (OR=3.0 (1.7-5.3)) and use of crack/cocaine (OR = 4.4 (2.1-9.5)).

CONCLUSIONS: The RAC was twice higher compared to rates of Brazilian general population. Social and programmatic vulnerability, in addition to the difficulties of accessing health services, in Brazil, increases TW exposure to violence, high alcohol consumption and other drugs. We confirmed that such consumption increases the risk of HIV infection, results suggest a high need for continuous attention to the health of transsexuals who are exposed to factor to vulnerability social. The consumption prevention of licit and illicit drugs is need.

TUAC0105

Factors associated with current ART use among transwomen participating in TransAmigas study, São Paulo, Brazil

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BACKGROUND: Transwomen face a high prevalence of HIV infection globally, affected by a syndemic of poor economic, social and mental health indicators. In Brazil, this disparity persists despite universal healthcare. In the context of 90-90-90 treatment targets, transwomen may experience different barriers to retention in care and antiretroviral therapy (ART) use than other groups, yet few studies of high statistical power exist to provide insight into this question. We assess factors associated with current ART use among trans women enrolled in an ongoing peer-navigation (PN) intervention in São Paulo, Brazil.

METHODS: TransAmigas is a 9-month randomized pilot intervention study. Between May-December 2018, 113 HIV positive, 18+ transwomen were randomized to control (n=38) or peer navigation intervention (n=75). Interviewer-administered questionnaires were conducted at enrollment. Bivariate and multivariate Poisson regression models were employed to analyze current ART use association with sociodemographic and mental health indicators at baseline.

RESULTS: The majority (84.1%) of participants saw a doctor for HIV care at least once in the previous 12 months, while 73.5% were currently in care. 79.7% had taken ART at some point, but only 63.7% were currently on treatment. In the multivariate model, Being 35 years or older (adjusted Prevalence Ratio [aPR] 2.27; CI95% 1.29 - 3.99), as well as having 12 or more years of education (aPR 1.37; CI95% 1.05-1.78), were associated with current ART use. K10 mental distress scale score, ethnicity, income, housing stability, legal name rectification and employment status were not significantly associated with current ART use.

CONCLUSIONS: Using 90-90-90 as a benchmark, current ART use was considerably low in our sample, which may have hindered elucidation of meaningful predictors other than older age and higher education, which have been documented in other groups. Further research, including studies with larger samples, is needed to examine the unique barriers facing this vulnerable population.

	Current ART Use		aPR	p	CI95%
	No (%)	Yes (%)			
Age					
18 - 24 (ref)	15 (65.22)	8 (34.78)	1	-	-
25 - 34	18 (36.00)	32 (64.00)	1.74	0.065	0.97 - 3.11
35 or more	8 (20.00)	32 (80.00)	2.20	0.004	1.29 - 3.99
Education years					
less than 12 (ref)	32 (43.84)	11 (56.16)	1	-	-
12 or more	9 (22.50)	31 (77.50)	1.37	0.020	1.05 - 1.78

[Multivariate correlates of current ART use among HIV+ transwomen in São Paulo, Brazil, 2018]

TUAC02 Upping the ante: Prevention for impact

TUAC0201

Continuing low HIV incidence in the expanded pre-exposure prophylaxis (PrEP) implementation in communities - New South Wales study (EPIC-NSW)

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BACKGROUND: Randomized trials of oral PrEP in gay and bisexual men (GBM) have reported efficacy of close to 90%, with HIV infections occurring only in non-adherent participants. In the first 3700 EPIC-NSW participants followed for one year, incidence was 0.51/1000 person-years (PY) compared to an expected incidence of over 20/1000PY. Concern has been raised about long-term PrEP efficacy. We report HIV incidence in the expanded study cohort with extended follow-up

METHODS: EPIC-NSW is a population implementation study of daily oral PrEP based in 31 clinics across NSW, Australia. HIV diagnoses were reported 1) as serious adverse events, 2) through electronic medical record systems, and 3) in consenting participants (80%), by linkage to the state HIV register. Participants contributed PY from date of enrolment to date of HIV diagnosis or to 31/12/2018 in those who remained HIV-negative. PY incidence rates and 95% confidence intervals (CIs) were calculated. Hazard ratios (HRs) were estimated using Cox regression

RESULTS: 9708 participants (98.5% GBM) were enrolled between March 2016 and April 2018. Over 17,747PY of follow-up, there were 16 HIV diagnoses, with evidence of PrEP non-adherence in all cases. HIV incidence was 0.90/1000PY (95%CI 0.55-1.47). HIV incidence was higher in the younger ($p=0.007$), reaching 2.4/1000PY in those aged < 25. Incidence was higher in those who at baseline had either a rectal sexually transmitted infection (STI) or recent methamphetamine use, and incidence was highest in those who had both (8.93/1000PY, HR 48.9 95%CI 10.2-236). Incidence was not related to country of birth ($p=0.100$) or residing in a Sydney suburb with >10% of males identifying as gay ($p=0.615$).

CONCLUSIONS: Over a mean approaching 2 years of follow-up per person, PrEP remained highly effective, with incidence remaining below 1/1000PY overall. However, annual HIV incidence was about 1% in those who at baseline used methamphetamine and had a rectal STI.

Predictor	Level	Incidence per 1000 py	Hazard ratio	95% CI	P
Age	18-24	2.37	1	-	0.007
	25-34	1.02	0.43	0.14-1.36	
	35-44	0.21	0.09	0.01-0.78	
	>=45	0.26	0.11	0.01-0.94	
Rectal sexually transmissible infection	No	0.29	1	-	<0.001
	Yes	4.19	14.17	4.57-43.9	
Methamphetamine use	No	0.54	1	-	0.002
	Yes	2.54	4.70	1.75-12.7	

[Table: Baseline factors predictive of HIV infection in the EPIC-NSW study]

TUAC0202

Incidence of HIV-infection with daily or on-demand PrEP with TDF/FTC in Paris area. Update from the ANRS Prevenir Study

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BACKGROUND: On-demand PrEP with TDF/FTC has been recommended as an alternative to daily PrEP for MSM by EACS and IAS-USA guidelines, but has not been endorsed yet by WHO due to limited real-world experience.

METHODS: The ANRS Prevenir study is an ongoing prospective cohort study enrolling individuals at high risk for HIV infection on PrEP in Paris area. Both daily and on-demand PrEP were offered to MSM. At baseline, month 1 and every 3 months thereafter, subjects were tested for HIV using a 4th generation combined ELISA assay and other STIs and creatinine plasma levels were monitored. At each visit participants provided information regarding sexual behaviour, dosing regimen and adherence using computer assisted self-interviews. HIV and HCV incidence were assessed as well as safety and study retention.

RESULTS: From May 3rd 2017 to October 31st 2018, 2143 subjects were enrolled across 22 sites in the Paris region, 56% already being PrEP user (median duration 10 months). Median age was 36 years (IQR: 30-44), 98.7% were MSM. At enrolment, PrEP was used daily in 46.7% and on demand in 53.3% of participants. Median number of partners in the last 3 months was 15 (IQR: 7-25) in the daily group and 10 (5-15) in the on-demand group ($P<0.001$). Median number of condomless sex events in the prior 4 weeks was 2 (0-8) and 2 (0-4), respectively, ($P=0.04$). Current follow-up lasted 744 and 830 person-years (PY) in the daily and on-demand groups, respectively. HIV-1 incidence was 0 (95% CI: 0-0.5) and 0 (95% CI: 0-0.4) per 100 PY in the daily and on-demand groups, respectively; and HCV incidence was 0.67 and 0.60 per 100 PY, respectively ($P=0.865$). Ninety-two subjects discontinued the study during follow-up (4.3%) and 49 (2.2%) discontinued PrEP, but only one for drug-related adverse events (nausea/headache/dizziness).

CONCLUSIONS: In this ongoing PrEP cohort in Paris area, enrolling mainly MSM at high risk of HIV-acquisition, no breakthrough HIV-infection was reported so far in participants choosing either daily or on-demand PrEP, supporting continuing use of both dosing regimens in this population.

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TUAC0203

High adherence and sustained impact on HIV-1 incidence: Final results of an open-label extension trial of the dapivirine vaginal ring

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BACKGROUND: Phase III clinical trials (MTN-020/ASPIRE & IPM 027/The Ring Study) showed that a monthly vaginal ring containing 25 mg dapivirine was well-tolerated and reduced HIV-1 incidence by approximately 30% compared to placebo. This abstract presents the final results of MTN-025/HOPE, one of the two phase IIIb open-label extension trials of the dapivirine vaginal ring.

METHODS: HOPE initiated in July 2016 and concluded in August 2018. HIV-1 uninfected women who had participated in ASPIRE were offered 12 months of access to the dapivirine vaginal ring at 14 sites in Malawi, South Africa, Uganda, and Zimbabwe. Used rings were returned at each study visit (monthly for 3 months, then quarterly) and were tested for residual levels of dapivirine. HIV-1 serologic testing was done at each visit and archived, frozen plasma samples, collected quarterly, were tested for HIV-1 RNA to more precisely define incident infection, and infections occurring after enrollment and through the Month 12 visit were considered to have occurred on study. HIV-1 incidence was compared to that expected by weighted bootstrap sampling of the placebo arm of ASPIRE, matched on trial site, age, and presence of a curable sexually transmitted infection at trial entry; a limitation is lack of a contemporaneous placebo group in this open-label trial.

RESULTS: A total of 1456 women enrolled into HOPE. The median age was 31 years. At baseline, 1342 (92%) accepted the dapivirine vaginal ring; ring acceptance remained high: 90%, 89%, 87%, 83%, and 79% at Months 1, 2, 3, 6, and 9. 86% of returned rings had residual dapivirine levels consistent with some use during the prior month (>0.9 mg released). A total of 35 HIV-1 infections were observed (incidence 2.7 per 100 person-years, 95%CI 1.9-3.8). Expected HIV-1 incidence was 4.4 per 100 person-years (95% CI 3.2-5.8) in the absence of access to the dapivirine vaginal ring, and an incidence of ≤2.7 would be expected to occur in fewer than 33 in 10,000 samplings (0.33%).

CONCLUSIONS: Final results from this open-label extension trial of the dapivirine ring indicate high uptake and lower than anticipated HIV-1 incidence in this high-risk population.

TUAC0204

What is the effect of layered prevention interventions on HIV risk among adolescent girls in Zambia?

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BACKGROUND: HIV prevention efforts are increasingly addressing social/structural factors associated with adolescent girls' HIV vulnerability. However, there is limited evidence whether interventions that go beyond the health sector can decrease HIV risk among adolescent girls in high-incidence settings. We delineate the layered effects of social protection, education, and economic interventions on HIV-risk among urban adolescent girls in Zambia.

METHODS: Surveys—conducted March-May 2018—captured knowledge, attitudes, practices, program experiences, and HIV service uptake of 15- to 19-year-old women (n=487) enrolled in the DREAMS program in Lusaka and Ndola. We focus on 4 layers of program exposure: (1) Participated in some safe space/social asset building interventions (SSI), (2) Completed all SSIs and received a certificate (SSC), (3) Completed all SSIs and received educational support (SSC+Ed), and (4) Completed all SSIs and received educational support and cash transfer (SSC+Ed+CT). Poisson regressions assess association between program exposure and HIV-risk outcomes (HIV knowledge, consistent condom use, transactional sex, and intimate partner sexual violence).

RESULTS: Among respondents, 30% received only some SSIs, 32% completed all SSIs (SSC), 17% received SSC+Ed, and 21% received SSC+Ed+CT. There were no differences in HIV-risk outcomes between SSI and SSC groups, except that the SSC group was more likely to engage in transactional sex [IRR:1.05 (0.74-1.47)]. Compared to SSI only, respondents who received the SSC+Ed were significantly more likely to have comprehensive knowledge about HIV (Incidence-Rate Ratio [IRR:1.09, [1.02-1.15]]) and report consistent condom use (IRR:4.80 [3.35-6.87]) and less likely to experience sexual violence (IRR:0.31, [0.15-0.65]). Similar significant findings were found for respondents receiving SSC+Ed+CT. Respondents who received SSC+Ed+CT were significantly less likely to engage in transactional sex (IRR: 0.59, [0.43-0.80]), compared to the SSI group.

CONCLUSIONS: We provide empirical evidence of the value of going beyond the health sector for HIV prevention efforts. Safe space interventions alone did not seem to influence HIV-risk and findings around transactional sex warrant further investigation. Layering educational and economic interventions on top of safe spaces/social asset-building activities reduced HIV-risk among urban adolescent girls in Zambia.

	Program uptake %	HIV knowledge IRR (95% CI)	Consistent condom use IRR (95% CI)	Transactional sex IRR (95% CI)	Sexual violence IRR (95% CI)
Participated in some Safe Space interventions only (SSI)	30%	ref	ref	ref	ref
Completed all Safe Space interventions only (SSC)	32%	1.05 (0.97-1.13)	1.45 (0.58-3.59)	1.14 (1.03-1.27)	1.05 (0.74-1.47)
Completed all safe space interventions & received education support (SSC+Ed)	17%	1.09 (1.02-1.15)	4.80 (3.35-6.87)	(low power)	0.31 (0.15-0.65)
Completed all safe space interventions & received education support & cash transfer (SSC+Ed+CT)	21%	1.15 (1.09-1.20)	4.66 (4.35-5.00)	0.59 (0.43-0.80)	0.62 (0.48-0.80)

[Table 1. IRRs between program exposure and key HIV-risk factors]

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TUAC03 Start stop restart: Supporting effective PrEP use

TUAC0301

PrEP adherence and effect of drug level feedback among young African women in HPTN 082

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BACKGROUND: PrEP adherence was low in efficacy trials among African adolescent girls and young women (AGYW). Adherence among African AGYW after PrEP is known to be efficacious and with additional adherence support are unknown.

METHODS: HPTN 082 enrolled sexually-active AGYW ages 16-25 in Cape Town and Johannesburg, South Africa and Harare, Zimbabwe. AGYW were randomized to standard adherence support (counseling, 2-way SMS, and adherence clubs) or standard support *plus* drug level feedback at 2 and 3 months (M) with follow-up at M 6, 9 and 12. Adherence was assessed by tenofovir-diphosphate (TFV-DP) in dried blood spots (DBS) measuring use in the prior month, and plasma tenofovir (TFV) measuring use in the prior week; high adherence is defined as TFV-DP ≥ 700 fmol/punch and plasma TFV ≥ 40 ng/ml, given association with HIV protection in trials.

RESULTS: 427 AGYW started PrEP; median age was 21 and median VOICE risk score was 7 (score ≥ 5 associated with $\geq 6\%$ HIV incidence in prior cohorts). 212 AGYW were randomized to standard and 215 to drug level feedback; 74 (17%) discontinued PrEP by M12, most commonly due to pregnancy (n=13) and participant preference (n=19). At M3, 85% took PrEP (detectable TFV-DP; 66% detectable TFV by plasma), and 25% had high adherence by DBS and 48% by plasma. There were no differences by arm in proportions with detectable TFV-DP or high adherence by DBS at M3 and M6 or plasma TFV at M6 and 12 (all $p > 0.3$). Adherence decreased significantly from M3-M12 when visits decreased to quarterly ($p < 0.0001$). Four acquired HIV, all of whom had undetectable plasma tenofovir at seroconversion.

CONCLUSIONS: Most African AGYW were taking PrEP in the first 3 months, and a substantial minority had high adherence by DBS and plasma, which was >2 -fold higher than in PrEP efficacy trials. Adherence declined significantly from M3-12, similar to other PrEP studies in youth. PrEP adherence did not increase with addition of drug level feedback. The four (1%) who acquired HIV were not taking PrEP. This combination prevention package that included PrEP achieved high protection. Research is needed to determine effective adherence support to sustain PrEP use among African AGYW.

TUAC0302

PrEP uptake and early adherence among at HIV risk transgender women from Rio de Janeiro, Brazil: Results from the PrEPParadas study

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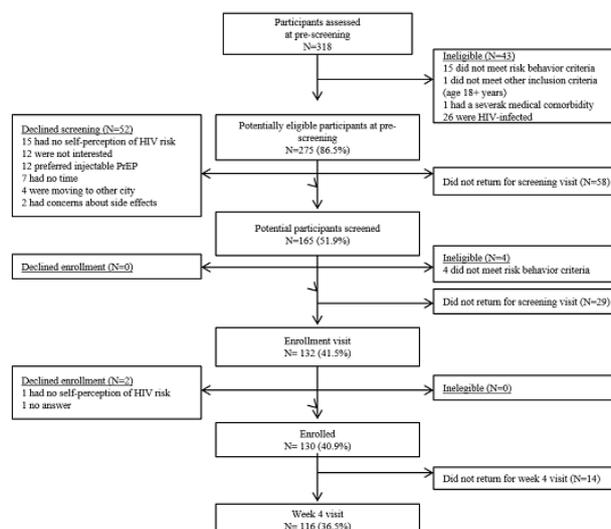
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BACKGROUND: Pre-exposure prophylaxis (PrEP) has proven efficacious for HIV prevention among transgender women (transwomen) with good adherence, but its implementation is challenging, especially in low-and-middle-income countries (LMIC). We aimed to describe PrEP uptake and early adherence in PrEPParadas study.

METHODS: PrEPParadas is a Brazilian trans-specific PrEP demonstration project. Inclusion criteria were: assigned as male at birth, self-identification as transwomen, aged 18+ years, HIV-negative and high-risk sexual behavior. Procedures included HIV viral load to evaluate acute viral infection (AVI). We calculated medication possession ratio (MPR) at the week 4 post-enrollment visit, which has been shown as a good measure for adherence. Predictors of low adherence (defined as MPR < 1) were evaluated using logistic regression model. At week 4, dried blood spots were also collected; TDF levels will be presented.

RESULTS: We assessed 318 transwomen for participation; 271 were potentially eligible and 130 were offered PrEP between August 2017 December 2018 (PrEP uptake: 48.0%). Among those enrolled (N=130), eligibility was determined by: condomless anal sex in the last 6 months (63.1%), sexually transmitted infection diagnosis in the last 12 months (24.6%), HIV-positive partner in the last 30 days (3.9%), and transactional sex in the last 6 months (40.0%). Median age was 30 years (IQR:23-37). Twenty-three (17.7%) had < 8 years of schooling. Out of 130, 89.2% returned at week 4, with no indication of AVI; only 22 transwomen had low adherence. Adjusted odds ratio indicated that transwomen with limited schooling (OR=3.9, 95%CI:0.8-18.4) and those not living in own or rented housing (OR=2.3, 95%CI:0.8-6.4) were more likely to have lower adherence.

CONCLUSIONS: Although a hard-to-engage group, transwomen had good uptake and adequate adherence levels in a LMIC study. More vulnerable transwomen had the worst adherence levels and deserve tailored strategies for PrEP delivery.



[Flowchart of PrEPParadas Study, 2017-2018]

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TUAC0303

Factors associated with stopping HIV pre-exposure prophylaxis (PrEP) for three months or more in the EPIC-NSW trial

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BACKGROUND: While pre-exposure prophylaxis (PrEP) is highly effective at preventing HIV, seroconversions have been reported in individuals who cease or take a break from PrEP. We examined factors associated with stopping PrEP for ≥ 3 months among high-risk men enrolled in the implementation trial of daily PrEP, EPIC-NSW.

METHODS: Between March 2016 and April 2018, 9,708 individuals were enrolled. At baseline, then quarterly, participants were invited to complete an optional online behavioural survey. Analysis was restricted to participants who had completed ≥ 1 survey ≥ 18 months after enrolment. Participants indicated in the surveys whether they had taken any PrEP in the previous 3-month period. Factors associated with stopping PrEP for ≥ 3 months were identified using generalised estimating equations controlling for repeated measurements.

RESULTS: Analyses included 1,682 participants; 96% were gay men. 220 participants reported stopping PrEP for ≥ 3 months (mean times per participant=2.0, SD=1.2; total=327). Among these, median days to first time stopping PrEP was 494 (IQR=122-591). 100 (45.5%) of these participants had at least one period of restarting PrEP after stopping for ≥ 3 months (median days stopping=101). Stopping PrEP for ≥ 3 months was significantly associated with younger age, lower partner numbers and less condomless anal intercourse (CLAI) in the previous week (table). There was no difference in likelihood of stopping PrEP by year of enrolment. In periods where PrEP was stopped, 8% of those who stopped PrEP had >20 partners, 30% and 15% reported party-drug and methamphetamine use, and 52% reported any CLAI in the last week (12% reported any CLAI with unknown-HIV-status partners).

CONCLUSIONS: Participants who stopped PrEP for ≥ 3 months had lower HIV risk than those who continued use. However, over half of those who stopped reported recent HIV risk when not on PrEP, and recreational drug use was common. Greater understanding of why individuals with high HIV risk stop PrEP is needed. Individuals with varying levels of HIV risk over time may need interventions to encourage re-uptake at the appropriate time or be encouraged to use on-demand PrEP.

Item	Crude Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)	p-value
Reported >20 partners in last 3 months (vs ≤ 20)	0.46 (0.29-0.72)	0.001	0.50 (0.29-0.84)	0.008
Reported CLAI in the last week (vs no CLAI)	0.58 (0.47-0.73)	<0.001	0.60 (0.46-0.79)	<0.001
Age (per year of age)	0.98 (0.96-0.99)	0.009	0.98 (0.96-1.00)	0.024

[Associations with stopping PrEP for at least 3 months, among those in EPIC-NSW for at least 18 months.]

TUAC0304

PrEP re-initiation after interruption by adolescent girls and young women in Kenya and South Africa

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BACKGROUND: African adolescent girls and young women (AGYW) are at high risk of HIV. PrEP is highly effective in reducing HIV acquisition, but interruptions are common. We explored PrEP re-initiation in a PrEP implementation project among African AGYW.

METHODS: POWER is a PrEP implementation science project among AGYW ages 16-25 in Kisumu, Kenya, Johannesburg and Cape Town, South Africa. Women are offered PrEP and have visits at month 1 and then quarterly. Patterns of PrEP use were measured using pharmacy records; PrEP interruption was defined as PrEP not dispensed at a visit or a gap of >14 days without PrEP due to a missed visit. Reasons for interruptions were documented in chart notes. This analysis characterizes PrEP interruptions and re-initiation within 6 months among AGYW who initiated PrEP at enrollment.

RESULTS: Between June 2017-November 2018, 1367 AGYW (median age 20) were enrolled. Most, (83%) were single, 28% reported never using condoms with their current partner(s), and 36% knew the HIV status of their partner(s). Most (92% 1254/1367) accepted PrEP. Of 970 women with 6 months of follow-up after PrEP initiation, 917/970 (95%) had a PrEP interruption; most (874/917, 95%) were due to late or missed visits. Of 644 women who could have had 6 months of follow-up after an interruption, 25% (160/644) re-initiated PrEP: 154 after a missed/late visit, 5 after declining a refill, and 1 after a clinical hold. PrEP re-initiations occurred within a month of interruption in 59% (median 38 days, interquartile range 26-57), and a higher proportion (87%) restarted within a month among those whose interruption occurred after the first 2 months of PrEP. Women reported travel and relationship dissolution as reasons for interruptions. Importantly, women sometimes did not view these periods as interruptions (e.g. intentional delays of PrEP initiation after the first prescription, attending follow-up visits late, or periods of PrEP non-use due to sexual abstinence).

CONCLUSIONS: PrEP uptake was high among African AGYW. PrEP interruptions were common, often intentional, and one-quarter re-initiated PrEP, typically in 1-2 months. In evaluating PrEP programs, interruptions, reasons for discontinuation, and re-initiation patterns should be monitored to assess the delivery and impact of PrEP.

TUAD01 Research by and for whom? Community engagement in research

TUAD0101

How do HIV cure trial researchers respond to an embedded social science study?

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BACKGROUND: There are increasing calls to integrate social/behavioral studies into HIV clinical research, especially research with complex ethical and social implications such as 'cure' trials. Yet limited data exist on how clinician-investigators respond to the findings of social/behavioral studies embedded in their trials.

METHODS: As part of our longitudinal social/behavioral Decision Making Study (DMS) embedded within four HIV 'cure' trials in the Thai SEARCH cohort, we periodically communicate findings on the experience of trial participants. At two timepoints we conducted anonymous surveys of SEARCH clinicians to examine how DMS findings 1) concord with clinician experience, and 2) influence clinicians' communication with participants. Findings were presented as statements; e.g., "Many trial participants feel the SEARCH team will protect them from any harms in the trial." Survey 2 added questions about DSM study impact on participants and clinicians.

RESULTS: At timepoint 1, all 18 clinicians responded; at timepoint 2, 15 of 18 responded. Concordance between each timepoint 1 DMS finding and clinician experience ranged from 33%-67% agreement. Concordance trended higher for timepoint 2 findings. Clinicians generally rated each finding's concordance with personal experience higher than the finding's potential impact on their communication with participants; the exception was the burden of optional procedures, where respondents reported similar communication impact (M=2.7, scale 1-4) and concordance (M=2.5). Most (10 of 15) agreed DMS interviews made participants more satisfied; few (4) agreed interviews made participants worry about trial participation. While almost all clinicians (14) agreed the DMS findings made them more satisfied with how SEARCH conducts trials, 6 agreed it made them worry about trial conduct. Most (12) agreed DMS findings left them wondering what to do differently in their communication with participants.

CONCLUSIONS: Results suggest variation in clinician awareness of ethical challenges identified by the DMS. Most clinicians believed DMS participation did not increase worry among trial participants. DMS findings led many clinicians to wonder whether/how to communicate differently with participants, supporting the need for practical interventions to address ethical challenges. Additional research is needed to understand the influence of social/behavioral findings on clinician behavior and enhance the integration of social/behavioral studies into clinical research.

TUAD0102

Bringing good participatory practice into action: Considerations and challenges from a sponsor perspective

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BACKGROUND: Good Participatory Practice (GPP) guidelines developed by UNAIDS and AVAC advise trial funders, sponsors and clinical trial implementers how to engage with stakeholders in the design and conduct of clinical HIV-prevention trials. Anticipated outcomes of GPP implementation are a more engaged community, better trial acceptance/inclusion and increased participant retention. To our best knowledge, since 2016, Janssen (in its role as a sponsor) is the first pharmaceutical company to design an operational framework to implement GPP in sponsored trials.

METHODS: A working group developed a 'GPP Considerations Document' providing high-level guidance to trial teams on the 'WHAT' per GPP topic areas outlining action plans, roles and responsibilities. Complementing this, a 'GPP-Toolbox' guided implementers on the 'HOW'. We applied GPP to three ongoing trials.

RESULTS: From a pharmaceutical-sponsor's perspective, meaningful adoption of GPP in global programs is challenging. It is a new way of working that implies internal/external stakeholder mapping and awareness, followed by change management, training, guidance and follow-up. Implementation in Janssen's trials required employee training on the guidelines. The 'Introduction to GPP' training module is accessible to employees and GPP awareness has been enhanced in teams working on infectious diseases and vaccine clinical trials. Several people obtained AVAC-certification.

Initial steps included enhanced stakeholder engagement. Unlike the usual approach, Janssen engaged more directly with study participants via letters informing them of study status, and sharing our appreciation for their efforts. Study results were shared more frequently and earlier with investigators and participants through talking points provided to sites. We designed participant engagement tools and long-term follow-up according to each country's/site's needs. HIV testing and counselling was provided to manage Vaccine-Induced Seroreactivity/Positivity.

CONCLUSIONS: Through meaningful planning and implementation of GPP within the HIV-prevention field, Janssen is contributing to a deepened awareness of the value of GPP; not only to hold trial conduct to a higher ethical standard, but to truly understand how best to serve communities through the research process and ultimate delivery of new prevention methods. More extensive GPP implementation is underway in Janssen's HIV vaccine program. These practices could benefit other clinical research outside of HIV-prevention, thus elevating and broadening standards of engagement.

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TUAD0103

Getting from good participatory practice to good trial outcomes for everyone: How stakeholders believe GPP works (or not)K. MacQueen, N. Eley
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BACKGROUND: Many claims are made about the benefits of using Good Participatory Practice (GPP) in biomedical trials but no systematic outcome evaluations exist. Indeed, we do not know the extent to which diverse stakeholders share common expectations about how GPP works. We used online surveys to develop a conceptual map of stakeholder beliefs about GPP.

METHODS: We used existing contacts, publicly available research networks, and social media to recruit biomedical research stakeholders at community (n=111), national (n=41) and global (n=41) levels to participate in a series of online surveys November 2017 to January 2019. Survey 1 used Maximum Difference Scaling to identify high priority GPP goals derived from the literature. Survey 2 asked participants to describe practices they believed could be used to achieve these goals; these were consolidated into broader strategies. Survey 3 asked participants to describe good and bad outcomes they believed could result from using the strategies. Surveys 4 & 5 assessed levels of agreement with the emerging model.

RESULTS: Survey panelists identified as 65% female, 34% male, and 1% transgender. There was strong agreement that the highest priority GPP goals were community-focused and emphasized protecting, engaging and empowering communities where biomedical prevention research takes place. Five strategies to achieve these goals were identified. Accountability, Context Mapping, and Continuous Community Engagement were believed to reinforce engagement & communications; knowledge, learning & understanding; awareness & transparency; and trust. The remaining two strategies, Maximizing Benefit and Minimizing Risk & Burden were believed to reinforce researchers valuing community expertise, being knowledgeable about participants, and being transparent which led to increased participant trust. Unintended bad outcomes were believed possible if local partners became insular or burdens on researchers too costly. Specific and potentially measurable outcomes were identified with relevance for researchers, participants, and communities.

CONCLUSIONS: The conceptual map provides a foundation for developing a mixed method systematic evaluation strategy to better understand and improve GPP in HIV research. Beliefs about relationships between strategies and good/bad outcomes can be translated into hypotheses, measures, and indicators as well as context-rich comparative analysis of cases.

TUAD0104

The game-changing nature of early and ongoing community engagement in HIV prevention efficacy trials: The AMP studies' experience (HVTN 703/HPTN 081 & HVTN 704/HPTN 085)M. Andrasik¹, G. Broder¹, J. Lucas², J. Davis², R. White², N. Luthuli³, K. Baepanye³, L. Oseso¹, S. Wallace¹, N. Ennis¹, C. Shipman¹, S. Karuna¹, P. Andrew², S. Edupuganti⁴, N. Mgodhi⁵, J. Andriesen¹, M. Cohen², L. Corey¹, AMP Protocol Teams¹Fred Hutch, HIV Vaccine Trials Network, Seattle, United States, ²FHI 360, Science Facilitation Department, Durham, United States, ³Fred Hutch, HIV Vaccine Trials Network, Johannesburg, South Africa, ⁴Emory University, Hope Clinic of Emory Vaccine Center, Atlanta, United States, ⁵Seke South Clinic, Department of Health Services, Harare, Zimbabwe

BACKGROUND: Engagement of community stakeholders is essential to the facilitation of community awareness, understanding, and support for research from conceptualization through retention. Recognizing the stigma surrounding HIV and misconceptions about research, ongoing community engagement is especially important for studies of novel biomedical HIV prevention products.

In 2015, the HIV Vaccine Trials Network (HVTN) partnered with the HIV Prevention Trials Network (HPTN) to launch the AMP trials among heterosexual women in sub-Saharan Africa (HVTN 703/HPTN 081) and cisgender

men and transgender persons who have sex with men in North and South America and Switzerland (HVTN 704/HPTN 085). These are the first efficacy trials of a broadly neutralizing antibody (bnAb) for HIV prevention. Recruitment began in April (HVTN 704/HPTN 085) and May (HVTN 703/HPTN 081) of 2016. Recruitment and retention were considered major potential barriers for these ongoing trials, which require 2 years of monthly visits and 10 intravenous infusions per participant.

METHODS: Community engagement training and implementation began 6 months prior to opening. A series of stakeholder engagement consultations were held to facilitate information exchange and encourage dialogue with in-country ethics, advocacy, spiritual, healthcare and research representatives. A Community-Based Participatory Research approach was utilized to develop and disseminate a set of four educational videos explaining the studies, bnAb science, and trial participation. Print materials and a website were created for each geographic region to educate and direct potential participants to local study sites. Retention workshops and ongoing communication with the studies' Community Working Groups maintain attention on retention.

RESULTS: Full study enrollment exceeded projected rates. Recruitment was efficient, with a screening-to-enrollment ratio of roughly 2.8:1 in the Americas and Switzerland and 2.4:1 in Africa at selected timepoints. As of January 16, 2019, retention in the AMP studies is 96% in HVTN 703/HPTN 081, 95% in HVTN 704/HPTN 085; early termination is 8% overall. There was tremendous community enthusiasm regarding the overall bnAb concept for HIV prevention.

CONCLUSIONS: Community engagement is critical for ethical trial conduct and must be employed in its entirety (education, recruitment and retention). Early and consistent integration throughout the clinical trial process contributes to improved screening, substantial recruitment, and strong retention.

TUAD0106

Engaging youth as long-acting HIV prevention product co-researchers in the iPrevent study in Cape Town, South AfricaM. Hartmann¹, A. Minnis¹, E. Krogstad¹, S. Ndwayana², S. Sindelo², M. Atujuna², L.-G. Bekker², E.T. Montgomery²
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BACKGROUND: South African youth are one of the highest risk groups, globally, for HIV acquisition, thus identifying prevention methods that they will consistently use is an urgent priority. iPrevent sought to understand preferences for long-acting (LA) PrEP among youth 18-24 in Cape Town recognizing this group as critical "end-users" of future LA methods. Undertaking multiple strategies, the study established an advisory board of young heterosexual men, women and men-who-have-sex-with-men to contribute as product co-researchers throughout the study process, to ensure effective engagement of the population under study.

METHODS: The iPrevent study implemented a large (n=809) community-based discrete choice experiment (DCE) survey assessing attributes of LA-PrEP with young women and men, including MSM. Through a series of four youth advisory board meetings, a WhatsApp group and 20 cognitive interviews, iPrevent's participatory approach to engaging youth as co-researchers included giving them opportunities as film-makers, as designers of the visual component of the DCE, and as interpreters of the results.

RESULTS: Convening youth as co-researchers had several impacts on iPrevent's approach and outputs. Youth input informed the use of local actors in the study's educational video creating a "real-world" community setting that situated the dialogue and content in a meaningful and accessible way. Their participation in cognitive interviews led to the successful development of language and images to explain scientific concepts in terms that would resonate (e.g., chili peppers to express pain associated with product insertion). Lastly, their insight reviewing results during an interpretation meeting, led to clarifications around misinterpretations of risk perception and confirmed youth's desires for future LA products that fit within their goals around fun, family, and their future. The findings from this end-user interpretation meeting were shared with developers of HIV prevention products at an international conference.

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CONCLUSIONS: The engagement of youth through creative, interactive activities to inform film-making, research tool design, and results interpretation directly contributed to adaptations of the study design and to research implementation and understanding of results. This was important for connecting with young end-users and translating the DCE findings to LA product developers in a way that reflected the context of youth's lives.

TUAD02 Prevention is more than PrEP

TUAD0201

Modelling combination interventions including increased school attendance to prevent HIV among girls of school age in South Africa (HPTN 068)

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BACKGROUND: Combination prevention interventions may be an effective way to prevent HIV in adolescent girls and young women. However, combinations require enormous resources to implement and evaluate. Modelling strategies are a cost-effective way to determine what might work before implementation. We modelled HIV prevention interventions including 1) staying in school or attending 80% or more school days; 2) intervention 1 plus eliminating depression; 3) intervention 1 plus reducing depression by 50%; 4) intervention 2 plus eliminating physical intimate partner violence (IPV) in the last 12 months; and 5) intervention 3 plus reducing IPV by 50%.

METHODS: We used data from the main trial period of the HIV Prevention Trials Network (HPTN) 068 study from 2011 to 2015 when girls were of school age. Our study includes 2,328 HIV negative adolescent girls and young women aged 13–20 years in rural South Africa. We used the parametric G-formula where we simulated a population of 10,000 girls from observed data in which confounding from observed covariates was removed. Confounders were age, intervention assignment, socioeconomic status, alcohol use, anxiety, and orphanhood. We then manipulated variables in this population and determined how these changes corresponded with changes in the cumulative incidence of HIV over the study period. Interaction terms were included between all exposures. Confidence intervals were calculated using the standard deviation of results from 200 bootstrap samples with replacement.

RESULTS: The observed risk of HIV over 3.5 years was 4.5%. School attendance, depression and IPV were each independently associated with incident HIV infection. Compared to the observed risk of HIV (4.5%), HIV risk was 4% for intervention 1 (Risk Ratio (RR) 0.90; 95% Confidence interval (CI): 0.84, 0.96; 3.5% for intervention 2 (RR 0.77; 95% CI: 0.70, 0.84); 3.9% for intervention 3 (RR 0.87; 95% CI: 0.80, 0.94); 3.4% for intervention 4 (RR 0.75; 95% CI: 0.69, 0.82); and 3.6% for intervention 5 (RR 0.80; 95% CI: 0.75, 0.86).

CONCLUSIONS: Combination prevention interventions that include increasing school attendance, reducing depression and reducing IPV may be an effective way to reduce risk of HIV in adolescent girls and young women in South Africa.

TUAD0202

Improving uptake of prevention of mother-to-child HIV transmission services in Benue State, Nigeria through a church congregation-based approach

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BACKGROUND: Nigeria has low antiretroviral therapy (ART) coverage among HIV-positive pregnant women, partially due to low uptake of facility-based antenatal care. In a previous cluster randomized trial in Nigeria, a church congregation-based intervention (also called Baby Shower events) demonstrated improvement in HIV testing and linkage of pregnant women to ART.

In this project, we assess outcomes for HIV testing and ART linkage using the congregational approach to prevention of mother-to-child HIV transmission (PMTCT) in a non-research setting.

METHODS: Seventy-seven congregations in Benue State conducted 630 Baby Shower events from July 2016–December 2017. Baby Shower events included a prayer ceremony, group education, music, gifting of a delivery pack, and HIV, Hepatitis B, and sickle cell testing with subsequent ART linkage support for HIV-positive participants. De-identified data were collected on participant demographics, pregnancy and HIV testing history, test results and linkage to ART. Frequencies and proportions were summarized for participant characteristics, HIV testing uptake and yield, partner testing results, and ART linkage.

RESULTS: Over the implementation period, 9,510 pregnant women and 5,650 male partners participated in the Baby Shower events (56.4% male participation). The median age of participants was 24 years (IQR 20, 28) for females and 30 years (IQR 25, 37) for males. Nearly half of female participants (45%) were not enrolled in antenatal care for the current pregnancy, and 22% and 23% of female and male participants respectively reported that they had never been tested for HIV. Overall, 9,498 (99.9%) female and 5,639 (99.8%) male participants had their HIV status ascertained, with 7% of female and 4% of male participants testing HIV-positive, 2.8% of females and 2.2% of males receiving a new HIV-positive diagnosis, and 5.5% of couples receiving discordant HIV results. The majority of HIV-positive pregnant women (83.5%, 5,811/6,966) were confirmed linked to antiretroviral therapy.

CONCLUSIONS: In this setting of low PMTCT/ANC uptake and strong church influence, the congregational approach facilitated identification of HIV-positive pregnant women and male partners, many of whom were not engaged with facility-based care. Future implementation should incorporate enhanced support for ART linkage and treatment retention in order to maximize the impact of this intervention on vertical HIV transmission.

TUAD0203

Does early infant male circumcision increase mothers' attendance for postnatal care services? Findings from Iringa and Njombe Regions, Tanzania

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BACKGROUND: The WHO and UNICEF recommend early infant male circumcision (EIMC) as a strategy to maintain male circumcision coverage in areas with high HIV prevalence. The USAID-funded AIDSFree Project and the Tanzania Ministry of Health Community Development Gender Elderly and Children scaled up EIMC services integrated into existing reproductive health services.

The home delivery rate of infants are 2%, 3% and 12% in Iringa, Njombe and Tabora, respectively. Parents who give birth at home may not be educated on the benefits of EIMC which generally occurs in facilities. Therefore, through project volunteers, parents are educated on the benefits (and risks) of EIMC. We explored the uptake of EIMC services on women who delivered at home, who were educated in the community, and whose infants accessed postnatal care within 60 days post-delivery.

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METHODS: We conducted a review of the client-level EIMC database from October 2016 to September 2018 from 38 EIMC facilities and 38 non-EIMC facilities was conducted to determine the effect of EIMC program on increasing number of PNC visits out of home deliveries. We used two-population z-test to compare the increase of PNC services between VMM facilities and non-VMMC facilities.

RESULTS: Out of 8748 Infants attending PNC, (3.4%) 298 were delivered at home and came for PNC through EIMC and out of 61,931 Infants attending non-EIMC (1%) 713 were delivered at home. Therefore, Infants delivered at home from EIMC communities were 3.4 times more likely to come for PNC visits compared to Infants delivered at home from non-EIMC communities ($p < 0.0001$, $z=18.97$). Infants born at home that came for EIMC received the missed PNC services.

CONCLUSIONS: The opportunity provided by EIMC services enabled 298 women who delivered at home to access postnatal care services that may have been missed. Postnatal care services are vital to mitigate risks of maternal and neonatal mortality in Tanzania. Therefore, advocating and scaling up EIMC services and ensuring them are linked to reproductive health services can be a catalyst to attract and subsequently offer, postnatal care services.

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TUAD0204

Condom and oral PrEP use among female sex workers: Findings from a study in South Africa

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BACKGROUND: Simultaneous use of oral PrEP and condoms may be a challenging behavioral aspect of PrEP. However, little data exists on the simultaneous use of PrEP and condoms in real world settings. This abstract aims to contribute to this knowledge gap.

METHODS: We administered a cross-sectional survey to female sex workers (FSW) aged 18 and above at nine facilities offering PrEP, followed by in-depth interviews (IDIs). Condom use at last sex was assessed for current, past and never users of PrEP in different sexual relationships (main or casual partner, client). Condom use at last sex is a proxy for condom use over time. We summarized data using descriptive statistics.

RESULTS: We enrolled 156 self-identified FSW (57 current, 43 past, 56 never users). In surveys, over 80% said that they used a condom the last time they had sex with a client; these proportions were similar among current (87%), past (86%), and never (86%) users. Among those with main ($n=85$) or casual ($n=64$) partners, condom use was higher with casual partners overall, and was higher for never (77% casual/54% main) and current users (70% casual/38% main) compared to past users (53% casual/24% main). Condom use was lowest with main partners, and in IDIs some FSW described that in steady relationships it was challenging to use condoms. Most current users felt it was easy to use PrEP and condoms simultaneously with main partners (90%) and clients (95%). However, in IDIs many noted that clients removed condoms and offered more money to "trick" or "tempt" participants into having sex without them, which could explain why, when asked which method worked better for them (condoms, PrEP or both), 70% of current users preferred both methods. However only 19% of past users preferred both, and 72% preferred condoms alone.

CONCLUSIONS: Current users seem to be able to use condoms and PrEP simultaneously. However, low condom usage with main partners is worrisome as this may potentially see a rise in sexually transmitted infections and unwanted pregnancies for those women not on contraceptives. Therefore, simultaneous use of PrEP and condoms should be encouraged.

TUAD0205

Improving prevention choice while we wait for an HIV vaccine: Prioritizing resources for key population-specific prevention research and implementation

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BACKGROUND: Since 2004, the Resource Tracking for HIV Prevention Research and Development (R&D) Working Group (AVAC, IAVI & UNAIDS) has tracked resource trends in R&D for new HIV prevention options. A 2018 UNAIDS report found that 47% of new HIV infections globally, or 850,000 in 2017, were among key populations and their sexual partners. A licensed HIV vaccine effective in all populations—even if current candidates in trials prove effective—is at least five years away.

METHODS: For 2017, the Resource Tracking Working Group tracked R&D investment in HIV prevention, and AVAC tracked oral PrEP implementation through the Prevention Market Manager Global PrEP Tracker. Data were collected on annual global disbursements for product development, clinical trials and trial preparation, community education, and policy advocacy to estimate annual non-vaccine investment in HIV prevention R&D directed specifically toward key populations. Funding was categorized based upon grant descriptions of work pertaining to men who have sex with men (MSM), sex workers, transgender people, and people who inject drugs (PWID).

RESULTS: In 2017, of \$228 million invested globally in microbicides, pre-exposure prophylaxis (PrEP), and treatment as prevention (TasP) R&D, \$14.6 million, or 6%, was devoted to research expressly directed toward key populations. This represents 2.3% of funding for research on microbicides, 17% for PrEP, and 4% for TasP. Among key populations, out of a global HIV non-vaccine prevention research portfolio of \$281 million, \$3.5 million was allocated to prevention research for transgender people, \$1.8 million for PWID, \$0.6 million for male sex workers, \$8.7 million for MSM, of which \$2.5 million was allocated for Black or Latino MSM.

CONCLUSIONS: The level of investment in key population-specific prevention research suggests the field is not sufficiently resourcing the necessary intersection of biological risk, preferences, and social determinants that affect uptake and effectiveness of new prevention options. Research in key populations is critical to inform development of prevention interventions with positive public health impact, effectively engage civil society in product development, and implement human-centered design research, yet it remains an underfunded and underutilized tool.

TUAD03 It's the costs, stupid: Why financial and economic policies matter

TUAD0301

Do changes in development assistance for health crowd out domestic investment for health and what are the implications for HIV/AIDS outcomes

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BACKGROUND: Much of the previous research on the relationship between development assistance for health and domestic health spending utilizes standard panel data regression approaches or relatively weak instrumental variables. These methods have made handling simultaneity and omitted variable bias difficult. In this study I utilize causal time series and panel techniques as well as a new data source to examine the interplay between development assistance and domestic health spending, both public and private. I then translate these dynamics into impacts on health outcomes including HIV prevalence, tuberculosis incidence, and mortality.

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METHODS: I merge data from the Institute for Health Metrics and Evaluation's (IHME) Development Assistance for Health dataset and Health Expenditure dataset with economic, demographic, and health outcomes data from the World Bank Databank and World Health Organization's Global Health Observatory from 2000 - 2015. The final dataset consists of 237,656 individual donor transactions from 30 source countries through 42 bilateral, multilateral and private channels, to 174 distinct recipients. To address the shortcomings of previous research, I employ a fixed-effects Arellano-Bond system generalized methods of moments model to assess the impact of changes in the level of development assistance for health on both domestic public and domestic private health spending. I also adapt the multi-level systems approach to determine the impact of these dynamics in development assistance on total mortality, HIV prevalence, and TB incidence.

RESULTS: The results demonstrate that a 1% increase in Development Assistance for Health results in a 0.011% (SE: 0.002) increase in private health expenditure, a 0.009% (SE: 0.001) decrease in public health expenditure and a 0.004% (SE: 0.001) decrease in out-of-pocket expenditure. Additionally, a 1% increase in development assistance for health also has an impact on decreasing overall mortality by 0.002% (SE: 0.0005), decreasing tuberculosis incidence by 0.8% (SE 0.24), and decreasing HIV prevalence by 0.011% (SE: 0.01).

CONCLUSIONS: Between 2000 and 2015 development assistance for health has mildly crowded out domestic public health investment. However, development assistance has also crowded out out-of-pocket expenditure and crowded-in domestic private health investment. These dynamics in development assistance have translated to reducing the incidence of TB, prevalence of HIV/AIDS, and mortality.

TUAD0302

From "nice-to-have" to "necessary": Increases in domestic financing and perceived value of key population-lead HIV services by the Thai government as international donor funding transitions

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¹United States Agency for International Development, Regional Development Mission, Asia, Bangkok, Thailand, ²National Health Security Organization, Thai Ministry of Public Health, Bangkok, Thailand, ³Rainbow Sky Association of Thailand, Bangkok, Thailand, ⁴SWING, Bangkok, Thailand, ⁵Mplus Foundation, Chiang Mai, Thailand, ⁶Caremat, Chiang Mai, Thailand, ⁷Sisters, Pattaya, Thailand, ⁸FHI 360 and U.S. Agency for International Development LINKAGES Project, Bangkok, Thailand, ⁹Thai Red Cross AIDS Research Center, Bangkok, Thailand, ¹⁰United States Agency for International Development Regional Development Mission, Asia, Bangkok, Thailand

BACKGROUND: The US Presidents Emergency Plan for AIDS Relief (PEPFAR) and The Global Fund for AIDS, Tuberculosis, and Malaria (GFATM) have been the predominant financers of key population-led HIV services (KP-LHS) in Thailand (and many other countries) for over 10 years. Data from multiple sites in Thailand suggest that KP-LHS focusing on men who have sex with men (MSM) and transgender women (TGW) have contributed substantially to national 90-90-90 goals. Given the upper-middle-income development status of Thailand, the funding for these interventions needs to transition from international donor support to domestic financing.

METHODS: The National Health Security Organization (NHSO) of the Thailand Ministry of Health provides funding to hospitals through reimbursement schemes. In 2016, the Ministry of Public Health and NHSO developed reimbursement schemes to pay CSOs for HIV-related outreach to key population groups. However, these planned schemes resulted in little actual reimbursements because of lack of understanding by CSOs of NHSO system requirements and a lack of perceived value by numerous stakeholders of the role of KP-LHS in HIV epidemic control in Thailand. To counter these barriers, leaders from local KP-LHS organizations and other partners including the Thai Red Cross AIDS Research Centre engaged in advocacy efforts with central and regional NHSO offices, hospitals, and provincial health offices. NHSO and CSOs also had numerous joint sessions to clarify NHSO submission requirements for reimbursements.

RESULTS: Advocacy efforts led to increased investments by the NHSO in local CSOs who provide these services. As shown in Table 1, five large local CSOs - SWING, Rainbow Sky Association of Thailand, MPLUS, Caremat, and SISTERS - all received increased investments by the NHSO from 2016 to 2019. Overall domestic funding investments in these institutions increased from US\$ 167,000 in 2016 to a planned and contracted US\$ 1.44 million in 2019.

CONCLUSIONS: With these domestic financing investments, Thailand joins only a few middle-development countries who are substantially supporting critical KP-LHS that can lead to epidemic control among MSM and TGW. These investments resulted from hard won advocacy efforts on the part of key population leaders and their allies with a ready-to-listen-and-act Ministry of Public Health.

TUAD0303

Study comparative NASA and budget tracking: Enabling and empowering the local budget and resource allocation in Bandung district

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BACKGROUND: Compared to another city, Bandung has the highest HIV and AIDS cases in West Java Province, with the trend of the new case is increasing continuously. Currently, many external donors emerge their program, but sustainability and ownership of the program remain questionable. Empowering the budgeting program from local fund resources was needed as an effort to ensure the prevention and control program. This study aims to track the previous and current budget expenditure and generate future costing for preparation of local fund.

METHODS: We analysed donor and local government financing using evidence from National AIDS Spending (NASA) and district reports on domestic HIV spending. A literature search conducted for peer-reviewed and grey literature on HIV related costing and financing published between 2007 and 2017. We estimated the costs of five service delivery models:

- (1) prevention and health promotion,
- (2) mitigation
- (3) diagnosis and treatment,
- (4) management and administration, and
- (5) enabling conducive environment.

RESULTS: Prevention and mitigation program acts as the most significant component of the overall funding allocation (61,73% and 24,20%) with average value needed is USD 313,340 (SD = 62,791) and USD 122,844 (SD = 9,517). Current management and administration allocation are appropriate (13,10%) with average value of USD 66,493 (SD = 18,684). Diagnostic and treatment are among the lowest allocation (0,39%) with average value of USD 5,889 (SD = 1,601) due to the ARV drug procurement are regulated by central government. Budget allocation for enabling conducive environment is among the lowest (0,59%) with average value of USD 2,985 (SD = 1,488).

CONCLUSIONS: Financial investment for prevention is the largest allocated for the available fund with a big gap to others service delivery. The local government need more fund allocation in diagnostic and enabling conducive environment to ensure sustainability and ownership of HIV program and allow empowering of budget and resource allocation in Bandung District.

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TUAD0304

Exploring the unit cost variation of Mexico's HIV treatment program: A facility-level longitudinal analysisD. Cerecero, C. Pineda-Antunez, F. Macías, S. Bautista-Arredondo
Instituto Nacional de Salud Publica, Cuernavaca, Mexico

BACKGROUND: The efforts for scaling up HIV prevention and treatment programs have increased in the last decade as well as the need for accurate cost information in a timely fashion. In moments of critical decision-making, decision makers need to understand how program costs vary at different implementation settings and facility characteristics. The aim of this work is to explore the variation of HIV treatment costs in Mexico using data on costs and outputs for the period 2010-2015.

METHODS: We obtained data from administrative records to measure costs for three main inputs: personnel, ARV drugs, and laboratory tests - CD4 and viral load. We estimated the total and unit cost - defined as the facility-level average annual cost per patient - of providing HIV treatment services for a sample of 74 facilities in the period 2010-2015. We conducted OLS regression modelsto estimate theeffect of the determinants ofunit cost variation across sites.

RESULTS: The average unit cost for HIV care and treatment in the period 2010-2015 was USD \$4,012 and on average 63,725 patients were served in the study period. We observed an increase of the unit cost from USD \$3,950 in 2010 to USD \$4,285 in 2015. The average cost composition in the study period was 60% ARV drugs, 27% personnel, and 13% laboratory tests. Our regression model showed non-linearities with respect to the number of patients served in the study period. Also, rural facilities and those located in the south region of Mexico showed significant determinants of lower unit costs. We also found that patient characteristics such as age, and clinical outputs such as the number of visits and viral suppression were predictors of HIV treatment costs.

CONCLUSIONS: We found an increase in the cost of HIV treatment services in the study period, as well as an increase in the number of patients served. We also found evidence consistent with economies of scale. This is the first study conducted in Mexico using longitudinal data on cost for HIV treatment services. Our results can help policy-makers to more efficiently allocate resources to scale up HIV treatment programs in Mexico.

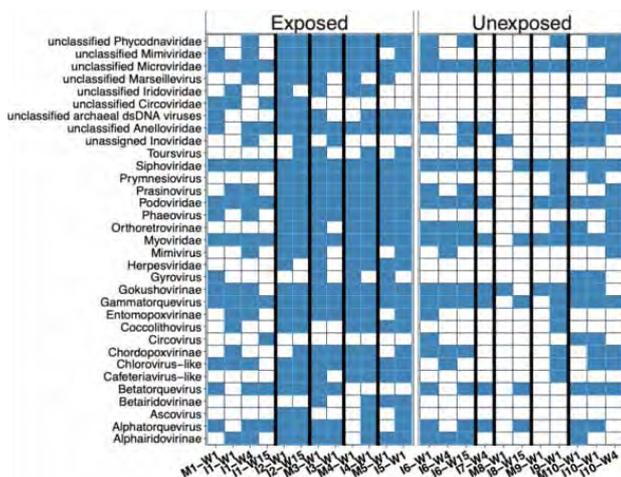
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TUPDA01 Mucosal tissues: What's 'crobes got to do with it?

TUPDA0101

Maternal HIV infection alters the community composition and dynamics of the enteric microbiome of associated infantsB. Brown^{1,2}, D. Chopera³, E. Havyarimana⁴, S. Jaumdally⁴, D. Martin⁵, A. Varsani⁶, H. Jaspan^{1,2,4}, InFANT Study Team¹Seattle Children's, Center for Global Infectious Disease Research, Seattle, United States, ²University of Washington, Schools of Medicine and Public Health, Seattle, United States, ³Africa Health Research Institute, Durban, South Africa, ⁴University of Cape Town, Institute of Infectious Disease and Molecular Medicine, Cape Town, South Africa, ⁵University of Cape Town, Computational Biology Group, Cape Town, South Africa, ⁶Arizona State University, The Biodesign Center for Fundamental and Applied Microbiomics, Tempe, United States**BACKGROUND:** Uninfected infants born to HIV-infected mothers (HEU) are more vulnerable to diseases and have altered immunity and enteric microbial communities. The gut virome plays an important role in modulating both the bacterial microbiota and immunity of HIV infected individuals, yet the role of maternal HIV status in structuring the infant enteric virome remains unexplored.**METHODS:** Here, we longitudinally characterize the enteric viral communities of 5 HIV-infected/exposed and 5 HIV-uninfected/unexposed (HU) mother-infant dyads from South Africa. Using shotgun sequencing of DNA isolated from virus-like particles, we illustrate significant shifts in the community composition and diversity of the fecal virome between HIV-infected mothers and their infants as compared to uninfected dyads.

[Figure 1. The fecal virome of HIV infected mothers and their exposed infants displays greater diversity than HIV uninfected/unexposed counterparts. Presence (blue)-absence (white) heatmap of viral subfamilies and genera detected in HEU and HU infant and their mothers. Maternal and infant sample labels begin with 'M' and 'I', respectively. Sampling time point is displayed as W1, week 1; W4, week 4; W15, week 15. Black lines are inserted between samples from different dyads and are used solely to aid visual demarcation.]

RESULTS: We report significant shifts in the longitudinal dynamics of various eukaryotic virus and bacteriophage families between HEU and HU infants, and strong inverse correlations between phage diversity and bacterial target abundance, suggesting bacteria-phage antagonism. Specifically, we describe elevated diversity of *Streptococcus* phage OTUs and significantly decreased *Streptococcus* abundance, as assessed via 16S rDNA sequencing. We also identified significantly greater similarity between viral communities of mothers and related infants than to unrelated

infants, suggesting some amount of vertical viral transmission. Additionally, we have identified a suite of novel and known viruses from stools from HEU and HU infants and their mothers, including a novel crAssphage genome, the most abundant bacteriophage in the human gut. Across the crAssphage genome, we report genome-wide positive selection, with hotspots of selection in phage tail proteins, indicating bacteria-phage antagonistic evolution. We further report average nucleotide identities across the crAssphage genome of > 99% within a dyad, as compared to 96-97% between dyads and compared to global strains, further supporting maternal transmission.

CONCLUSIONS: Overall, our results are the first to describe how maternal HIV infection affects isolate and community wide shifts in the enteric virome of HEU infants.

TUPDA0102

Glycomic determinants of gut microbial dysbiosis and translocation during suppressed HIV infectionL. Bertoni Giron¹, C. E Tanes², A. Anzurez¹, P. A Engen³, L. M Mattei², M. H Schleimann⁴, K. Bittinger², P. W Denton⁴, F. Bushman⁵, H. Tateno⁶, A. Keshavarzian³, A. L Landay³, M. Abdel-Mohsen¹¹The Wistar Institute, Philadelphia, United States, ²CHOP Microbiome Program, Children's Hospital of Philadelphia, Philadelphia, United States, ³Rush University Medical Center, Chicago, United States, ⁴Aarhus University Hospital and Department of Clinical Medicine, Aarhus University, Aarhus, Denmark, ⁵University of Pennsylvania, Philadelphia, United States, ⁶National Institute of Advanced Industrial Science and Technology (AIST), Tokyo, Japan**BACKGROUND:** An emerging paradigm suggests that gut glycosylation is a key force in maintaining a homeostatic relationship between the gut and its microbiota. In the general population, changes in the gut glycome can alter the gut microbial composition, leading to microbial dysbiosis and gut inflammation. In HIV-infected individuals, microbial dysbiosis and translocation contribute to the vicious cycle between HIV and immune activation/ inflammation. This vicious cycle likely contributes to the development of non-AIDS inflammatory-related illnesses and HIV persistence. However, how gut glycosylation machinery contributes to this cycle is yet to be characterized.**METHODS:** We used ileum, right colon, and sigmoid colon biopsies, as well as plasma, from 20 HIV-infected individuals on suppressive antiretroviral therapy (ART) to examine: 1) gut glycomes using lectin microarray; 2) mucosal-associated microbiome using 16S rRNA marker gene sequencing; 3) plasma markers of inflammation/microbial translocation using ELISA, and 4) gut-associated HIV DNA levels using qPCR. Analysis was performed using Spearman's rank correlation coefficient and linear mixed effects models. Nominal p-values and Spearman's Rho are reported.**RESULTS:** Increased levels of mucosal-associated, hypo-sialylated O glycans (glycans with low sialic acid) correlated with lower gut microbiome diversity ($p=0.001$, $\rho=-0.68$), higher *Bacteroidetes/Firmicutes* ratio (a marker of microbial dysbiosis; $p=0.003$, $\rho=0.64$), higher plasma levels of sCD14 (a marker of LPS-mediated inflammation; $p=0.007$, $\rho=0.58$), and higher levels of ileum-associated HIV DNA ($p=0.028$, $\rho=-0.56$). Levels of mucosal-associated a1-2 branched fucose correlated with higher microbiome diversity ($p=0.032$, $\rho=0.48$), lower *Bacteroidetes/Firmicutes* ratio ($p=0.009$, $\rho=-0.57$), and lower plasma levels of sCD14 ($p=0.03$, $\rho=-0.48$). Last, levels of ileum-associated galactosylation correlated with lower levels of sCD14 ($p<0.0001$, $\rho=-0.8$).**CONCLUSIONS:** Our pilot study provides the first proof-of-concept evidence that differential gut glycomic patterns (mainly sialylated and fucosylated glycans), during ART-suppressed HIV infection, support distinct microbiome compositions that predispose to microbial translocation, inflammation, and HIV persistence. Our data are consistent with previous general population reports which demonstrated that sialic acid catabolism drives microbial dysbiosis and intestinal inflammation and that gut fucosylation sustains host-commensal symbiosis as well as prevents gut inflammation. Exploiting gut glycosylation machinery may allow the design of strategies to manipulate it to treat HIV and/or prevent/delay the development of HIV-associated co-morbidities.Monday
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TUPDA0103

Relevance of Reg3 α and I-FABP on microbial translocation, inflammation and reservoir size in people living with HIV

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BACKGROUND: Epithelial gut damage persists during HIV-infection despite antiretroviral therapy (ART) and has been associated with microbial translocation, immune activation, and the development of non-AIDS events. Regenerating islet-derived protein 3 α (Reg3 α) is an intestinal antimicrobial protein secreted by Paneth cells in response to mucosal damage. Reg3 α plasma levels have been reported to be a predictor of graft vs host disease and elevated in people with inflammatory bowel diseases and obesity. We assessed the association between two markers of gut damage, Reg3 α and intestinal fatty acid binding protein (I-FABP), and microbial translocation, inflammation, as well as reservoir size in people living with HIV (PLWH).

METHODS: 169 adult PLWH, categorized into early (EHI n=51) or chronic HIV infection (CHI n=88) or elite controllers (EC n=30), and uninfected controls (UC n=30) were analyzed. A sub-group of EHI were assessed prospectively. Plasma Reg3 α levels were measured by ELISA and correlated with markers of disease progression, epithelial gut damage, and microbial translocation (lipopolysaccharide (LPS) and (1 \rightarrow 3)- β -D-glucan [β DG]). Size of HIV reservoir was assessed by integrated HIV DNA via nested qPCR in CD4 T cells.

RESULTS: In a cross-sectional analysis, plasma Reg3 α levels were significantly elevated in untreated EHI (1938 \pm 374 pg/ml), CHI (3084 \pm 293), ART-treated CHI (2441 \pm 630) and EC (1442 \pm 270) compared to uninfected controls (715 \pm 243). Over the course of two years, plasma Reg3 α levels increased in 11 PLWH without ART (p=0.03) and decreased in 10 individuals who initiated ART during EHI (p=0.048). Spearman analyses revealed that Reg3 α levels positively correlated with viral load (r=0.37, p=0.0009), I-FABP (p<0.0001, r=0.34), LPS (p<0.0001, r=0.46) and β DG (p=0.02, r=0.17). Conversely, Reg3 α levels negatively correlated with CD4 count (r=-0.29, p=0.0002) and CD4/CD8 ratio (r=-0.31, p<0.0001). Compared to I-FABP, Reg3 α levels had stronger correlations with CD4 Count, CD4/CD8 ratio, VL, LPS, and 5 pro-inflammatory cytokines. In addition, Reg3 α but not I-FABP levels correlated with the frequency of integrated HIV DNA in CD4 T cells (r=0.3, p=0.04 vs r=-0.15, p=0.29).

CONCLUSIONS: Plasma levels of Reg3 α were increased during HIV infection and did not normalize with ART. Reg3 α represents a more promising epithelial gut damage marker than I-FABP in PLWH, and may help evaluate HIV remission interventions.

TUPDA0104

HIV acquisition risk and genital inflammation associated with hormonal contraceptives is dependent on the vaginal microbiome

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BACKGROUND: The injectable hormonal contraceptive depot medroxyprogesterone acetate (DMPA) has been associated with increased risk of HIV-1 acquisition in women, but observations have been inconsistent

between studies. We used a proteomics-based systems biology approach to examine whether the vaginal microbiome influences inflammation and rates of HIV incidence in women using different hormonal contraceptives in an HIV prevention trial in South Africa (n=685).

METHODS: Cervicovaginal mucosal specimens from 61 women who went on to acquire HIV within the trial (cases), and all available women who remained uninfected (controls, n=624), were analyzed by mass spectrometry-based proteomics.

RESULTS: Nearly all women were using hormonal contraceptives (97.7%) including DMPA (65.6%), norethisterone enanthate (NET-EN) (18.0%), and combined oral contraceptives (COC) (14.2%). Two major vaginal microbiome profiles were observed, one dominated by *Lactobacillus* species (59.4%), and the other that was non-*Lactobacillus* dominant (40.6%), where *Gardnerella vaginalis* predominated with other facultative and anaerobic bacteria. Microbiome groups were similarly distributed among contraceptive types. A case-control analysis showed the probability of HIV infection was not different in those using DMPA when compared to NET-EN and COC users as a single group (OR: 1.56, 95% CI: 0.87 to 2.95, P=0.151). In non-*Lactobacillus* dominant women, the risk of HIV acquisition was not significantly higher in those using DMPA compared to all other hormonal contraceptives (OR: 0.95, 95% CI: 0.44 to 2.15, P=0.895). However, in *Lactobacillus*-dominant women, DMPA use was associated with a >3-fold increase in HIV acquisition risk for DMPA users relative to women using other hormonal contraceptives (OR: 3.27; CI: 1.24 to 11.24, P=0.0305). Interaction analysis suggested a statistical trend toward the vaginal microbiome having an impact on DMPA-associated HIV-risk (P=0.0686). Serum MPA levels associated with increased glucose metabolism and immune activation pathways in cervicovaginal mucosa in *Lactobacillus*-dominant women, which were already activated in non-*Lactobacillus* dominant women, and these biomarkers associated with increased frequency of activated cervical CD4+ T-cells (HLA-DR+CD38+).

CONCLUSIONS: This study provides evidence that women with vaginal *Lactobacillus* may be more susceptible to the negative influences of DMPA-associated genital inflammation and HIV acquisition risk.

TUPDA0105

Recent injectable contraception correlates with reduced cervicovaginal mucosal growth factor expression in South African women

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BACKGROUND: Injectable contraceptives have been associated with HIV-acquisition risk and mucosal immune changes, but studies have reported inconsistent results. Challenges include the inaccuracy of self-reported data, unknown timing of injection, and interactions with other mucosal transmission co-factors. To address this, we quantified the concentration of injectable contraceptives in plasma, estimating how recently women received an injection.

METHODS: Plasma medroxyprogesterone acetate (MPA) was quantified in women from the CAPRISA004 study (n=722), with parallel quantitation of 48 cytokines in cervicovaginal lavage (CVL). Each cytokine was tested as an outcome in linear-mixed models; the main explanatory variables in-

cluded MPA concentration, modelled as a categorical variable, along with additional covariates [age, study arm, study site, number of sex acts, condom use and baseline HSV-2 serostatus] in multivariable models. Interaction analyses examined the impact of age, HSV-2 and the vaginal microbiome on MPA-cytokine associations. Mass spectrometry was used to profile host CVL-proteins associated with MPA and/or cytokine concentrations (n=443).

RESULTS: Almost all women (467/481; 97.1%) who reported DMPA use had detectable plasma MPA (>10pg/ml), while MPA was detected (mostly at low levels) in 13.9% of non-DMPA users. Compared to women with undetectable levels, those with high MPA levels (≥800pg/ml) had reduced CVL concentrations of GCSF, MCSF, IL16, CTACK, LIF, IL1A, and SCGFB. Similar results were observed in multivariable analyses. The strongest associations were with GCSF and MCSF. Host proteomic analyses revealed significant clustering by MPA concentration; low MPA/high GCSF and MCSF women had higher MUC16, MUC5B and PIGR levels, proteins important for mucosal fluid function, factors involved in keratinization, growth factors (GF), protein processing, integrin binding, and sugar metabolism. While pro-inflammatory cytokines were not associated with MPA levels, in stratified analyses we observed positive IP10-MPA associations in older women and women who were HSV-2 seropositive. MPA-cytokine associations also frequently differed based on the expression of vaginal microbiome proteome, with *Gardnerella vaginalis*-dominant samples having elevated IL-8, MCP-1 and IP-10.

CONCLUSIONS: High plasma MPA concentration, reflective of recent DMPA injection, was associated with reduced levels of several genital cytokines including GFs in a dose-dependent fashion. Age, HSV-2 and the vaginal microbiome may modify DMPA-CVL cytokine associations.

TUPDA0106

The effect of hepatitis C (HCV) cure on markers of macrophage activation and microbial translocation among HIV seropositive women

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BACKGROUND: HCV infection is highly prevalent in HIV and is associated with excess liver-related and all-cause mortality. HCV cure decreases risk of hepatocellular carcinoma and liver-related mortality however the effect of HCV cure on other HIV associated morbidities is unclear. We examined the effect of HCV cure on markers of macrophage activation and microbial translocation (soluble CD163 and sCD14 respectively) which have been implicated in the pathogenesis of serious non-AIDS morbidities.

METHODS: We studied 126 HIV/HCV coinfecting Women's Interagency HIV Study (WIHS) participants who had been successfully treated for HCV as of March 2018 and had available serum from pre- and post HCV treatment. HCV cure was defined as undetectable HCV RNA at least 12 weeks after completion of HCV therapy. sCD163 and sCD14 were measured in duplicate by ELISA (R&D Systems) on samples frozen at -80C. The final result was the mean of the duplicate tests. Multivariate analysis of variances was used to compare differences in log-transformed pre- and post-treatment sCD163 and sCD14.

RESULTS: Participants were 52% African-American, 16% Hispanic, 20% other/multiracial. Pretreatment the mean age was 56.3 years, mean CD4 was 615, 72% had suppressed HIV RNA and 10% had cirrhosis by APRI or FIB-4. 114 participants had directly acting agent based HCV therapy and 12 had interferon based therapy. Results were similar when therapy groups were analyzed separately so results are presented for the full group. sCD163 and sCD14 significantly decreased from pre to post-treatment in unadjusted analyses (Table). In analyses using log-transformed

values and adjusting for age, race, liver fibrosis stage, drug and alcohol use, CD4 and viral suppression status, the decrease in sCD163 and sCD14 remained significant.

CONCLUSIONS: Successful treatment of hepatitis C significantly decreased markers of microbial translocation and macrophage activation in HIV/HCV co-infected women. Larger, longitudinal analyses are needed to determine if these changes in markers predict reductions in HIV associated non-AIDS co-morbidities.

Mean (SD)	Pre-treatment	Post-Treatment	p value	Wilks' Lambda (F) for adjusted	Adjusted p value
sCD163 (ng/mL)	1461.7 (920.8)	901.7 (539.4)	<0.001	0.948 (6.07)	0.015
sCD14 (pg/mL)	2256332 (5231256)	2102740 (497910)	0.017	0.948 (6.03)	0.016

[Pre- and Post-HCV Treatment Serum Markers of Macrophage Activation and Microbial Translocation]

TUPDB01 Chasing waterfalls: Cascades of care

TUPDB0101

Apples and oranges: Assessment of the care cascade in sub-Saharan Africa

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BACKGROUND: In 2014 UNAIDS adopted the 90-90-90 targets to track progress towards ending the HIV epidemic. To achieve universal access to HIV care and treatment with viral suppression, each HIV-positive individual must progress along the cascade of care. We examined the methods used in published studies of the HIV care cascade, focussing on sub-Saharan Africa (SSA), where most people with HIV live.

METHODS: Systematic review to identify papers reporting on at least two steps of the HIV care cascade. We assessed definitions used for numerators and denominators for each step in the UNAIDS 90-90-90 cascade and an adapted WHO cascade framework.

RESULTS: Fifty-eight studies met the inclusion criteria: 44 cohorts, 10 cross-sectional and 4 mixed design studies. Fourteen SSA countries were represented; nearly half (N=27) of the studies were from South Africa. Eight studies covered the whole cascade from PLHIV to viral suppression. The steps covered most frequently were retention on antiretroviral therapy (ART) (N=22) and viral suppression (N=34). The proportion of studies reporting definitions for numerator and denominator ranged from 36% to 100% (Table).

HIV care cascade step	No. of studies reporting on step (%)	No. of studies reporting definition for numerator and denominator (%)	No. of definitions used for numerator	No. of definitions used for denominator
People living with HIV	8 (14%)	3 (38%)	3	3
Diagnosed with HIV	24 (41%)	17 (71%)	4	4
Linked to pre-ART care	26 (45%)	17 (65%)	7	6
Retention in pre-ART care	17 (29%)	13 (76%)	6	3
ART initiation	33 (57%)	12 (36%)	7	4
On ART	12 (21%)	7 (58%)	5	2
Retention on ART	22 (38%)	20 (91%)	4	2
Viral suppression	34 (64%)	34 (100%)	7	2

[Number of papers reporting definitions and different definitions used for the eight steps of the HIV care cascade in sub-Saharan Africa (n=58)]

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Definitions used for calculating percentages at each step differed. For example, for PLHIV, denominators were population-based, clinic-based or participants of testing campaigns. For linkage to pre-ART care, denominators included self-reported or laboratory confirmed test results. For ART initiation, denominators ranged from those newly-diagnosed with HIV infection to those eligible for ART, and numerators included self-reported ART initiation, first recorded prescription of ART or evidence of antiretrovirals in blood samples.

CONCLUSIONS: Definitions used for the steps of the cascade were not reported in many published studies. Where reported they were heterogeneous, that results cannot be compared across studies. To allow tracking of progress along the care pathway and towards the 90-90-90 targets, more complete reporting, comparable measures and clear definitions of numerator and denominator at each step are urgently needed.

TUPDB0102

Gaps in the continuum of care. Loss to follow-up and return to care: Who is at risk?

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BACKGROUND: People living with HIV (PLWH) require constant adherence to antiretroviral therapies (ART) and clinical care. Patients linked to care but not retained may contribute to HIV transmission. Little is known about the gaps in the continuum of care, loss to follow-up (LTFU) frequency and its associated factors in Mexico. We aimed to compare characteristics of PLWH constantly-retained in care (CRIC), definitively-lost to follow-up (dLTFU) and returning-to-care (RTC) after a period of absence.

METHODS: Observational retrospective cohort study including HIV-positive adults with at least one clinical visit (CV) from 1987 to 2017 at an HIV Clinic in Mexico City. Patients who missed CVs for 12 months or longer were considered LTFU. When CVs were registered after LTFU, patients were classified as RTC. Patients dLTFU didn't have any CV after the initial LTFU episode. We compared demographic and clinical characteristics at enrollment between patients CRIC, dLTFU and RTC.

RESULTS: 2,967 patients were included (89% were male); 1,565(53%) were CRIC, 826(28%) dLTFU and 576(19%) RTC. Median time to LTFU was 1.28(0.25-3.48) years. Among RTC patients, median absence lasted 1.59(1.21-2.62) years and median number of LTFU episodes was 2(1-2). RTC patients were younger at enrollment (32yo) than those CRIC and dLTFU (34yo each, $p < 0.01$). Table-1 summarizes demographic and clinical characteristics. RTC (23.8%) and dLTFU (19.4%) were more frequently initiated on protease-inhibitor based regimens than CRIC patients (10.6%, $p < 0.01$). Median time to ART initiation in the CRIC was significantly shorter than in those dLTFU and RTC [3[0.71-9.71] vs 6.07[1.86-51] weeks, $p < 0.001$].

Characteristic at enrollment	CRIC group n=1,565	dLTFU group n=826	RTC group n=576	p
Men who have sex with men n(%)	1,077 (68.8)	525 (63.6)	389 (67.5)	
Heterosexual men n(%)	222 (14.2)	149 (18.0)	91 (15.8)	<0.01 for comparison between transmission modes
Heterosexual women n(%)	140 (8.9)	87 (10.5)	71 (12.3)	
Other n(%)	126 (8.1)	65 (7.8)	25 (4.3)	
Enrollment before 2010 n(%)	635 (40.6)	582 (70.5)	501 (87.0)	<0.01
School education ≤9 yr n/available data (%)	327/1,507 (21.7)	200/757 (26.4)	105/478 (22.0)	0.04
AIDS events n/available data (%)	499/1,536 (32.5)	326/811 (40.2)	222/571 (38.9)	<0.01
CD4 cell count <200cell/uL n(%)	752 (48.1)	455 (55.1)	227 (39.4)	<0.01

[Table 1. Demographic and clinical characteristics at enrollment]

CONCLUSIONS: Gaps in the continuum of care were frequent. A high proportion of patients LTFU (41%) returned to care. Young age, heterosexual transmission, low literacy, advanced HIV-infection, delayed ART initiation and initiation of IP-based regimens were more frequent in people with gaps in the continuum of care. The importance of prompt initiation of ART is underscored.

TUPDB0103

Understanding gaps in the HIV treatment cascade in 11 West African countries: Findings from the regional Community Treatment Observatory

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BACKGROUND: In West and Central Africa, 48% of people living with HIV (PLHIV) are aware of their status, 40% are accessing antiretroviral therapy (ART), and 29% are virally suppressed. Progress is stymied by drug stock-outs, weak health systems, human rights barriers, and low quality of care. In February 2017, the International Treatment Preparedness Coalition (ITPC) established the Regional Community Treatment Observatory in West Africa (RCTO-WA) to increase accountability for the 90-90-90 targets.

METHODS: ITPC trained and supported national networks of PLHIV to collect and analyze facility-level data along the HIV treatment cascade from 103 health centers in 11 West African countries. From July 2017-June 2018, the RCTO-WA conducted 538 health center visits, 279 key informant interviews, and 110 focus group discussions. In this paper, we share the first year of RCTO-WA community monitoring findings, analyzed using the 'Five As' framework—availability, accessibility, acceptability, affordability and appropriateness.

RESULTS: *Availability:* ART stock-outs were recorded during 23.4% of health facility visits (95% confidence interval [CI] 19.8%-27.0%), lasting an average of 40.5 days (95% CI 34.2-46.7). Stock-outs were less common for HIV tests and viral load supplies. *Accessibility:* Long distances to health centers was the top cited barrier to HIV testing and ART. Linkage to care was high overall (4,692 positive tests; 4,354 ART initiations), but was lower among key and vulnerable populations, and countries without test-and-treat. Among 81,817 people on ART, 16,491 viral load tests were performed. *Acceptability:* A third of participants rated the quality of services a 3 or less out of 5. A quarter of viral load test results were returned within two weeks, with faster turnaround time associated with improved viral suppression ($p < .05$). *Affordability:* Payment was not cited as a major barrier to services. *Appropriateness:* Key and vulnerable populations made up 16% of positive tests but just 7% of people on ART. Young men were less likely to access services than young women.

CONCLUSIONS: To achieve the 90-90-90 targets, ongoing community monitoring is critical. The RCTO-WA highlights key access gaps along the HIV treatment cascade. National and regional advocacy should focus on expanding differentiated service delivery and removing gender- and human rights-related barriers.

TUPDB0104

The "Failure Cascade" for patients with unsuppressed viral load in Zambia: Results from a large HIV treatment cohort

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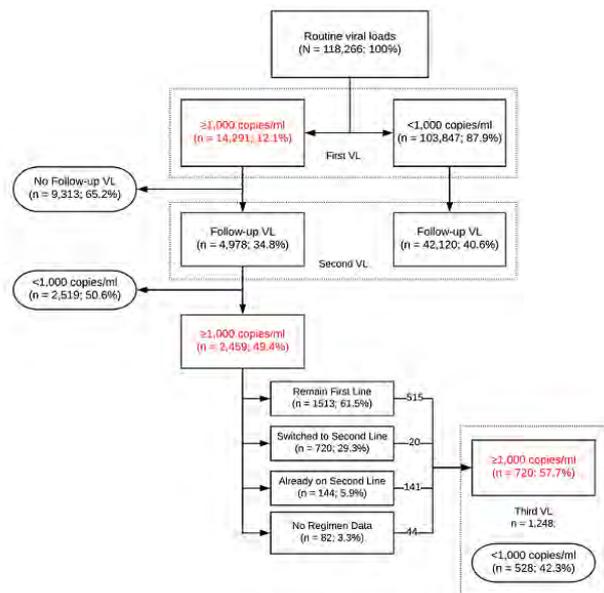
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BACKGROUND: Achieving the 3rd 90 demands sustained anti-retroviral therapy (ART) and routine viral load (VL) monitoring for people living with HIV (PLHIV) to ensure viral suppression (i.e. VL< 1,000 copies(c)/ml). In Zambia, ART-treated PLHIV with VL ≥1,000 c/ml enter a complex "failure" cascade requiring enhanced adherence counseling (EAC), follow-up VL testing (within 90 days), and possible switch to second-line ART. Here, we report the first "failure" cascade from Zambia for a large PEPFAR-funded HIV treatment cohort supported by the Centre for Infectious Disease Research in Zambia (CIDRZ).

METHODS: We abstracted routine data from electronic health records for all PLHIV >18 years who accessed ART services in 74 CIDRZ-supported facilities across 3 Zambian provinces and had ≥1 documented VL between January 1, 2016–September 30, 2018. We describe the failure cascade using summary statistics.

RESULTS: Figure 1 depicts patient flow in the failure cascade. Of 118,266 patients with a documented first VL, 12.1% (n=14,291) were unsuppressed. Of those, 9.2% had a follow-up VL drawn within 90 days, at a median of 266 days (IQR: 174-402). Time to first follow-up VL did not differ by gender (p=0.23), but was faster for adolescents (18-24 years) compared to older (>25 years) PLHIV (p< 0.001). Half of patients with a follow-up VL achieved viral suppression (n=2,519, 50.6%), while 49.4% (n=2,459) experienced virological failure (i.e. two consecutive unsuppressed VLs). Of 2,459 with virological failure, only 720 (29.3%) switched to second-line ART per guidelines.

CONCLUSIONS: For ART-treated PLHIV with an unsuppressed routine VL in Zambia during the evaluation period, we observed gaps with provision of follow-up VL testing and substantial testing delays. Of those with virological failure, only about one-third receive second-line ART. New differentiated service delivery models are needed that offer unsuppressed patients expedited clinical and laboratory services, including EAC, follow-up VL and HIV genotype testing, and ART regimen change.



[Figure 1. Patient Flow in the HIV Viral Load Failure Cascade]

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The hepatitis C treatment cascade in the era of direct-acting antivirals (DAAs), and barriers to DAA treatment initiation, among US men and women with and without HIV

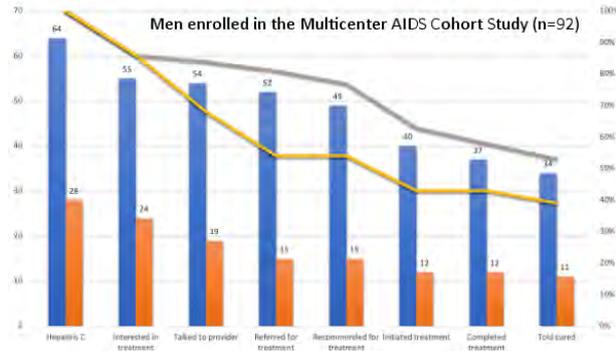
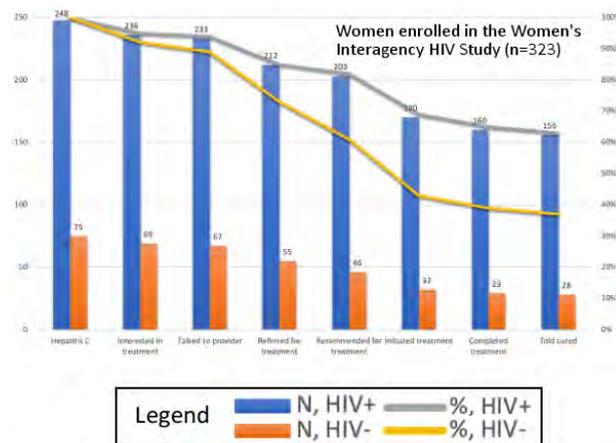
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BACKGROUND: People with HIV are disproportionately co-infected with the Hepatitis C virus (HCV) and experience accelerated liver-related morbidity and mortality. Direct-acting antivirals (DAAs) are well-tolerated and yield high sustained virologic response (SVR) rates. However, DAA uptake is low. This study characterizes the DAA-era HCV treatment cascade among US men and women with and without HIV and identifies treatment barriers.

METHODS: We constructed HCV treatment cascades using data from two observational cohorts: Women's Interagency HIV Study (women, six semi-annual visits, 2015-2018, n=2,447) and Multicenter AIDS Cohort Study (men, one visit, 2016-2017, n=2221). Cascades included HCV treatment-eligible individuals, defined as HCV RNA+ or reported DAAs. Surveys captured clinical (e.g., CD4/viral load, poor health), patient (e.g., missed visits), system (e.g., appointment access), and financial (e.g., insurance) barriers.

RESULTS: 323 women and 92 men were HCV RNA+ or reported DAAs. Most women/men had HIV (77%/70%) and were Black (69%/63%); median age (interquartile range) was 56 (51-60) and 58 (55-63), respectively. Despite similar treatment interest, HIV+ women were more likely to attain cascade outcomes than HIV- women (82% vs. 61% recommended, 69% vs. 43% initiated, with 63% of HIV+ vs. 37% of HIV- women achieving SVR); similar discrepancies were noted for men (Figure).



[Direct-acting antiviral Hepatitis C treatment cascade among US men and women, by HIV status (n=415)]

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Men were less likely to progress through the cascade. Individuals reporting substance use and Black men were less often treated. Women initiating treatment (vs. those not) differed in proportions of visits with reported patient (14%/33%) and system barriers (34%/17%), but not clinical (32%/35%) or financial barriers (26%/24%). Among men not treated, clinical barriers were most often reported (53%), compared to patient (1%), system (2%), and financial (2%) barriers.

CONCLUSIONS: In our cohorts, people with HIV were more likely to receive treatment for HCV and attain SVR. HIV-related care may facilitate navigation of HCV treatment barriers. HIV- individuals, Black men, and substance users may need additional support.

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TUPDB0106

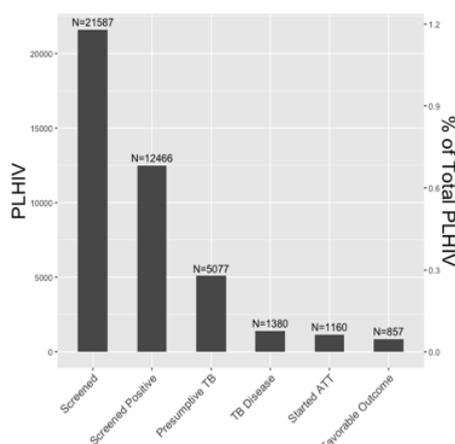
**Actively contributing to a cascade of change:
Analysis of the TB treatment cascade among children
and adolescents living with HIV in six high TB/HIV
burden countries**

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BACKGROUND: While substantial attention has been given to facility-based TB symptom screening, analyses of the subsequent TB diagnostic and treatment cascade has been remarkably limited. To inform comprehensive TB care for children and adolescents living with HIV (C/ALHIV), this study analyzed retention within the cascade among C/ALHIV in sub-Saharan Africa.

METHODS: Patient data from 2013 to 2017 were analyzed from electronic medical records and national paper registers utilized at seven BIPAI Centres of Excellences (COEs): Botswana, Eswatini, Lesotho, Malawi, Tanzania-Mbeya, Tanzania-Mwanza, and Uganda. Data were analyzed on C/ALHIV (ages 0-18.99 years in Tanzania; ages 0-19.99 years in the remaining five sites) along the TB cascade. TB symptom screening, diagnosis, and treatment practices followed national and COE protocols. TB treatment outcomes were defined in accordance with WHO definitions.

RESULTS: Of the 22490 patients analyzed, 96% (21587/22490) completed TB symptom screening, and 58% (12466/21587) had a positive screen at one or more visit during the analytic period. After clinical evaluation, 41% (5077/12466) of C/ALHIV with a positive symptom TB screen were classified as presumptive TB, and 27% (1380/5077) of those were diagnosed with TB. TB treatment was initiated in 84.1% (1160/1380) of C/ALHIV with TB, of which 73.9% (857/1160) had favorable outcomes (cured or treatment completed). Among C/ALHIV with available data, TB was bacteriologically confirmed in 32% (216/675) of those initiating anti-TB treatment (ATT).



[Figure 1. TB Cascade of care across all clinical COEs**]

CONCLUSIONS: Facility-based TB symptom screening is feasible early in the TB cascade. High rates of positive TB symptom screening and presumptive TB cases, combined with drop offs in TB diagnoses, ATT initiation, and favorable outcomes underscore the need for improved retention throughout the TB cascade. Thorough follow-up and action along the cascade are needed to ensure that presumptive TB cases receive appropriate diagnostic evaluation, workup, and treatment, particularly in the late downstream steps.

TUPDC01 Must do better: addressing the failures of SRH HIV integration

TUPDC0101

Measuring perceptions of sexual risk among adolescent girls and young women taking PrEP: A new qualitative method using visual timelines in HPTN 082

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BACKGROUND: Perceived risk of HIV may motivate use of pre-exposure prophylaxis (PrEP) but is dynamic and challenging to elicit and measure. Existing methodological approaches are often constrained by social desirability bias. We tested a novel approach to identifying when young women perceive 'seasons of risk' and therefore when PrEP could offer significant HIV protection.

METHODS: HPTN 082 was an open label study of PrEP uptake and adherence in 16-25 year-old HIV-uninfected women in Cape Town and Johannesburg, South Africa and Harare, Zimbabwe. In a qualitative sub-study, we used a visual method with 24 participants to obtain information about their past and current sexual relationships and perceived exposure to HIV. Participants sketched relationship 'timelines', and an interviewer probed about condom use, relationship power, substance use, intimate partner violence (IPV), concurrent relationships, sexually transmitted infections (STIs), and pregnancies associated with each relationship. Participants assigned a "risk score" to each relationship, based on a weighing up of factors they identified as associated with HIV risk. Interviews were audio-recorded and transcripts were analysed using NVivo 11.

RESULTS: Early sexual debut, having an older partner, sex while intoxicated, and transactional sex were highly prevalent, but women seldom considered those factors in rating relationships as 'high risk'. Women rated relationships 'low risk' if they were casual, if condoms were used consistently, or if sex was infrequent. Risk assessment was also based on their trust and confidence in the relationship; loving partners were rated 'low risk' and unhappy relationships involving conflict rated 'high risk', regardless of other risk factors. Women indicated that creating the timelines revealed and encouraged new reflections on aspects of their HIV risk in relationships.

CONCLUSIONS: Self-assessment of risk is challenging when reflecting on intimate relationships. The "visual storytelling" approach using sexual history timelines facilitated discussions and recalibration of personal risk among young African women, who use different parameters than public health professionals to assess risk. This approach is relevant both for researchers seeking to understand the relationship between risk perception and PrEP use, and potentially for providers as a tool to support young women to assess their risk and adopt protective behaviours, including PrEP.

TUPDC0102

High uptake and adherence to periconception PrEP among women in South Africa

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BACKGROUND: Women who plan to conceive while exposed to HIV need strategies to mitigate HIV acquisition risks. We are conducting a longitudinal study in Durban, South Africa to evaluate use of TDF/FTC as PrEP among HIV-exposed women planning for pregnancy.

METHODS: We enroll HIV-uninfected women aged 18-35 years with personal or partner plans for pregnancy in the next year, not using long-acting contraception, and with a stable partner living with HIV or of unknown-serostatus. Safer conception counseling occurs at each post-enrollment study visit and PrEP is offered along with quarterly adherence counseling. We follow women for one year; those who become pregnant are followed through pregnancy. The primary objective is to evaluate periconception and pregnancy PrEP uptake and adherence. Adherence is defined as the number of electronic pill cap openings divided by number of days of expected PrEP use. Women provide blood for plasma tenofovir levels quarterly. We present data for the first 147 participants including adherence data for the first 52 participants completing 3-month follow-up.

RESULTS: Between October 2017 and December 2018 we enrolled 147 women with median age 24 (range 18-35) years and 146 (99%) identifying as black South African. Partner HIV-serostatus was unknown by 96%. Among 135 women completing safer conception counseling, nearly two-thirds (N=86) chose to initiate PrEP. At the time of analysis, 52 had completed the 3-month follow-up visit with adherence data. During these first months, mean weekly adherence was 71% (95% CI: 66-77%). Nearly 50% of participants achieved $\geq 80\%$ adherence; 37% had 50-80% adherence, and 15% averaged $< 50\%$ adherence to daily PrEP. Among 40 PrEP-initiators providing plasma at the 3-month visit, 45% had detectable tenofovir; 38% had levels associated with daily dosing ($\geq 40\text{ng/mL}$).

CONCLUSIONS: Among women at-risk for HIV acquisition, and planning for pregnancy, most choose PrEP as a safer conception strategy. Adherence is high with nearly one-half with detectable tenofovir. Ongoing mixed-methods analysis will explore how to refine adherence support to optimize adherence for those women who want, but struggle, to use PrEP to safely achieve reproductive goals. These data indicate high demand for and acceptability of periconception PrEP in South Africa.

TUPDC0103

Safer conception services: A model to support progress towards 90-90-90 goals for men and women with horizontal and vertical HIV transmission risks

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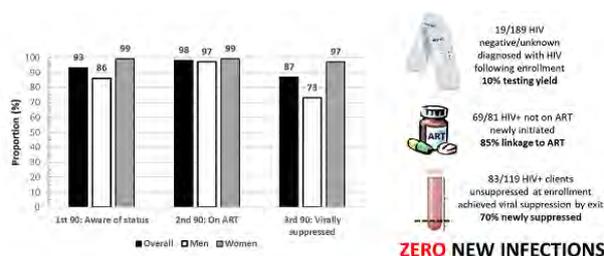
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BACKGROUND: Safer conception services have the potential to support HIV treatment, prevention and elimination-of-mother-to-child (EMTCT) targets, however implementation remains limited. We explored a safer conception service through a 90-90-90 lens to assess potential for impact and scale-up.

METHODS: Between June 2015-April 2017, a safer conception demonstration project was implemented in a high-volume, public sector primary healthcare clinic in Johannesburg, South Africa. HIV-affected individuals and couples desiring pregnancy enrolled in the service and received a

comprehensive package of care including: HIV testing, ART initiation/optimisation, viral load monitoring and other interventions to minimise periconception horizontal and vertical HIV transmission risks. Clinical records, laboratory results and structured interviews were used to establish client achievement of 90-90-90 targets.

RESULTS: Overall, 692 individuals enrolled, 454 women and 238 men. Of the 462 couples represented, 230 enrolled as dyads and 232 as unaccompanied individuals. Of these couples, 225 (49%) were HIV seroconcordant, 159 (34%) were serodifferent and 78 (17%) had one serounknown partner. Overall, 93%, 98% and 87% of HIV-positive individuals achieved the 1st, 2nd and 3rd 90s respectively (figure 1).



[Figure 1. 90-90-90 outcomes achieved in a safer conception service cohort in Johannesburg]

Out of those not on ART at enrolment, 85% (80% of men and 91% of women) initiated treatment through the service. Out of 120 recorded pregnancies, 72 resulted in live births with 63 HIV-exposed infants. No vertical or horizontal transmissions were observed.

CONCLUSIONS: Females attending this safer conception service achieved all three 90s, boding well for EMTCT outcomes. Furthermore, although male partners achieved only the second 90, linkage to ART initiation was good and the clear progress achieved towards 90-90-90 may indicate that safer conception services represent a promising intervention to improve cascade outcomes for heterosexual men. Overall, this service performed well compared to South Africa's public sector programme, narrowly missing the 90-90-90 targets for the HIV-positive partners reached. Safer conception scale-up could support greater progress towards 90-90-90 targets.

TUPDC0104

Prevalence of HIV and other sexually transmitted infections among female sex workers in Moscow, Russia: Results from a community-based, cross-sectional study using respondent driven sampling methodology

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BACKGROUND: In Russia, it is estimated by the Ministry of health that 0.8 million people are living with HIV, and that 85,800 new infections occurred in 2017. Despite female sex workers (FSW) being known as a key population for HIV and other sexually transmitted infections (STI), data on HIV/STIs prevalence in this group are scarce in Russia. The objective of this study was to estimate HIV and other STIs prevalence among FSW in city of Moscow and Moscow region.

METHODS: A cross-sectional study was implemented by an international non-governmental organization (NGO), a Russian NGO and a Russian research institute using the respondent driven sampling methodology. The recruitment took place between October 2017 and July 2018. Data collection included a face-to-face questionnaire, HIV and syphilis rapid tests, throat swab and self-collected vaginal and anal swabs for the detection of 4 other STIs (*Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Trichomonas vaginalis* and *Mycoplasma genitalium*). Statistical analysis was conducted using weights based on the RDS-II estimator. Factors associated with HIV infection were identified using a weighted multivariate logistic regression.

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RESULTS: In total, 385 participants were included in the analysis, including 18 seeds. Among them, 53.5% worked as indoor FSW and 46.5% as outdoor FSW. The median age was 30.0 years. Regarding ethnic origin, 73.2% were Russian, 19.5% came from Former Soviet Union States and 5.7% were African. The median age of sex work debut was 23 years and the median weekly number of clients was 8. In the previous 30 days, 36.9% declared unsystematic condom use with clients. Weighted HIV prevalence was 3.1% [95% CI: 1.5%-7.0%]. Other STI prevalence was comprised between 4.1% [2.2%-8.0%] (*Neisseria gonorrhoea*) and 14.9% [10.5%-21.0%] (*Mycoplasma genitalium*). Factors associated with HIV infection were: being 25 years and less (OR=0.06; 95% CI: 0.00-0.77, p=0.03); coming from Former Soviet Union States [4.55 [1.12-18.50], p=0.03] or Sub-saharan Africa [24.76 [2.51-243.81], p=0.006]; and having taken drugs in the previous 6 months [7.84 [1.42-43.20], p=0.01].

CONCLUSIONS: These results show high HIV/STIs prevalence among FSW in Moscow region, highlighting the need for better access to SW-friendly prevention and care services in Russia.

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PrEP use and sexually transmitted infections are not associated longitudinally in a cohort study of young men who have sex with men in Chicago

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BACKGROUND: In the United States, rates of sexually transmitted infections (STIs) have risen steadily in recent years as has PrEP use to prevent HIV infection. Our goal was to understand longitudinal patterns in the association between PrEP user and STIs. These analyses are a key target in prevention efforts aimed at disrupting the downstream HIV infection risk.

METHODS: Data were collected as part of RADAR, a cohort study of young men who have sex with men (YMSM) and transgender women (TGW; aged 16-29) living in Chicago. Unadjusted and adjusted longitudinal lagged regression models were utilized to assess the relationship between PrEP use and odds of rectal STI acquisition. Analyses included data from six study visits. Mediation models were also utilized to consider the potential pathway between PrEP use, condomless sex, and STI diagnosis.

RESULTS: Two hundred and eight-two (24.1%) participants reported PrEP use at least once across all study visits while 374 (31.9%) participants had a positive rectal STI test at least once. In longitudinal models, no significant association was observed between PrEP use and STI diagnosis (aOR=1.07, 95% CI: 0.63-1.82). This same finding was observed when comparing PrEP users to non-users as well as when comparing consistent PrEP users to those who varied their used between study visits. In mediation models, PrEP use was significantly associated with increased likelihood of condomless anal sex at the next study visit (CAS; aOR=1.61, 95% CI: 1.10-2.36), however, CAS was not associated with STI status (aOR=0.95, 95% CI: 0.58-1.57). Nor was there a significant difference in relationship between PrEP and STIs when stratifying either of these analyses by race/ethnicity.

CONCLUSIONS: We demonstrated that, overall, PrEP use was not associated with STIs among YMSM but did observe that PrEP users were more likely report increased participation in CAS at the subsequent study visit. In the talk, theories will be explored as to why an association exists between PrEP use and CAS but not between CAS and STIs.

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Prospective, multicenter study to assess point prevalence, incidence and recurrence of sexually transmitted infections in men who have sex with men in Germany: BRAHMS study

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BACKGROUND: Rates of new HIV infections in Germany are moderately declining, and knowledge on impact of novel HIV prevention methods, such as HIV pre-exposure prophylaxis (PrEP), including its impact on sexual transmitted infections (STI) are sparse.

Here we report on a prospective, multicenter study to assess point prevalence, incidence and recurrence of STIs in 1000 men who have sex with men (MSM) at risk for HIV infection.

METHODS: The BRAHMS study is a prospective study conducted at ten sites in 7 major German cities enrolling MSM at risk for HIV infection. Participants are seen every three months and systematically screened for all STIs including HIV, HAV, HBV, HCV, Gonorrhoea (NG), Syphilis (TP), Chlamydia trachomatis (CT) and Mycoplasma genitalium (MG) among others. Diagnosis was performed from blood samples as well as urine, anal swab, and oropharyngeal swab specimens. Sexual behavior questionnaires are assessed at each time point.

RESULTS: Among participants at risk for HIV infection we found high point prevalence of sexually transmitted infections (NG: 10%, CT, 13% MG 20%, TP 5%). Overall seropositivity for TP was 20.3%, which includes participants with a positive EIA and history of previously-treated disease. In addition, we found a point prevalence of HIV and acute HCV infection of each 0.5%. 25% of participants were positive for more than one STI. Over 90% of STI cases were asymptomatic. CT, MG and GO infections were predominantly rectal (CT:67%; MG:59%; GO:43%), while GO was also frequently pharyngeal (CT: 15%; MG: 14%; GO 43%). 68% of individuals at risk for HIV infection initiated PrEP. There were no significant differences in the point prevalence of STIs in individuals that already took PrEP before enrollment into the study and non-PrEP users. All HIV infections were detected in non-PrEP users.

CONCLUSIONS: We detected high frequencies of asymptomatic, rectal STIs in MSM but low point prevalence of previously undiagnosed HIV infection.

TUPDD01 Measuring, mapping and working with populations most in need

TUPDD0101

Measuring anticipated sex-work stigma: Scale validation and association with HIV and non-HIV service utilization

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BACKGROUND: Stigma research has largely focused on HIV-related stigma; however, the importance of measuring and addressing stigmas that intersect with HIV is growing. Anticipated HIV stigma has been linked with delay of HIV testing and avoidance of health services but there is limited research on the association between anticipated sex-work stigma and healthcare utilization. This abstract presents results of analysis to validate a scale for anticipated sex-work stigma and examine associations between anticipated stigma and HIV and non-HIV service utilization among sex workers in Kenya.

METHODS: Using a pool of 23 items on anticipated sex-work stigma, we tested items with data from a cross-sectional survey of 729 sex workers (232 males, 497 females, 172 HIV-positive), collected in January-February 2015 in four sites (Nairobi, Kitui, Homa Bay, Busia). Confirmatory factor analysis (CFA) was used to identify the best scale and logistic regression was used to assess associations between anticipated sex-work stigma and HIV and non-HIV service utilization in the past 12 months.

RESULTS: CFA supported a 6-factor anticipated sex-work stigma scale (chi-square p value < 0.001; root mean square error of approximation [RMSEA]=0.08; standardized root mean square residual [SRMR] = 0.04); and comparative fit index [CFI]=0.92. The final 18-item scale included 6 subscales. The scale demonstrated excellent internal consistency (α=0.93). Higher scores on certain subscales of anticipated sex-work-stigma scores were associated with avoidance or delay of HIV testing: healthcare workers (aOR: 1.09 [1.01-1.35]) and police (aOR: 1.11 [1.02-1.21]). Anticipated stigma from healthcare workers was also associated with avoidance or delay of HIV treatment (aOR:1.17 [1.01-1.35]). Higher scores on all subscales were associated with avoidance or delay of non-HIV health services.

Anticipated Stigma Subscales*	Avoidance/Delay HIV Testing (n=729), adjusted odds ratios (95% CI) [†]	Avoidance/Delay HIV Treatment (n=245), adjusted odds ratios (95% CI) [†]	Avoidance/Delay of non-HIV Health Services (n=729), adjusted odds ratios (95% CI) [†]
Healthcare workers	1.09 (1.01-1.19)*	1.17 (1.01-1.35)*	1.09 (1.03-1.16)*
Family	1.03 (0.94-1.05)	0.99 (0.84-1.17)	1.12 (1.06-1.18)*
Community and friends	1.00 (0.95-1.05)	1.08 (0.99-1.17)	1.07 (1.04-1.10)*
Police	1.11 (1.02-1.21)*	1.05 (0.91-1.23)	1.10 (1.02-1.19)*
Social exclusion	1.04 (0.99-1.09)	1.01 (0.95-1.08)	1.06 (1.03-1.09)*
Physical violence	1.02 (0.96-1.09)	1.01 (0.92-1.11)	1.06 (1.02-1.11)*

*Adjusted for weekly income, city of residence and presence of depression; [†]Anticipated stigma subscales modeled as continuous variables; *Significant at α=0.05

[Table 1. Association between anticipated sex work stigma and delay or avoidance of HIV and non-HIV services]

CONCLUSIONS: Sex-work stigma is a recognized, yet understudied, barrier to effective HIV responses. This validated measure of sex-work stigma can be used in conjunction with existing HIV stigma measures to explore intersectional stigma as a barrier to HIV testing, prevention, and treatment.

TUPDD0102

Mapping key population hotspots in Nigeria for targeted HIV program planning

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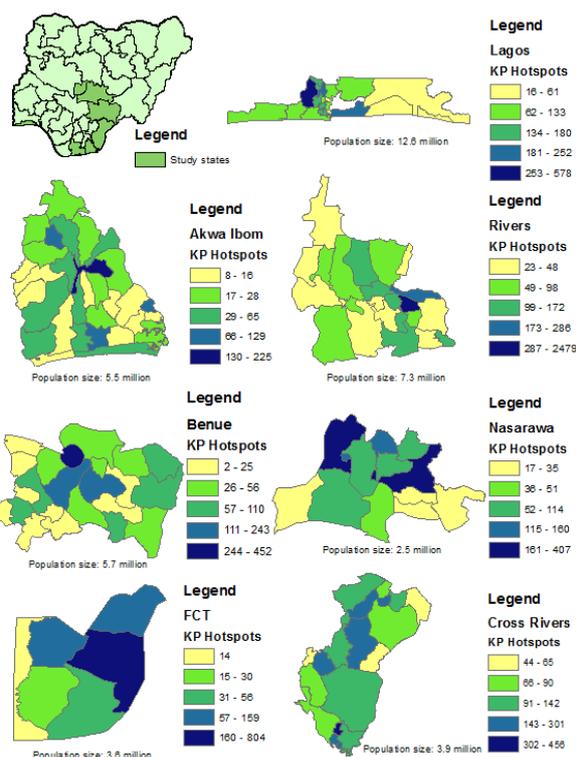
BACKGROUND: Nigeria has the second highest HIV burden globally. In 2017, UNAIDS demonstrated high prevalence among Nigeria's key populations (KP): 14.4% among female sex workers (FSW), 23.0% among men who have sex with men (MSM), and 3.4% among people who inject drugs (PWID). Reliable and accurate mapping of KP hotspots is necessary for strategic placement of services and allocation of limited resources for targeted interventions.

METHODS: During August 2018, 261 trained staff from 36 KP-led community-based organizations in seven U.S. President's Emergency Plan for AIDS Relief (PEPFAR) priority states mapped and validated hotspots identified during a recent formative assessment. Geographic coordinates, peak times of activity, and estimated number of KP individuals were recorded.

RESULTS: Of the 13,862 KP hotspots mapped, 69.1% were FSW, 11.3% were MSM, and 19.6% were PWID. Although generally clustered around the city centers, many hotspots were in less populated areas of each state. We found far fewer MSM hotspots compared to FSW and PWID hotspots. The highest number of hotspots were observed in Lagos, Cross River, and Rivers states.

	FSW	MSM	PWID	Total
Akwa Ibom	708	276	312	1296
Benue	1098	265	351	1714
Cross Rivers	1782	268	616	2666
Federal Capital Territory	977	116	105	1198
Lagos	2599	131	239	2969
Nasarawa	985	242	313	1540
Rivers	1423	273	783	2479
Total	9572	1571	2719	13862

[Hotspots identified in seven U.S. President's Emergency Plan for AIDS Relief priority states in Nigeria by key population]



[Distribution of key population hotspots by local government area in Nigeria]

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CONCLUSIONS: We identified many new and previously undocumented KP hotspots. The low number of MSM hotspots relative to FSW and PWID hotspots might be attributed to the Same Sex Marriage (Prohibition) Act, which has reduced the visibility of MSM activities. Engaging local KP throughout this activity increased access to previously undocumented hotspots and strengthened partnerships for future collaboration with HIV programs. The information obtained from this exercise will be used by the Government of Nigeria to design more strategically located and appropriately scaled KP-specific interventions.

TUPDD0103

The M-Spot 2 Study: Feasibility of measuring viral load longitudinally using home-collected dried blood spot specimens of high-risk MSM living with HIV

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BACKGROUND: The "Undetectable=Untransmittable" campaign emphasizes the need for individuals living with HIV to reach and maintain viral suppression to prevent new infections. Emerging prevention strategies to monitor viral load (VL) are needed for those disengaged from care or sub-optimally adherent to antiretroviral therapy (ART). eHealth studies with HIV-positive MSM report high acceptability of self-collecting biological specimens, including dried blood spots (DBS) to measure VL; however, little information exists on longitudinal monitoring of VL. We report longitudinal research-based VL test results from home-collected DBS specimens among HIV-positive MSM recruited online.

METHODS: In 2018, US HIV-positive MSM (n=78) identified as having detectable VL (DVL) were invited to participate in a study to measure VL longitudinally via self-collected DBS specimens. Consenting participants received DBS kits at baseline and 3-month follow-up with instructions to collect and mail specimens to a research laboratory. RNA was extracted using the Qiagen RNeasy kit. TaqMan-based Real-time Quantitative PCR research assay was used to quantify VL. The lower limit of quantification (LLQ) was estimated at 500 copies/mL. Results were reported as undetectable (UVL), below the LLQ, or a quantitative result if VL >500 copies/mL.

RESULTS: Of 56 consenting participants, 68% were White, 14% Black, and 16% Hispanic. Median age was 42; 51/56 (91%) returned specimens for testing at baseline and 43/51 (84%) at 3-month follow-up. At baseline, 2 specimens were below the LLQ, and 6 had a DVL (median=1475; range=603-2867 copies/mL); at 3-month follow-up, 4 specimens were below the LLQ, and 3 had DVL (median=1804; range=1245-14709 copies/mL). While 74% of men had UVL specimens at both time points, the remainder had VL fluctuations from baseline to follow-up (DVL to UVL=4; UVL to DVL=5; DVL to DVL=2).

CONCLUSIONS: Our longitudinal study of HIV-positive MSM with a past DVL showed that at-home DBS collection and research-lab monitoring of VL is feasible. Fluctuating viremia over a 3-month period was identified in a subset of participants. Findings signal interest in DBS home collection by HIV-positive MSM with sub-optimal ART adherence. This approach may improve research data collection and potentially provide a complementary VL monitoring approach in clinical care to increase the proportion of MSM with UVL.

TUPDD0104

Developing and validating a model for risk-based differentiation of HIV prevention and testing services for female sex workers: Experiences from Maharashtra, India

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BACKGROUND: India's national AIDS control program delivers HIV services for key populations through targeted interventions (TI). Optimum use of limited resources demands prioritization to maximize impact. We aimed to develop and validate a model to prioritize female sex workers (FSWs), based on risk/vulnerability characteristics, for HIV diagnosis and risk-reduction services.

METHODS: We analyzed routinely collected program data covering demographics, risk behavior, vulnerabilities, and biological outcomes from three FSW TIs in Maharashtra from April 2016 to March 2018. We linked each individual's behavioral data from the previous quarter to the HIV test results of the reporting period, generating 16,228 data points. Penalized and regular logistic regression analyses were used to identify any associations between the odds of HIV positivity and prospective explanatory variables including age, years of FSW activity, years of TI association, number of sex acts in the past week, condom use, and history of sexually transmitted infections. We used receiver operating characteristic curve analysis and the Youden's index method for each numerical variable and optimal cutoff, respectively. Weighted scores for each indicator were computed using dominance analysis. The cutoff with the best sensitivity for HIV positivity in the high-risk group and best specificity for HIV negativity in the low-risk group were identified. After the model was completed, it was applied prospectively in two of the above-mentioned FSW TIs to study its efficiency for segmenting FSWs into high, medium, and low priority for HIV testing and risk-reduction services.

RESULTS: Among 2,239 FSWs categorized into priority groups, 684 (30.5 percent) were considered high-priority. Of the 11 cases of HIV detected, all were from this high-priority group (Table 1).

Female Sex Workers	High-Priority	Medium-Priority	Low-Priority	Total
Number (percentage) in priority group	684 (30.5%)	1,068 (47.7%)	487 (21.8%)	2,239 (100%)
Number tested	573	840	311	1724
Number of HIV-positive cases	11	0	0	11

[Table 1. HIV testing and detection by priority group (April to September 2018)]

CONCLUSIONS: The model demonstrated effective and precise categorization of FSWs at increased HIV risk, corroborating the need for intensified interventions among the high-priority group. This would include augmenting the frequency and intensity of high-threshold prevention services through differentiated strategies within the concentrated HIV epidemic in India.

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TUPDD0105

Receipt of medication-assisted treatment halves the risk of HIV-1 RNA viral load rebound for HIV-positive women who use illicit drugs

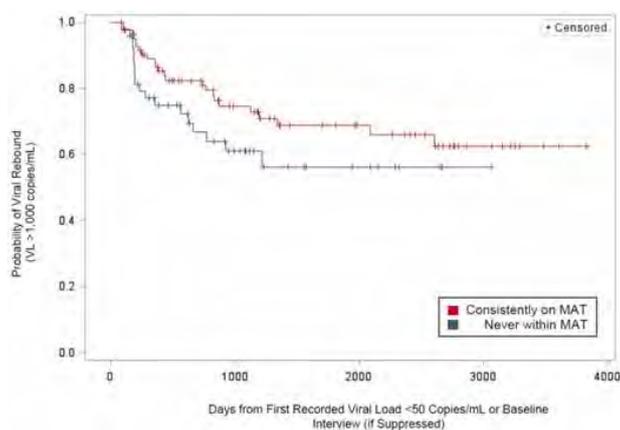
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BACKGROUND: Women living with HIV are less likely to achieve optimal antiretroviral adherence and retain HIV-1 RNA viral load non-detectability compared to men. Risk factors for viral rebound may differ by sex. This study's objective was to evaluate the impact of sociodemographic, behavioral, and clinical factors on the hazard of viral rebound after achieving viral suppression for a cohort of women living with HIV who use illicit drugs.

METHODS: We used longitudinal data from 2005-2017 for women living with HIV who use illicit drugs enrolled in the ACCESS study, a prospective cohort with systematic HIV viral load monitoring. Women were included if they achieved viral suppression (i.e., HIV-1 RNA viral load < 50 copies/mL) following antiretroviral therapy initiation and had more than one study interview. Sociodemographic as well as substance use, addiction treatment, and HIV clinical factors were evaluated as predictors of viral rebound (i.e., HIV viral load >1000 copies/mL). Cox regression using a recurrent events framework, time-varying covariates, and robust standard errors were used.

RESULTS: Of the 206 women included, nearly half (46%) are Indigenous, 4.4% are transgender women, and a quarter self-identified as a sexual minority. Over the 12-year period, 40% (n=83) experienced at least one virologic failure, accumulating a total of 115 viral rebound events. In adjusted analysis, the only factor associated with viral rebound was receipt of medication assisted treatment (MAT) in the past six months. Figure 1 compares probability of viral rebound by MAT status. Women who received MAT had half (adjusted hazard ratio: 0.49, 95% confidence limits: 0.28-0.88) the hazard of viral rebound compared to women who had not received MAT.

CONCLUSIONS: This study provides additional evidence that MAT can improve HIV treatment outcomes among women. Efforts to improve access to and retention within MAT programs may improve rates of viral suppression for HIV-infected women who use illicit drugs.



[Kaplan-Meier curve of time to first viral rebound following suppression by MAT status]

TUPDD0106

Police harassment and alcohol and drug abuse is associated with poorer 6-month retention among transgender women starting ART in a clinical trial in Argentina

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BACKGROUND: In Argentina, HIV morbidity and mortality is still high among transgender women (TGW). Previous studies describe that syndemic factors act as barriers to access health services. Our objective was to identify psycho-social factors associated with retention in care in treatment-naïve TGW in a clinical trial.

METHODS: Naïve TGWs were offered to start ART in a trans-sensitive health-care service. All participants initiated Dolutegravir plus TDF-FTC. Psychosocial interviews were applied longitudinally. The questionnaire collected data regarding socio-demographic characteristics, alcohol and drug use, depression, anxiety, personality traits, HIV-related stigma, sexual behavior, interactions with police, healthcare access, housing, education, work, and experiences of stigma and discrimination in these settings. Relevant variables in this analysis were: Retention (completing assessment week-24, +/- 1 month), gender identity-related police harassment (detained longer, threatened, beaten or sexually abused by policemen last year), subscale alcohol-related problems (AUDIT), substantial and severe drug abuse (DAST score >6).

RESULTS: The sample included 61 TGW, median age 28 (IQR 25- 32), 19.7% had less than 200 CD4 at screening. At week 24, 82% (n=50) were retained in treatment and 77.6% were virologically suppressed. Baseline characteristics showed high levels of vulnerability: 60.7% less than high-school education, 53.3% unstable housing, 29.5% foreign born, 77% sex work, 65.6% regular drug use and 32.8% suffered sexual abuse in the last year. Moreover, 31% reported being arrested and 18% experienced police harassment last year. The only factors significantly associated with failure of retention but not with virological failure were: police harassment (OR=0.16, 95%CI 0.03-0.71), alcohol-related problems (t(46)=-2.43, p=0.019), drug/alcohol consumption with clients during sexual encounters (t(56)=-3.26, p=0.002), and drug abuse (OR=0.07, 95% CI 0.01-0.76).

CONCLUSIONS: Trans-competent health care provides a safe space for vulnerable TGW to access health services and may counteract the negative effect of previous discriminatory experiences in health settings. Nevertheless, the contextual risk environment where TGW live, work and socialize, with high exposure to violence, drugs, and discrimination and stigma may jeopardize ART expansion in this population. Future clinical research and interventions targeting this group should consider self-empowerment, drug harm-reduction and address structural-discrimination of TGW in order to improve their retention in HIV healthcare.

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22 July**TUPDD02 Thinking and doing: Novel conceptual and methodological approaches****TUPDD0201****Exploring the mediating role of tobacco use in the relationship between intersectional stigma and HIV clinical outcomes among women living with HIV in Canada**C. Logie¹, Y. Wang¹, M. Kazemi², B. Gagnier², T. Conway², S. Islam², M. Lee³, K. Beaver², A. Kaida³, D.P. Alexandra⁴, M. Loutfy²¹University of Toronto, Toronto, Canada, ²Women's College Research Institute, Toronto, Canada, ³Simon Fraser University, Vancouver, Canada, ⁴McGill University, Montreal, Canada**BACKGROUND:** Intersectional stigma harms women living with HIV's (WLHIV) health and wellbeing. Coping strategies such as tobacco use may reduce stigma-related stress. Yet there are serious adverse health effects associated with long term tobacco use among WLHIV. Limited research has explored intersectional stigma and tobacco use. We examined coping strategies (tobacco use, resilience) as mediators of the relationship between intersectional stigma (HIV-related stigma, gender discrimination, racial discrimination) and HIV clinical outcomes among WLHIV in Canada.**METHODS:** We analyzed baseline survey data from a national cohort study with WLHIV in three Canadian provinces. Structural equation modeling (SEM) using weighted least squares estimation methods was used to test the direct effects of intersectional forms of stigma (HIV-related stigma, gender discrimination, racial discrimination) on HIV-related clinical outcomes (>90% ART adherence, CD4 count >200 cells/mm³, undetectable viral load), and the indirect effects via resilience and current tobacco use, adjusting for socio-demographic factors.**RESULTS:** Among 1422 participants (median age: 42.5 years; IQR=35-50), most were women of colour (29.40% African, Caribbean and Black; 22.36% Indigenous; 7.17% other ethnicities; 41.07% white). Over one-third (43.66%; n=616) were current tobacco users, 12.05% (n=170) formerly used tobacco, and 44.29% (n=624) never used tobacco. SEM results suggest that racial discrimination had a direct effect on ART adherence (B=-0.215, p<0.001: direct effect; B=0.046, p<0.01: indirect effect), resilience partially mediated this relationship. Current tobacco use fully mediated the relationship between gender discrimination and lower CD4 count (B=-0.061, p<0.01) and detectable viral load (B=-0.055, p<0.01). Current tobacco use partially mediated the relationship between gender discrimination and ART adherence (B=-0.044, p<0.01). Resilience fully mediated the relationship between HIV-related stigma (B=0.040, p<0.01) and racial discrimination (B=0.027, p<0.01) with CD4 count, and between HIV-related stigma (B=0.021, p<0.05) and racial discrimination (B=0.014, p<0.05) with viral load. Fit indices suggest good model fit (CFI=0.937; RMSEA=0.048 [90% CI: 0.43-0.069]; SRMR=0.030).**CONCLUSIONS:** Intersectional stigma based on HIV, race and gender contributed to increased tobacco use and reduced resilience, that in turn contributed to lower CD4 count and detectable viral load. There is an urgent need for intersectional stigma reduction interventions and strategies to support WLHIV who use tobacco as an intersectional stigma coping strategy.**TUPDD0202****Implementation of social capital theory and process to strengthen state-level combination prevention outcomes in 12 states in Mexico**A. Luna^{1,2,3}, C. Coria⁴, K. Morrison^{4,5,6}¹MoKexteya, Direction, Mexico City, Mexico, ²Instituto Nacional de Salud Publica, Diplomado Sida, Cuernavaca, Mexico, ³Consorcio de Investigación sobre VIH SIDA TB CISIDAT, Research and Training, Cuernavaca, Mexico, ⁴MoKexteya, Mexico City, Mexico, ⁵Consorcio de Investigación sobre VIH SIDA TB CISIDAT, Cuernavaca, Mexico, ⁶Instituto Nacional de Salud Publica, Diplomado Sida, Cuernavaca, Mexico**BACKGROUND:** Prevention, especially in marginalised groups, KPs, has not kept up with the advances in treatment. Combination prevention provides a frame within to work at state level. While stigma and discrimination are often cited as the principle obstacle to effective prevention, little concentrated emphasis has been put on addressing internal stigma. Social capital theory (helping excluded persons and groups increase sense of belonging, trust and influence) provides a social process approach to addressing the effects of internal stigma and provide for multisectoral comprehensive response to prevention.**METHODS:** This combination prevention project involved working with 3 key sectors (community, health service providers and government representatives or consumers, producers, and overseers) using three forms of networking (bonding, bridging and linking). It was undertaken in 12 states: in each state, 30 representatives of the three sectors participated cooperatively in a 3-step process:

- 1) diagnosis and planning,
- 2) collaborative and complementary implementation,
- 3) collective assessment.

Each state addressed 5 aspects of combination prevention (structural prevention was broken down into quality of services; policies and procedures; and community mobilization and development).

RESULTS: The project resulted in a collective comprehensive and cohesive approach to combination prevention in all states with notable advances in understanding and addressing needs of key populations. Yearly assessment meetings at the end of a 10-month process as well as The results of an external qualitative assessment of 10 states showed significant progress in collaborative action, uptake in services, and in some states an increase in state HIV/STI prevention budgets. It showed the need for more emphasis on social cohesion for trans persons and sex workers. Process has been adjusted and now focusing on improved health care services for trans in the states as part of the integrated approach to HIV prevention.**CONCLUSIONS:** The overall process, refined over 5 years, provides a systematic process approach to building social capital as a key part of the response to effective HIV prevention while addressing issues of stigma, discrimination and internal sigma in a collective multisectoral manner that greatly impacted the perception to and use of differentiated health services for key affected populations.**TUPDD0203****Frustrated patients, frustrated providers: A comprehensive integrated conceptual model to explain why patients delay, decline, or discontinue HIV medication and strategies to boost sustained HIV viral suppression in populations at-risk**M. Gwadz^{1,2}, C. Cleland³, B. Martinez¹, A. Ritchie¹, R. Freeman¹, N. Leonard¹, Y. Allen¹, N. Bobb¹, D. Kennedy¹, D. Sherpa¹, D. Jonas¹, A. Kutnick¹, Heart to Heart 2 Collaborative Research Team¹New York University Silver School of Social Work, New York, United States, ²New York University, Center for Drug Use and HIV Research (CDUHR), New York, United States, ³New York University School of Medicine, Department of Population Health, New York, United States**BACKGROUND:** At least 40% of persons living with HIV (PLWH) in the U.S. do not sustain HIV viral suppression (VS), with the lowest rates among low-socioeconomic status and African American/Black and Hispanic populations. This presentation will synthesize a set of mixed methodsTuesday
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studies on the complex multi-level barriers this subgroup experiences to VS, and facilitators of VS, *from their own perspectives*, and describe promising intervention approaches to increase rates of VS in this population at-risk.

METHODS: We formed a multi-disciplinary interpretive community and, guided by an ecological model, the theory of triadic influence, and critical race theory, compared/contrasted, critically evaluated, interpreted, and synthesized findings from studies we conducted with this population from 2008-2018. Studies focused on diverse topics including effects of concentrated poverty, experiences in institutional settings, the history of HIV, emotions, "forgetting" medication, substance use/mental health, reasons for stopping/starting medications, resilience, selling medication, and efficacious culturally salient behavioral interventions to increase VS. A comprehensive integrated conceptual model of intersecting barriers to and facilitators of VS was developed, along with efficacious or promising intervention approaches to modify or address barriers, at multiple levels of influence. Emphasis was placed on under-studied barriers, and facilitators, resilience, and potential interventions.

RESULTS: Barriers to and facilitators of VS were articulated at all levels of the ecological model, highlighting their complexity. Poverty was central at all levels of the ecology, and structural racism was a second major contextual influence. The history of the HIV epidemic was potent, where the collective memory of ineffective AZT monotherapy contributed to social norms and individual beliefs regarding medical distrust, counter-narratives about the origins of/cures for HIV, and fear of medication, producing emotions leading to medication avoidance. Incarceration among men caused trauma and disrupted care, and contributed to intersectional stigma. Substance use problems were pervasive. Promising intervention approaches included those made culturally salient by addressing these barriers. An example of an efficacious behavioral intervention to boost VS will be provided, along with other promising intervention approaches that emerged from the analysis.

CONCLUSIONS: This comprehensive integrated conceptual model provides insights into intervention approaches to increase rates of VS among populations at-risk.

TUPDD0204

Estimating plausible ranges on the scale of implementation for evidence-based HIV/AIDS interventions in the US

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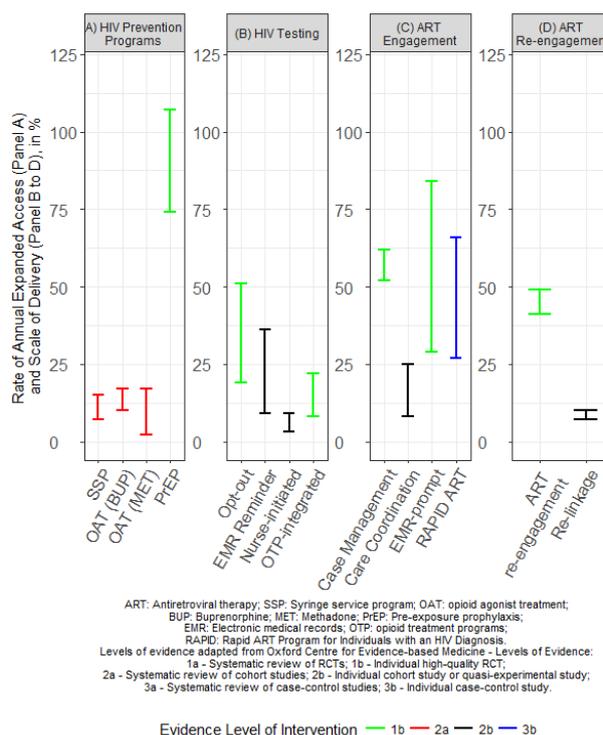
BACKGROUND: Simulation modeling plays a critical role in priority setting for HIV treatment and prevention interventions; however, interventions may vary substantially in their ability to deliver value at different levels of scale and in different epidemiological contexts. To inform a U.S. six-city microepidemic HIV transmission model, we executed a targeted literature review to identify plausible ranges of the scale of delivery for a set of evidence-based interventions for the treatment and prevention of HIV/AIDS among adults.

METHODS: We identified 14 evidence-based interventions from the US CDC's Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention and from the recently published literature, ranking the quality of the evidence using the Oxford Centre for Evidence-based Medicine - Levels of Evidence scale. Using the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework, we defined the scale of delivery (i.e., the proportion of a target population who are provided with the intervention) as a plausible rate of annual expanded access for HIV

prevention programs and as the product of healthcare setting-specific reach and adoption for HIV testing, antiretroviral therapy (ART) engagement, and ART re-engagement interventions.

RESULTS: We synthesized evidence from 11 peer-reviewed publications, 12 public health and surveillance reports, and 3 publicly-available data sets. Plausible annual rates of expanded access ranged from 7%-15% increase for syringe service programs to 74%-107% for pre-exposure prophylaxis (PrEP). Plausible ranges of the scale of delivery for HIV testing interventions ranged from 3%-9% (nurse-initiated) to 19%-51% (opt-out). We estimated ART engagement could reach from 8%-25% (coordinated care) to 29%-84% (EMR-prompt) diagnosed people living with HIV/AIDS. The ART re-engagement interventions were estimated to reach from 7%-49% of those who have discontinued ART (Figure 1).

CONCLUSIONS: Basing simulation analyses and estimating impacts of evidence-based interventions delivered at feasible levels of implementation is critical to assessing their potential population-level health and economic effectiveness.



[Figure 1. Plausible Ranges of Scale of Delivery]

TUPDD0205

Extrapolation of population size estimates for key populations: Impact of method of extrapolation on estimates produced using regional estimates of female sex workers from Tanzania as an illustrative example

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BACKGROUND: Population size estimates(PSE) play a critical role in allocation of funding and planning, in disease surveillance, and in models to understand transmission dynamics. Methods for direct PSE, including capture-recapture, multiplier methods, etc. each have their own limitations, but have been applied widely. Countries must extrapolate direct PSE from selected areas to obtain estimates at the national or sub-national levels without direct data. Multiple methods for extrapolation have been applied, but with few metrics for assessing validity. Here, we show the impact of different methods of extrapolation and an approach for assessing

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the validity of results compared to known values. Publicly available data on population size of female sex workers(FSW) in Tanzania are used in an illustrative example.

METHODS: Extrapolation results were obtained using three methods of extrapolation: simple imputation, stratified imputation, and regression using seven, direct FSW PSE. We allowed for variation in specification of how the estimate was to be modeled(estimate or proportion). We allowed variation in covariates selected. The different methods and variations by method resulted in 21 model permutations. Covariates included urbanicity, literacy, HIV prevalence, and deliveries in health facilities(%HF). We assessed validity of results using the leave-one out approach for three of the permutations.

RESULTS: Depending on how the estimate was modeled, we observed a maximum 358% difference in extrapolated estimates holding all else constant (in Simuyi region using estimate itself:4491 vs. using proportion of women living in urban areas:980). Across methods, there was as much as a 342% difference in extrapolated estimates holding all else constant (in Njombe region using simple imputation:4491 vs. using multiple regression:19894). Differences were also observed depending on the covariate selected. Using the leave-one out approach, multiple regression performed the best.

CONCLUSIONS: Extrapolation can be used as an analytical tool to optimize use of existing data and provide data-driven program planning, but choice of how the estimates are modeled, choice of models, and choice of covariates to include in models can have a dramatic impact on conclusions reached. Understanding of the estimates that do exist, what they represent, and discussions with local stakeholders and community groups are key to making informed decisions on extrapolation.

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Viral origins, evolution and diversity

TUPEA001

Genetic characterization HIV-1 sequences from Cabo Verde points to a new sub-subtype A

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BACKGROUND: Cabo Verde, localized at Western Africa, presents around 2400 (2000- 2900) of individuals living with HIV (UNAIDS 2017). In a study of de Pina-Araujo et al 2014, using samples collected in 2010, a vast HIV-1 pol diversity was verified, showing 53.7% of pure HIV-1 subtypes and 46.3% of recombinant forms, being 5.2% of them classified as A_U recombinants. Thus, the objective of the present study was to improve the characterization of these A_U recombinant sequences to contribute for the better understanding of the HIV/AIDS molecular epidemiology of Cabo Verde.

METHODS: Whole blood from seven HIV-1 A_U pol-infected individuals had their genomic DNA extracted, and nested-PCR was used to amplify four overlapping fragments aiming to compose the full-length HIV-1 genome. Six individuals were from Santiago and one from Sal Island. Five were female and two males. Only two of them presented a known epidemiological link resulting from a mother to child transmission. Phylogenetic trees were generated for the sequenced fragments using the neighbor-joining/NJ (MEGA 7.0). Reference sequences from all HIV-1 pure subtypes, A sub-subtypes and CRF26_A5U were included in the analysis.

RESULTS: Up to now, at least three unlinked HIV-1 A_U sequences have been sequenced and analyzed in each studied fragment (Fragment I- positions 1129 to 2553, II- 2252 to 4792, III-4780 to 5509 and IV-7386-8588 of HXB2 reference). In all analyzed fragments, the studied sequences grouped together with high bootstrap support >70, in a separated branch from the other A sub-subtypes (A1, A2, A3, A4, A6) and CRF26_A5U. The intragroup genetic distance varied from 2.8%-7.3% in the analyzed fragments. The distance between the possible new A group to the others A sub-subtypes varied on average from 5.3% (A6) to 9.4% (CRF26) in the fragment I, from 4.3% (A6) to 6.6% (A1) for fragment II, from 6.2% (A3) to 8.6% (CRF26_A5U) for fragment III and from 7.6% (A3) to 11.9% (CRF26_A5U) for fragment IV.

CONCLUSIONS: Our study points to the description of a new HIV-1 sub-subtype A circulating in Cabo Verde and highlights the importance of the continued molecular surveillance studies, mainly in countries with high HIV molecular diversity.

TUPEA002

Identification of two new HIV-1 BF intersubtype circulating recombinant forms of South American origin, CRF66_BF and CRF75_BF, which also circulate in Southern Europe

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BACKGROUND: Circulating recombinant forms (CRFs) are important components of the HIV-1 pandemic. 92 have been identified, 15 of them BF recombinants, mostly from South America. In Spain, we have identified several BF clusters branching outside CRFs. Our aim is determining whether they represent new CRFs and their relationship with viruses from other countries.

METHODS: HIV-1 samples were collected in 9 Spanish regions in 1999-2018. Protease-reverse transcriptase (PR-RT) and in some cases integrase or V3 sequences were obtained through RT-PCR. Phylogenetic analyses were performed via maximum likelihood. Recombination was analyzed by bootscanning. Relationship with database sequences was analyzed through BLAST searches and phylogenetic analyses. Near full-length genome (NFLG) sequences were obtained through RT-PCR in four overlapping segments. Times and locations of most recent common ancestors (MRCA) were estimated through a Bayesian method.

RESULTS: We identified 15 BF recombinant clusters branching outside CRFs. Here we analyze two, designated BF_9 and BF_13. Including database sequences, BF_9 comprised 24 individuals, with samples collected in Spain (n=18), Argentina (n=4), Paraguay (n=1), and Italy (n=1). Of 12 samples from Spain with available data, 9 were from Paraguayans and only 1 from a Spaniard.

Transmission was predominantly heterosexual. NFLG from three samples showed identical mosaic structures, with 5 breakpoints, coincident with those of two database BF recombinant NFLG from Paraguay. BF_13 comprised 24 individuals, with samples collected in Spain (n=13), Italy (n=5), Brazil (n=4) and USA (n=2).

All but one samples from Spain and Italy grouped in a subcluster. The three Spanish samples studied by us were from men who have sex with men. We obtained three NFLG, two of which showed identical mosaic structures, with 20 breakpoints, coincident with those of two database BF recombinant NFLG from Italy. The third NFLG had 18 breakpoints coincident with the other two, but had additional subtype B segments. MRCA were estimated in 1986 and Argentina for BF_9 and 1982 and Brazil for BF_13.

CONCLUSIONS: Two new HIV-1 CRF_BFs have been identified, designated CRF66_BF and CRF75_BF by the Los Alamos HIV Sequence Database staff, corresponding, respectively, to BF_9 and BF_13 clusters. These CRFs probably originated in South America but also circulate in Southern Europe.

TUPEA003

Near full-length genome sequences of recombinant HIV-1 viruses derived from parental strains expanding in transmission clusters in Spain

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BACKGROUND: Transmission clusters (TCs) play a central role in the HIV-1 epidemic in Spain since about a decade, mainly among men who have sex with men (MSM). Different TCs which have expanded widely are co-

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circulating, exposing people to different strains. Here, we analyze near full-length genomes (NFLGs) of HIV-1 recombinants derived from dual infections with viruses belonging to TCs.

METHODS: Samples were collected from MSM diagnosed of HIV-1 infection in Spain since 2008. Clustering was determined with phylogenetic trees constructed with FastTree including sequences of protease-RT and env-V3 segments of >10,000 infections from Spain analysed by us since 1999 and related sequences obtained through BLAST searches in public databases. TCs were designated with their subtype or circulating recombinant form followed by a correlative number. NFLG were amplified in four overlapping fragments and recombination was analyzed with bootscanning.

RESULTS: We describe 11 NFLGs of HIV-1 strains derived from large transmission clusters designated F1_1 (n=191), CRF02_1 (n=71), A1_1 (n=63), B_13 (n=62), F1_3 (n=40), B_109 (n=23) and B_59 (n=22). Recombinants analyzed in NFLGs were 3 CRF02_1/B59, 2 A1_1/B, 2 F1_1/B, 1 CRF02_1/B, 1 F1_1/B13, 1 F1_1/B109 and 1 F1_3/B. The CRF02_1/B59, A1_1/B and F1_1/B recombinants showed coincident mosaic structures and clustered in phylogenetic trees, suggesting transmission of these recombinants. Additionally, partial genomes of protease-reverse transcriptase and an env fragment comprising the V3-loop of 2 other infections clustered with the F1_1/B109 viruses analyzed in NFLG and 2 other partial genomes clustered with the A1_1/B NFLGs.

CONCLUSIONS: Co-circulation of large TCs of HIV-1 increases the risk of acquiring dual infections with viruses from different TCs. As a result, we have detected recombinant viruses derived from parental strains belonging to large TCs, and at least four of them have been transmitted. Molecular surveillance is necessary to detect new recombinants which are increasing the complexity of HIV-1 epidemics.

Viral fitness and resistance

TUPEA004

Acquired drug resistance surveillance in HIV-1 treated patients in Senegal

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BACKGROUND: To achieve the 90-90-90, surveillance of acquired drug resistance mutations (ADR) in HIV treated patients is a key component. The aim of this work was to evaluate ADR mutations to ARV at 12 months and 48 months in Senegal as recommended by WHO HIV Drug resistance surveillance guidance.

METHODS: From December 2017 to June 2018, patients under ART were recruited randomly throughout the country according to WHO guidelines for ADR survey after informed consent at M12 +/-3 months and M48 +/-3 months. Dried blood spots (DBS) were prepared from blood samples collected on EDTA tubes and were sent to HIV national reference lab at le Dantec hospital maximum 14 days after sampling. Viral load was performed using Nuclisens easyQ version 2.0 (Biomerieux, France) and sample with more than 1000 copies/ml was eligible for partial genotyping of Reverse Transcriptase gene according to ANRS AC11 procedure. Sequences were edited with DNA STAR software (Lasergene) and drug resistance mutations were analyzed through HIVdb v8.7 of Stanford University.

RESULTS: A total of 262 adult patients on first-line ARV treatment at M12 and 294 at M48 were recruited in 30 sites. The median age of patients were 40.53 years and 40 at M12 and M48, respectively. HAART regimen was mainly TDF+FTC/3TC+EFV with 234/262 and 200/294 at M12 and M48, respectively. The proportion of virological failure was 16.9% (43/262) and 13.9% (41/294) at M12 and M48 respectively. The overall resistance rate at M12 was 6.1% (3.8% to NRTI and 6.1% to NNRTI) and 11.2% at M48 (6.1% to NNRTI and 11.2% to NNRTI). More prevalent DRM included

M184VI, K65R and at both M12 and M48 but TAMs were essentially noted at M48. Genetic diversity showed the same pattern with a predominance of CRF02_AG (63% vs 70%).

CONCLUSIONS: These results provided an update of ADR on early stage at 12 months and more later at M48 and pointed out the need to reinforce adherence and scaling virological monitoring to maintain patients under first line regimen as longer as possible.

Viral entry (attachment, receptors and co-receptors, penetration and tropism)

TUPEA005

Impact of CCR2 genetic polymorphisms in HIV acquisition in a Northern Cameroonian pediatric population

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BACKGROUND: The association of chemokine receptor-2 (CCR2) polymorphism with HIV transmission or disease progression remains highly controversial. The roles of CCR2-64I allele in HIV infection may differ from one population to another because of their genetic background.

METHODS: A cross-sectional study was carried out in five health facilities in the Northern region of Cameroon from August 2015 to May 2016. Blood samples were collected from under 15 years children. DNA was extracted from the buffy coat of each participant using the QIAamp®DNA mini kit. The DNA extract was then subjected to polymorphic analyses. CCR2 genotypes were analyzed by Polymerase Chain Reaction (PCR) and Restriction Fragment Length Polymorphism (RFLP). The Chi-squared test was used for the assessment of Hardy-Weinberg equilibrium.

RESULTS: A total of 134 children comprising 38 (28.36%) HIV infected and 96 (71.64%) HIV un-infected were recruited. Prevalences of 44.78% wild type homozygous, 48.52% heterozygous and 6.7% mutant homozygous were found in the overall population. An allelic frequency of 29.69% for the mutant allele CCR2-64I was found in HIV-uninfected individuals compared to 34.21% in HIV infected ones (p=0.47).

CONCLUSIONS: The CCR2-64I allele is relatively common in the Northern region of Cameroon and seems not to confer protection against HIV-1 infection. This CCR2-64I mutation alone could not be used as drug or vaccine target in Northern Cameroon. We suggest that more investigations should be carried out using genotype combination of CCR2 polymorphism and other single nucleotide polymorphisms to determine their possible role in HIV infection.

Viral regulation (transcriptional and gene expression regulation)

TUPEA006

Upregulation of DNA methylation-dependent repressors ZBTB4 and ZBTB38 in CD4+ T cells from HIV+ patients

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BACKGROUND: HIV eradication has not been possible due to the existence of latent viral reservoirs in CD4+ T cells; DNA methylation is an epigenetic mechanism that contributes to HIV latency, where repressors leads to transcriptional silencing. ZBTB4 and ZBTB38 are DNA methylation-dependent repressors that participate in the regulation of lymphopoiesis and the *Specificity Proteins (SP) 1, 3 and 4* genes, and subsequent downregulation of some pro-inflammatory cytokines such as IL-10, MCP1 and IL-18. Although, they regulate the development and function of CD4+ T cells, their participation in HIV infection has not been elucidated.

METHODS: Cross-sectional study. 12 healthy donors and 21 HIV+ patients were enrolled, subclassified as ART-naïve (n= 8) and ART treated for ≥1 year with undetectable viral load (n=13) from March to October 2018. CD4+ T lymphocytes were isolated from whole blood and RNA was extracted for gene expression of *ZBTB4* and *ZBTB38* by qRT-PCR; also, an *in-silico* analysis was performed. Cytokines (IL-1β, IFN-α, IFN-γ, TNF-α, MCP-1, IL-6, IL-8, IL-10, IL-12, IL-17, IL-18, IL-23, and IL-33) were quantified by flow cytometry in serum. *Kruskal-Wallis* test was used for statistical analysis.

RESULTS: HIV+ group exhibited a significant up-regulation compared to healthy controls; particularly, in ART treated, which show an increased expression in both genes: *ZBTB4* 1.23 fold (p< 0.01) and, *ZBTB38* 2.04 fold (p< 0.01). Relative to the ART-naïve group, no statistically differences in gene expression were found (*ZBTB4*: 1 fold; *ZBTB38*: 0.13 fold). Furthermore, cytokine levels showed no significant differences. However, ART-naïve subjects display a positive correlation between *ZBTB38* expression and IL-10, IL-12, IL-23 and IL-33 levels. No correlation was found between *ZBTB4*/*ZBTB38* expression and IL-10, MCP-1 or IL-18. *In-silico* sequence analysis revealed *ZBTB4* repressor could be binding to HIV proviral DNA in 5 different sites, while *ZBTB38* does it in 2.

CONCLUSIONS: In this study we show an increased expression of *ZBTB4* and *ZBTB38* genes in ART-naïve and treated patients. *In-silico* sequence analysis revealed different binding sites in the HIV-1 genome for *ZBTB4* and *ZBTB38* repressors. This might be a new molecular mechanism involved in the establishment of viral latency by epigenetic transcriptional repression.

Virology of CNS compartment

TUPEA034

The replication-competent HIV reservoir is detectable in circulating monocytes and is increased in ART-suppressed chronic HIV-infected individuals with neurocognitive impairment

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BACKGROUND: The replication-competent HIV reservoir in circulating monocytes and how it relates to neurocognitive impairment in ART-suppressed chronic HIV infection are not understood.

METHODS: Cryopreserved peripheral blood mononuclear cells collected at entry from ART-suppressed chronic HIV-infected individuals, whom were enrolled in a cross-sectional neuroHIV MRI study and had available age- and education-adjusted neuropsychological global and domain-specific z-scores, were cell-sorted using multi-parametric flow-cytometry for total monocytes and CD4 T cells. Subsequent flow-cytometry analyses confirmed 100% purity of sorted cell populations. Using a novel modified TZM-bl Assay (TZA), termed MoCo-TZA, frequencies of cells producing replication-competent HIV (IUPM) were calculated in monocytes and CD4 T cells. Total p24 associated with replication-competent HIV produced by monocytes and CD4 T cells were quantified using a relative light unit to replication-competent HIV-associated p24 standard curve in the Mo-Co-TZA. Ratios of total replication-competent HIV-associated p24 and IUPMs, termed infectious potential, were calculated for monocytes and CD4 T cells. Cognitive impairment was defined as a global z-score < -0.5 or a z-score < -0.5 in one cognitive domain known to be affected by HIV. Mann-Whitney and Spearman's tests assessed group comparisons and correlations.

RESULTS: All HIV-infected participants in cognitively-impaired (n=7) and normal (n=9) groups were male, on ART>3 months, and virally-suppressed (< 20 RNA copies/mL). There were no significant differences in median age (58vs.54), education years (14vs.15), and nadir and current CD4 T cell counts (139 cells/ul vs.69 cells/ul; 568 cells/ul vs.470 cells/ul). IUPMs in monocytes were detectable in 11 of 16 participants (median IUPM=1.32; range:0-16.01). IUPMs in CD4 T cells were detectable in 13 of 16 participants (median IUPM=7.22; range:0-52.57) and were significantly higher as compared to monocytes (p=0.004). Median infectious potential was slightly higher in monocytes as compared to CD4 T cells (0.443vs.0.104;p=0.271). Cognitively-impaired participants had significantly higher IUPMs in monocytes (4.43vs.0.31;p=0.015) and lower IUPMs in CD4 T cells (5.81vs.20.32;p=0.071) as compared to cognitively-normal participants. Infectious potentials between cognitive groups were similar for both cellular compartments. Higher monocyte-CD4 T cell IUPM ratios correlated with lower executive function (p=0.009), working memory (p=0.159), and global performance (p=0.084).

CONCLUSIONS: Despite ART-suppression, circulating monocytes capable of producing replication-competent HIV may contribute to neurocognitive impairment.

TUPEA035

Impact of suppressive cART on reduction of inflammation in the CNS of Chinese-origin rhesus macaques with SIV infection

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BACKGROUND: The anatomic HIV reservoir in the central nervous system (CNS) is one of the obstacles to an HIV cure. Previously we used the rhesus macaque of Chinese-origin as a nonhuman primate model for SIV reservoirs in the CNS. We examined 16 specific regions of the brain and 4 regions of the spinal cord, we found uneven distributions of SIV in the brain with higher frequency of SIV DNA detection in basal ganglia than other brain regions. As it is known that residual HIV/SIV reservoir is associated with inflammation, based on these results, we further tested the hypothesis that inflammation may play a role in the CNS especially where there's higher SIV+ cells in the specific brain region even on suppressive cART.

METHODS: Three groups of animals were studied, a group of SIV-infected animals with triple antiretroviral drug therapy, a group of SIV-infected animals without cART, and a group of SIV-naïve healthy animals serving as controls. We studied inflammatory cytokines in both plasma and cerebrospinal fluid (CSF) using Luminex multiplex cytokine assay. We further studied inflammation in molecular levels in the basal ganglia using PCR arrays in groups of SIV-infected with cART, SIV-infected without cART, and healthy controls.

RESULTS: We found that IL-6, IP-10, IFN-γ, and CCL2 in the CSF were significantly reduced in animals receiving cART compared with untreated group. We also found that inflammatory cytokines changes in plasma do

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not always reflect the regulation of inflammation in the brain with most of the above tested cytokines. Moreover, we found that although ART reduced the levels of inflammation significantly, compared with healthy animals, animals in cART group still had 7 ~ 17-fold higher levels of gene expression in approximately 20 inflammatory related cytokines, which included IL3, CCR3, CCL23 and CCL11.

CONCLUSIONS: Suppressive cART can greatly reduce inflammation in the CNS of SIV-infected rhesus macaques, however, inflammation still occurs in specific brain regions such as basal ganglia with higher frequency of SIV detection.

Mucosal transmission

TUPEA072

Heterogeneity of HIV co-receptor expression on CD4+ T cell subsets in human rectal mucosal tissues

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BACKGROUND: The rectal mucosa (RM) is a major site for HIV acquisition and replication as the gut harbors the majority of the body's CD4 T cells, most with high levels of HIV co-receptor (CCR5) expression. However, our understanding of mucosal CD4 cell subsets and their roles in HIV transmission and pathogenesis is still evolving with recent attention focused on tissue resident and Th17 CD4 cells as critical cell subsets. Here, we examine HIV co-receptor expression on various subsets of CD4 cells in blood and RM of healthy men.

METHODS: Peripheral blood and rectal biopsies (via rigid sigmoidoscopy) were collected from 43 healthy, HIV-negative men. Blood and RM mononuclear cells were phenotyped with CD3, CD4, CD8, CD69, CD103, and CCR5 antibodies. The function of cells was measured by stimulating with PMA/Ionomycin and staining for CD4, CD8, IL-17A, TNF- α and IFN- γ . Boolean gating was used to define: Th1 (CD4⁺IFN- γ ⁺ or TNF- α ⁺), Th17 (CD4⁺IL17A⁺), and pro-inflammatory Th17/Th1 (IL17A⁺IFN- γ ⁺) cells. Expression of CCR5 on tissue resident (CD69⁺CD103^{-/-}) and non-resident (CD69⁻CD103⁻) CD4 T cells and on Th1, Th17, Th17/Th1 subsets was determined and compared with non-parametric statistical analyses.

RESULTS: In RM, CCR5 expression was highest on CD69⁺CD103⁺ (median, 70.1%) CD4 cells compared to CD69⁺CD103⁻ (median, 46.3%) and CD69⁻CD103⁻ (median, 25.0%) ($p < 0.0001$). Compared to blood, RM cytokine-producing CD4 T cell subsets were heterogeneous in CCR5 expression. There were higher percentages of CCR5⁺cytokine⁺ CD4 cells in RM compared to peripheral blood ($p < 0.0001$ for all comparisons). In both RM and blood, Th1 and Th17/Th1 cells expressed higher levels of CCR5 (median: RM, 69.1 and 76.8; blood, 6.9 and 13.3) compared to Th17 cells (median: RM, 40.3 and blood, 5.2; $p < 0.01$ for all comparisons).

CONCLUSIONS: RM CD4 cell subsets display significant heterogeneity in expression of the HIV co-receptor, CCR5, that was not consistently represented in the blood. Non-tissue resident memory cells and Th17 cells expressed more moderate levels of CCR5 in contrast to very high levels seen on tissue resident, pro-inflammatory Th17/Th1, and Th1 CD4 cells suggesting that these specific subsets should be further investigated for their specific roles in mucosal HIV acquisition and pathogenesis.

Preclinical drug development (including prophylactic drug and microbicide development)

TUPEA074

Triterpene derivative NAT-078 as a novel bifunctional HIV-1 entry inhibitor

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BACKGROUND: Both neutralizing antibodies (NAbs) and entry inhibitors can inhibit HIV-1 infection by acting at different stages of the entry process. The combination of NAbs with entry inhibitor(s) may offer a therapeutic advantage, possibly overcoming resistance to them. CD4 mimetic small compounds, such as NBD-556, act as a bifunctional entry inhibitor of HIV-1 with respect to both neutralizing antibody activation and entry inhibition. Recently, we previously identified a triterpene derivative, OKS3-019, and synthesized a series of OKS (NAT) compounds that target non-CD4-binding site of HIV-1. In this study, we show the antiviral potency of a new triterpene derivative.

METHODS: Twenty-one NAT compounds were designed and synthesized using our previously reported method. The sensitivities of HIV-1 infectious clones (NL4-3, 89.6, JR-FL, YU2 and KP-5mvr primary isolate) to entry inhibitors and anti-HIV NAbs were determined using the TZM-bl assay.

RESULTS: We synthesized and tested 21 kinds of triterpene derivatives and found a novel entry inhibitor NAT-078, which could inhibit HIV-1 infection in IC₅₀ values of 0.49, 0.18, 19, 5.8 and 6.5 μ M for HIV-1 NL4-3, 89.6, JR-FL, YU2 and KP-5mvr, respectively. NAT-078 interfered with viral infection at the entry step. We further examined the combined effect of NAT-078 and NAbs targeting different domains in Env (VRC01, b12, PG9, PG16, 2G12, 4E10, 2F5, 447-52D and KD-247). Synergistic anti-HIV activity (CI = 0.39 to 0.82) was demonstrated with a large number of combinations. These results suggest that combination of NAT-078 with NAb can result in increased sensitivity to NAbs.

CONCLUSIONS: The novel entry inhibitor NAT-078 can inhibit HIV-1 entry and combinations of NAT-078 with NAbs are efficacious against HIV-1. Furthermore, NAT-078 can serve as a critical tool to explore the mechanism and synergistic effect of the entry inhibitors and NAbs.

TUPEA075

In vitro resistance profile of GS-6207, a first-in-class picomolar HIV capsid inhibitor in clinical development as a novel long-acting antiretroviral agent

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BACKGROUND: GS-6207 is a multi-stage capsid inhibitor with picomolar activity against all major HIV-1 subtypes. In healthy volunteers, GS-6207 was well tolerated and its pharmacokinetic profile following subcutaneous administration supports dosing once every 3 months. This study evaluated *in vitro* resistance emergence to GS-6207.

METHODS: GS-6207-resistant HIV-1 (HXB2D) variants were selected in MT-2 cells using escalating or fixed drug concentrations. Additional selections at fixed concentrations of GS-6207 and control antiretrovirals were conducted in peripheral human blood mononuclear cells (PBMCs) infected independently with 6 clinical isolates. Selected HIV-1 mutants were characterized using standard genotyping and phenotyping methods and their fitness evaluated in primary CD4⁺ T-lymphocytes.

RESULTS: Dose escalation selections progressed more slowly with GS-6207 over 15 weeks than with efavirenz or elvitegravir. Early GS-6207-selected HIV-1 passages encoded N74D in capsid and showed 5.3-fold reduced susceptibility (RS) to GS-6207, whereas later passages encoded Q67H+N74D conferring >100-fold RS to GS-6207. In MT-2 cells, GS-6207 prevented viral breakthrough (VB) at 8-fold EC₉₅ and selected for VB with

N74D in 38% (3/8) of replicates at 4-fold EC₉₅, a concentration below its anticipated clinical trough concentration. In PBMCs infected with HIV-1 clinical isolates, GS-6207 selected for VB with N74D in 8% (3/36) of samples at 8-fold EC₉₅, a frequency superior or similar to emtricitabine (81%), rilpivirine (33%) and efavirenz (8%) at their respective human plasma-free clinical trough concentration. At 4-fold EC₉₅, GS-6207 selected for L56I, Q67H, N74D/S, or T107N mutations alone or in distinct pairwise combinations. These HIV-1 capsid mutants showed a range of RS to GS-6207 and all but Q67H replicated poorly in primary CD4+ T-cells relative to wild-type virus. All GS-6207-selected HIV-1 variants remained fully susceptible to other antiretroviral classes.

The residues at which the GS-6207-selected mutations occurred *in vitro* are highly conserved (94-100%) across >10,000 capsid sequences from all major HIV-1 subtypes (www.hiv.lanl.gov). In addition, deep sequencing (2% frequency cut-off) of HIV-1 isolates from >100 treatment-naive patients detected only the T107N variant (4-fold RS to GS-6207) in a single patient isolate.

CONCLUSIONS: GS-6207 exhibits a unique *in vitro* resistance profile that supports its further clinical development as a new long-acting agent for the treatment of HIV-1 infection.

TUPEA076

Development of a pleuricellular *ex-vivo* foreskin model of HIV infection

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BACKGROUND: The human foreskin is an immunologically active tissue that is a rich source of CD4+ T cells, tissue macrophages and Langerhans cells. The foreskin is the main portal of entry for sexually acquired HIV in men and these tissue resident cells can serve as HIV targets with the potential to support viral replication. To better understand the process of HIV acquisition in the male genital tract, we sought to identify the likely HIV target cells using an HIV infection assay from foreskins collected after medical male circumcision (MMC).

METHODS: Crawl assay, isolation of cells, immunophenotype of cells and virus challenge assays. We investigated challenging suspensions of cells dissociated from the foreskin with fluorescent HIV-1 and analysing the relative susceptibility of the different cell types to HIV-1 infection. Migratory foreskin cells were obtained from foreskin tissue from South African men undergoing voluntary medical male circumcision.

RESULTS: The migratory cells were immunophenotyped and the CD3+ lymphocyte population was found to be predominantly CD4+. The presence of CCR5+ CD4+ cells was also shown. Migratory cells were co-cultured with cell free and cell associated viruses. PBMCs and TZMBL-GFP were used for the cell-associated infections. Foreskin cells were analysed in a time dependent manner by flow cytometry to detect infection. The results showed infection of CD4+ foreskin cells using this multi-cellular *ex-vivo* assay.

CONCLUSIONS: This assay will be used to assess the viral activity of putative inhibitors of HIV infection. We propose exploitation of this platform for the validation and characterisation of the different compounds. This platform has the capacity to validate activity and to interrogate cell-specific modes of action in a multi-cellular *ex-vivo* human challenge model.

TUPEA077

Synergistic inhibition of cell-to-cell infection of HIV-1 by the combination of single chain fragment variables (scFvs) and fusion inhibitors

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BACKGROUND: Cell-to-cell spread of HIV permits ongoing replication despite antiretroviral therapy (ART) and is suggested to be a major contributor to sexual transmission by mucosal routes. However, clinical use of fusion inhibitors, which target viral entry, is limited because of its weak antiviral activity and short half-life, as well as a low genetic barrier, to induce drug resistance.

Here we constructed a series of single-chain variable fragments (scFv) and examined the combinational effect of scFvs and fusion inhibitors against both cell-free and cell-to-cell infections.

METHODS: We constructed and purified scFvs from 3 anti-V3 and 3 anti-CD4i antibodies. Their inhibitory efficacy against cell-free infection was evaluated by neutralization assay using TZM-bl cells. Whereas, cell fusion was analyzed by dual split protein based fusion assay using cells expressing Env of HIV-1_{JR-FL_{WT}} and the fusion inhibitor-resistant mutants. Synergistic effect of scFvs and fusion inhibitors, such as C34 and SC34, was analyzed by Zero interaction potency model.

RESULTS: We found that all the scFvs tested have broad neutralization coverage against a panel of subtype B viruses, compared with the corresponding IgGs. Neutralization of cell-free viruses was observed for all anti-V3 IgGs and scFvs and anti-CD4i scFvs against HIV-1_{JR-FL_{WT}} and the fusion inhibitor-resistant mutants. In addition, all the anti-V3 scFvs and some CD4i scFvs significantly inhibited cell fusion, while their IgG counterparts did not. Furthermore, the combinations of scFvs and fusion inhibitors showed a high level of synergistic inhibition of cell fusion of both HIV-1_{JR-FL_{WT}} and the fusion inhibitor-resistant mutants. Among them, most prominent combinational effect was observed for one of the CD4i-scFv, 916B2 with SC34. The delay in cell fusion in fusion inhibitor-resistant mutants partly explains for the synergistic inhibition of cell fusion.

CONCLUSIONS: Our data demonstrate advantages of single chain fragments (scFvs) over their parent IgGs against both cell-free and cell-to-cell infections. Highly synergistic inhibition of cell fusion by the combination of scFvs and fusion inhibitors suggests possibility of intensification therapy using this combination added on the current anti-HIV treatment.

TUPEA078

Effect of human milk sulfated glycosaminoglycans on HIV-1 infection of human CD4+ cells *in vitro*

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BACKGROUND: The interaction of HIV-1 with the cell occurs mainly by non-specific binding to some cell surface molecules as heparan sulfate proteoglycans (glycosaminoglycan (GAGs) chain-linked proteins). Previous studies show that human milk GAGs (HM-GAGs) inhibit HIV gp120 binding to CD4 receptor and have a potent inhibitory effect on HIV-1 infection *in vitro*. It has also been reported that HM decreases the expression of CCR5 receptor in human PBMCs, so that HMGAGs could also have an effect on CD4+ cells that contribute to inhibit HIV-1 infection by down-regulation CCR5 expression and preventing HIV-1 entry. We evaluate if

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HMGAGs alter HIV-1 receptor (CD4) and co-receptors (CCR5, CXCR4) expression and the production of their ligands, in HIV-1 infected CD4+ cells and to define if there is a correlation with the inhibition of HIV-1 infection. **METHODS:** HMGAGs were purified by ion exchange chromatography and characterized by Electrospray Ionization time-of-flight HPLC-mass spectrometry. Inhibition assays were performed by preincubation of HMGAGs and shark cartilage chondroitin sulfate (CS), with HIV-1 IIIIB supernatant before infecting MT2 cells by 2 hr at 37°C. After 5 days, HIV-1 P24 antigen and chemokines were quantified by ELISA in culture supernatant. Significant inhibition of viral infectivity was defined as ≥ 80 reduction in P24 concentration. CD4, CXCR4 and CCR5 expression were quantified by flow cytometry.

RESULTS: HM-GAGs significantly inhibited MT2 infection by HIV-1 IIIIB (90-100%) with respect to the maximum inhibition observed with CS (61%). No significant difference was observed in MIP-1 α , MIP-1 β , RANTES and SDF-1 chemokines levels or CCR5 and CXCR4 expression. There was a significant decrease in CD4 expression in infection controls and infected MT2 in the presence of low concentrations of CS and HMGAGs (1-10 μ g) where the inhibition was < 80%. We did note that CD4 downregulation is reversed only at highest HMGAGs dosis when inhibition was ≥ 90 %.

CONCLUSIONS: Our results suggest that strong inhibitory effect of HMGAGs on HIV-1 infection is mainly due to its interaction with viral envelope because no effect was observed on the expression of chemokines receptors and their ligands. HMGAGs provide a new basis for blocking HIV infection and they may qualify as efficient microbicides.

Novel approaches to assess viral load, ARV resistance and tropism

TUPEA096

Rates of HIV-1 virological suppression and patterns of acquired drug resistance among fisherfolk on first-line antiretroviral therapy in Uganda

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BACKGROUND: Realising 90% virological suppression (VS) among individuals on antiretroviral therapy (ART) may become cumbersome in settings without routine viral load (VL) monitoring. We examined virological outcomes and patterns of acquired HIV-1 drug resistance (ADR), correlates of virological failure (VF) and ADR among fisherfolk on first-line ART.

METHODS: In this cross-sectional survey, we enrolled HIV-1 infected adults on first-line ART for 6, 12, 24, 36 and ≥ 48 months. For VL testing, we implemented a 5-mini-pool and a 10 x10 matrix pooling, and a deconvolution algorithm to identify VF (VL ≥ 1000 copies/ml). We performed genotyping among VFs, determined the correlates of VF and ADR by logistic regression for $p < 0.05$ and 95% confidence intervals.

RESULTS: Among the 1,169 participants with the median age of 36 years (IQR: 30-44), 648 (55.4%) were females, and the overall median time on ART was 24.0 months (IQR: 11.3-37.6). The overall VS rate was 91.7% and VS rates were 88.7% (211/238), 91.6% (217/237), 93.3% (222/238), 93.0% (214/230) and 92.0% (208/226) at median duration on ART of 6, 12, 24, 36 and ≥ 48 months respectively. ADR was detected in 71 of the 97 VFs (73.2%) with resistance to NNRTIs (73.2%), both NNRTIs and NRTIs (58.8%), (0%) NRTIs only and (0%) PIs.

The prevalent mutations were K103N (39.2%) for NNRTIs and M184V/I (53.6%) for NRTIs while TAMs existed in 21.6% of VFs. VF was associated with age <35 years (AOR: 1.36 95% CI: 0.41-0.97, $p=0.042$), secondary/higher education (AOR: 2.42, CI: 1.04-5.64, $p=0.041$) and zidovudine-based regimen (AOR: 2.10, 95% CI: 1.29-3.46, $p=0.003$). Nevirapine-backed regimen (AOR 1.87, CI: 0.03-0.54, $p=0.005$) and VL ≥ 10000 copies/ml, (AOR

3.48, CI: 1.37-8.85, $p=0.006$) were correlates of ADR. Our pooling strategy for VL testing saved \$20,320 (43.5%) of VL testing cost and had a negative predictive value of 95.2%.

CONCLUSIONS: We report high VS rates among these highly vulnerable fisherfolk despite widespread ADR among those with virological failure at the first viral load testing prior to intensive adherence counseling. Timely treatment switching and adherence support are recommended for better treatment outcomes. Adoption of pooled VL testing is cost-effective for monitoring of ART programmes in resource-limited settings.

TUPEA097

Bioinformatic analyses followed by phenotypic assays detect two new mutations associated with patients failing Raltegravir in Uganda

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BACKGROUND: Deep sequencing provides a sensitive and cost-effective assay for low-frequency variants in diverse HIV-1 infections, but historically has been underutilized for non-subtype B HIV-1 infections in resource-limited settings. Here, we use deep sequencing to analyze samples from treatment-naïve individuals and individuals experiencing virological failure on combination antiretroviral treatment (cART) in Uganda. Our objective was to detect associations between low-frequency mutations in HIV-1 integrase and treatment outcomes in Uganda.

METHODS: We retrieved a total of 380 archived plasma samples from patients at the Joint Clinical Research Centre (Kampala) with non-B infections, of which 328 were Integrase inhibitor-naïve individuals and 52 were Integrase inhibitor-experienced individuals for Raltegravir (RAL). Patient-derived plasma samples were used to extract HIV-1 RNA and generate amplicon libraries spanning HIV-1 integrase for sequencing on a MiSeq (Illumina). Our bioinformatic pipeline performed alignment and variant calling from the MiSeq data, subtype determination, multiple imputation for missing or discordant base calls, and support vector machine coupled with independent odds ratio analyses for detection of polymorphisms associated with RAL failure. Candidate point mutations of interest were introduced into the HIV-1_{NL4-3} backbone to determine susceptibility to RAL using U87.CD4.CXCR4 cells. Replication capacity experiments in TZM-bl cells in the presence of RAL fifty percent inhibitory concentrations (IC₅₀s) were determined for the wild-type and mutant viruses.

RESULTS: Overall, HIV-1 subtype A (49.7%) was the most frequent, followed by subtype D (21.3%). SVM plus Odds ratio analyses identified the known major mutation N155H, accessory mutations G163R and V151I, and novel mutations I203M and I208L as most highly associated with RAL failure. The addition of I203M and I208L mutations in competitive inhibition assays confirmed decreased susceptibility to RAL (12.7-fold and 15.6-fold, respectively) compared to wild-type virus (IC₅₀s=0.1023 nM).

CONCLUSIONS: Detecting minority HIV-1 variants with deep sequencing is important in settings where patients frequently discontinue treatment following VF, often leading to reversion to wild-type genotype by the follow-up visit. Our method described successfully a general strategy for detecting potential associations between the residual polymorphisms and treatment outcomes.

TUPEA098

Accuracy, sensitivity, and specificity of the cobas® Plasma Separation Card on cobas® 8800 System vs DBS on Abbott m2000 for the classification of HIV virological failure as compared to plasmaS. Carnona^{1,2}, E.G. Marins³, C.O. Simon³, D. Magubane^{1,2}, L. Hans^{1,2}, M. Hoppler⁴¹University of the Witwatersrand, School of Pathology, Department of Molecular Medicine and Haematology, Johannesburg, South Africa, ²National Health Laboratory Service, Johannesburg, South Africa, ³Roche Molecular Systems, Inc., Pleasanton, United States, ⁴Roche Diagnostics International AG, Rotkreuz, Switzerland**BACKGROUND:** Alternative sample types can help to expand access to diagnostics but concerns on the misclassification rates of virological failure (VF) at 1000 cp/mL remains. The cobas® Plasma Separation Card (PSC) has demonstrated good analytical performance compared to plasma but data on its performance compared to that of Dried Blood Spots (DBS) is limited. We compare the HIV viral load results using PSC and DBS to the reference plasma results and determined the sensitivity and specificity of DBS and PSC on the classification of VF at 1000 cp/mL.**METHODS:** Venous blood was collected from 282 HIV-1 infected patients who were either treatment naïve or on ART. One aliquot was used to spot the PSC and DBS and a second aliquot was used to process EDTA-plasma. The PSC and EDTA-plasma were tested on the cobas® 8800 System (c8800) using the cobas® HIV-1 quantitative nucleic acid test and the DBS were tested with the RealTime HIV-1 test on the Abbott m2000 system. We determined the concordance of the PSC and DBS result to the plasma result at the 1000 cp/mL cutoff, as the currently accepted treatment failure threshold and calculated the sensitivity and specificity of the two alternative sample types as compared to plasma.**RESULTS:** The mean log₁₀ difference between EDTA-plasma and PSC for the 142 samples within the linear range was 0.05 cp/mL [95%CI = -0.01 to 0.11] on the c8800 and -0.12 cp/mL [95% CI = -0.26 to 0.02] for DBS on m2000. For the 254 samples with valid results, the sensitivity and specificity for treatment failure observed with PSC on c8800 were: 96% [95% CI = 89% to 99%] and 97% [95% CI = 94% to 99%] while for DBS on the m2000 they were 87% [95% CI = 78% to 94%] and 86% [95% CI = 80% to 91%], respectively. A total of 8/254 samples were misclassified with PSC while 34 samples were misclassified with DBS.**CONCLUSIONS:** PSC demonstrated a good correlation to plasma and high concordance on the classification of VF and improved sensitivity and specificity compared to DBS in the same population.

TUPEA099

Field evaluation of HIV-1 viral load monitoring in adults and children receiving antiretroviral treatment in Nigeria by dried blood spot testing with realtime HIV-1 on m2000M. Tola¹, H.O. Ramadhani², O. Ogbanufe³, S. Peters¹, A. Abimiku¹, A. Charurat², W. Blattner², M. Swaminathan³, P. Dakum¹, N. Ndembu¹
¹Institute of Human Virology Nigeria, FCT, Nigeria, ²Institute of Human Virology, University of Maryland School of Medicine, Baltimore, Maryland, United States, ³U.S. Centers for Disease Control and Prevention, FCT, Nigeria**BACKGROUND:** The viral load (VL) demand in Nigeria is expected to increase from estimated 810,000 to 1.1 million tests per year by 2020. In resource-limited setting, use of Dried Blood Spots (DBS) is a pragmatic alternative to plasma for VL monitoring in HIV+ patients. This study aims to evaluate accuracy of DBS versus plasma VL testing under field conditions in patients on ART (>6 months).**METHODS:** DBSs were prepared from venous using disposable transfer pipettes (V-DBS), from finger-prick using micro-capillary tubes (M-DBS) and directly spotting (D-DBS). DBS and matched EDTA plasma were tested on the Abbott m2000 platform (CE marked 1 spot DBS protocol). Plasma also was tested on the Roche COBAS Ampliprep/COBAS TaqMan (CAP/CTM) version 2.0. Diagnostic accuracy indicators (sensitivity, specificity, misclassification rate, and kappa coefficient) for VF based on different VL

threshold levels (1000, 3000, and 5000 cp/mL) and agreement of absolute VL were calculated. Statistical analyses were conducted using SAS V.9.3 [SAS Institute, Cary, North Carolina, USA].

RESULTS: As the DBS VL cut-off threshold increased, the sensitivity for predicting VF decreased and specificity increased, when Abbott platform was used for DBS VL testing. V-DBS tested using the Abbott platform had a peak sensitivity of 93.5% [95% CI: 90.0-97.1] at 1000 cp/mL VL cut-off threshold and a peak specificity of 96.4% [95% CI: 94.2-98.7] at the 5000 cp/mL VL cut-off threshold. The lowest proportion of upward misclassification (patients classified with VF who actually had viral suppression) for Abbott V-DBS was 4.3% [95% CI: 1.8-6.9] at 5000 cp/mL cut-off threshold, whereas the lowest proportion of downward misclassification (patients classified as undetectable who actually had VF) was 6.5% [95% CI: 2.9-10.0] at the 1000 cp/mL VL cut-off threshold.**CONCLUSIONS:** Abbott RealTime HIV-1 VL results from all DBS types (V-, M-, and D-DBS) for adults and children showed strong correlation with the gold standard Abbott plasma, indicating that the results observed with DBS versus plasma testing in this study are in-line with data reported by other countries.

In vitro activity

TUPEA102

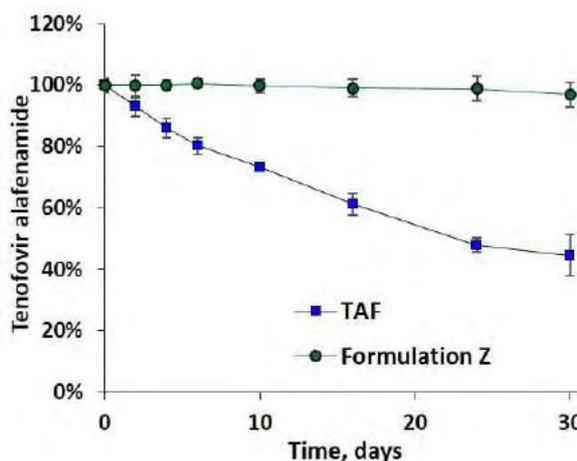
Tenofovir alafenamide-releasing nanochannel drug delivery system for PrEP

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BACKGROUND: Pre-exposure prophylaxis (PrEP) of human immunodeficiency virus (HIV) using a combination of emtricitabine and tenofovir disoproxil fumarate (Truvada®) has been shown to reduce the rate of infection by over 90%. Tenofovir alafenamide fumarate (TAF), an experimental drug with reduced kidney toxicity and improved specificity for peripheral blood mononuclear cells (PBMCs), is a promising candidate for PrEP monotherapy. Still, adherence remains a major limitation in PrEP efficiency. To overcome this issue drug-releasing implants were proposed. Tenofovir alafenamide, however, is hydrolytically unstable which hinders its use in the implants.

The present work is dedicated to development of a formulation that can insure the stability of tenofovir alafenamide and insure therapeutic levels of the drug in PBMCs over extended periods of time.

METHODS: We have developed a nanochannel drug delivery system (nDS) and used it in both in vitro and in vivo studies. During the in vitro studies we analyzed the stability and release of tenofovir alafenamide using HPLC-UV. For the in vivo studies in rhesus macaques we employed HPLC-MS/MS to determine the concentration of tenofovir diphosphate (Tdp, the therapeutically active metabolite of tenofovir alafenamide) in PBMCs.

[Stability of tenofovir alafenamide over time]

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RESULTS: Developed TA formulation ("Formulation Z") was tested for its ability to protect tenofovir alafenamide from hydrolysis at 37 C. As can be seen from the figure, the stability was significantly improved. The hydrolysis half-life increased from 25 days in case to TAF, to 735 days in the case of the formulation Z. We further used the formulation in a pilot study with two rhesus macaques and discovered that the therapeutic levels of Tdp in PBMCs were reached within 7 days of the nDS implantation.

CONCLUSIONS: The presented formulation enables the use of tenofovir alafenamide in drug-releasing implants and will have a major impact on implant-based PrEP development thus solving the patience adherence problem.

TUPEA103

Forgiveness of antiretroviral regimens: In vitro HIV-1 viral breakthrough with 2-drug versus 3-drug regimens simulating variable adherence to treatment

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BACKGROUND: Guidelines for modern treatment of HIV-1 infection recommend triple therapy consisting of an integrase strand transfer inhibitor (INSTI) plus 2 nucleoside/tide reverse transcriptase inhibitors (NRTIs). Recently, controlled clinical studies have reported on the efficacy and safety of an INSTI + one NRTI. To estimate regimen "forgiveness" for triple therapy versus experimental 2-drug combinations, *in vitro* experiments monitoring viral breakthrough (VB) and resistance development were conducted under conditions simulating drug exposures at full adherence or suboptimal adherence to treatment. In addition, the role of pre-existing minority drug resistant variants was assessed

METHODS: MT-2 cells were infected with wild-type HIV-1(IIIb) or HIV-1 with low-level (0.01-10%) pre-existing FTC/3TC-resistant M184V. Infected cells were cultured in the presence of fixed doses of bictegravir+emtricitabine+tenofovir alafenamide (BIC+FTC+TAF) or dolutegravir+lamivudine (DTG+3TC) and monitored for VB by cytopathic effect for up to 5 weeks. Constant drug concentrations were set at their human plasma-free adjusted clinical trough concentrations (C_{min}) or fixed at simulated C_{min} after missing 1 to 4 consecutive doses. Emergent HIV-1 variants were characterized using standard genotyping methods.

RESULTS: Using drug concentrations corresponding to full adherence (drug concentrations set at C_{min}) and wild-type HIV-1, 0/24 replicates showed VB with either BIC+FTC+TAF or DTG+3TC through 5 weeks in culture. Using drug concentrations corresponding to two consecutive missed doses and wild-type HIV-1, 0/24 replicates showed VB with BIC+FTC+TAF through week 5 whereas 23/24 had VB with DTG+3TC as early as 2 weeks in culture. At breakthrough, HIV-1 lacked drug resistance mutations when analyzed by population sequencing. Additional studies using a broader range of missed doses, other drug combinations, and pre-existing low-level M184V are on-going.

CONCLUSIONS: These preliminary *in vitro* VB results suggest that the higher potency provided by the BIC/FTC/TAF triple therapy regimen may provide better long-term suppression of HIV-1 replication and therefore more robust prevention of potential drug resistance development compared to the 2-drug regimen DTG/3TC. These results highlight the importance of a third agent to prevent viral replication and evolution, particularly in the real world where imperfect drug adherence is frequent.

In Vitro Dosing	Breakthrough Frequency (HIV-1 wild type)	
	BIC+FTC+TAF	DTG+3TC
C_{min} (full adherence)	0% (0/24)	0% (0/24)
C_{min} (2 doses missed)	0% (0/24)	96% (23/24)

[Table 1]

TUPEA104

Abacavir sulphate increases vascular endothelial activation and endothelial-platelet crosstalk: Mechanisms of cardiovascular risk?

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BACKGROUND: Cardiovascular disease (CVD) is more prevalent among people living with HIV (PLWH); however, the underlying mechanisms remain unknown. Although antiretroviral (ARV)-induced platelet and leukocyte activation have been reported, the effects of ARVs upon the vascular endothelium, which has an established role in CVD, are poorly characterised. The vascular endothelium influences cardiovascular risk through dysregulated expression of adhesion molecules and coagulation factors to modulate platelet and leukocyte activity. Moreover, activated endothelial cells secrete membrane-enclosed microparticles (EMP) that can confer inflammatory properties, and contribute to disease pathophysiology. We examined the effects of ARVs upon endothelial activation and EMP phenotype to identify mechanisms linking ARVs with endothelial dysfunction and altered endothelial-platelet crosstalk in PLWH.

METHODS: Human umbilical cord endothelial cells (HUVEC) were pulsed with plasma C_{max} concentrations of abacavir sulphate (ABC), tenofovir disoproxil fumarate (TDF) or tenofovir alafenamide (TAF) 2 days prior to experimentation (90min/day) and stimulated with TNF- α . Expression of adhesion molecules and tissue factor (TF) and EMP phenotype were assessed by flow cytometry. Platelet-rich plasma was incubated with 50,000 EMP/ml for 30min, and platelet activation markers (activated integrin $\alpha_{IIb}\beta_3$ and granule release) were monitored by flow cytometry following stimulation by ADP, collagen or thrombin receptor activator peptide (TRAP)-6.

RESULTS: We observed lower levels of intercellular adhesion molecule (ICAM)-1 in TDF- and TAF-treated cells compared to ABC (-26.6% and -27.3% respectively, $p < 0.05$). ABC-treated cells also had higher levels of TNF- α -induced ICAM-1 and TF expression compared to TDF (+46.1% and +15.4%, $p < 0.05$) and TAF (+46.2% and +14.0%, $p < 0.05$). Moreover, EMP analysis identified that more ICAM-1+ (2.4×10^5 EMP/ml; +51.4% vs TDF, +55.4% vs TAF, $p < 0.05$) and TF+ (3.5×10^5 EMP/ml; +60.0% vs TDF, +59.5% vs TAF, $p < 0.05$) EMP were produced by ABC-treated cells. EMP isolated from ABC-treated HUVEC significantly enhanced collagen-, but not ADP- or TRAP-6-induced, platelet integrin activation and alpha granule release.

CONCLUSIONS: Increased ICAM-1 and TF expression by ABC-treated endothelium, as well as EMP-induced platelet activation, may augment cardiovascular risk by enhancing platelet reactivity and endothelial interactions with circulating leukocytes and platelets. We describe mechanisms of endothelial activation and endothelial-platelet crosstalk that may underlie the reported ABC-associated risk in PLWH.

TUPEA105

OB-002 (5P12-RANTES) is significantly more potent than other CCR5 antagonists in development for the treatment or prevention of HIV infection

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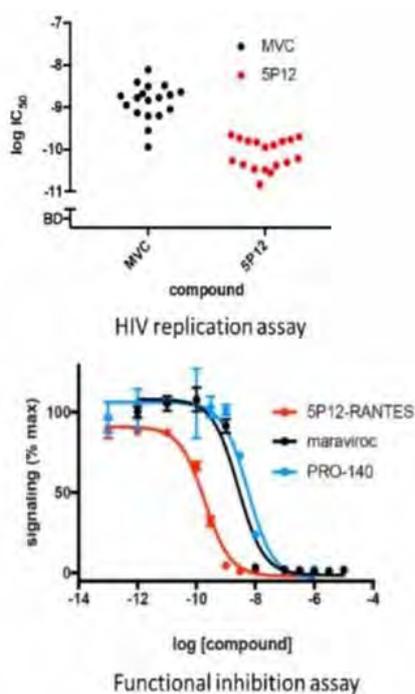
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BACKGROUND: Topical OB-002 is highly effective in preventing vaginal transmission of SHIV1623P in a non-human primate (NHP) model of HIV infection (Veazey et al. JID 2009). In contrast, data for maraviroc (MVC), another CCR5 antagonist, has been more variable. Oral MVC did not protect NHPs from rectal SHIV1623P challenge (Massud et al. J Virol 2013) but topical MVC was protective in a vaginal challenge humanized mouse model (Neff et al. PLoS ONE 2011). Using standardized *in vitro* assays of both HIV replication inhibition and functional (signalling) inhibition, we sought to identify differences in potency between these CCR5 antagonists.

METHODS: Inhibitory potency of CCR5 antagonists were compared in (i) an HIV replication assay provided by ImQuest using CCR5-tropic HIV BaL strain with PBMC from 18 different healthy donors and (ii) an aequorin-based functional inhibition assay provided by Euroscreen Fast (<https://euroscreenfast.com>). IC₅₀ values were calculated from fitted dose-inhibition curves.

RESULTS: Across the panel of donors, OB-002 showed potency consistently higher (between 8- and 80-fold) than that of maraviroc in the HIV replication inhibition assay. Similarly, in the functional inhibition assay the potency of OB-002 (0.2 nM) was 13-fold higher than that of MVC (2.6 nM). In the same assay, PRO 140 (Leronlimab), a CCR5 monoclonal antibody that is currently in development for a HIV treatment indication [Thompson Curr Opin HIV AIDS 2018], gave a potency (5.6 nM) 28-fold lower than that of OB-002.

CONCLUSIONS: The difference in performance between OB-002 and maraviroc in NHP models could be due to the superior potency of OB-002, which according to our results is the most potent CCR5 inhibitor currently in development for HIV indications. These data further support development of OB-002 as a highly potent candidate microbicide for HIV prevention. Phase 1 rectal and vaginal safety studies are planned to start in Q3 2019.



[Inhibitory potency of OB-002 compared to other CCR5 antagonists]

TUPEA106

Sustained release of cabotegravir from nanochannel delivery implant for HIV PrEP

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BACKGROUND: Cabotegravir (CAB), an integrase strand transfer inhibitor (INSTI), is undergoing clinical trials as an oral human immunodeficiency virus (HIV) pre-exposure prophylaxis (PrEP) antiretroviral (ARV) and as a long-acting CAB (LA-CAB) injectable formulation. Pharmacokinetic studies have shown monthly or bimonthly LA-CAB injections maintain the protein-adjusted concentration that inhibits viral replication by 90% (PA-IC90). While LA-CAB overcomes the challenges of daily oral dosing, injections always carry a risk of infection and other adverse side effects.

We developed the nanochannel delivery implant (nDI), a subcutaneously implantable device for sustained and constant CAB drug delivery for 3 months.

METHODS: CAB was formulated with 2-hydroxypropyl- β -cyclodextrin (β -CAB) and lyophilized to improve its solubility and stability for long-term release. *In vitro* release of CAB and β -CAB from nDI was analyzed via high performance liquid chromatography (HPLC) demonstrating sustained release for 3 months. Further nDI-cabotegravir was implanted into Sprague-Dawley rats to assess pharmacokinetics *in vivo*. Six male rats and three male rats were subcutaneously implanted with β -CAB nDI and CAB nDI, respectively. Plasma was collected weekly for three months and CAB concentration was analyzed via liquid chromatography-tandem mass spectrometry (LC-MS/MS).

RESULTS: β -CAB nDI group achieved plasma CAB concentrations above 4 \times PA-IC90 and 1 \times PA-IC90 for 3 weeks and 91 days, respectively. CAB nDI group exhibited plasma CAB concentrations above 1 \times PA-IC90 only on day 7. Higher plasma CAB concentrations was reached with β -CAB formulation due to improved solubility with 2-hydroxypropyl- β -cyclodextrin. Rat skin histology showed a normal fibrotic capsule surrounding the β -CAB nDI, typical of implanted medical devices. No adverse effects were observed in rats, suggesting the biocompatibility and safety of β -CAB nDI.

CONCLUSIONS: The *in vivo* study design demonstrated nDI loaded with β -CAB maintained plasma CAB concentrations above 1 \times PA-IC90 for 3 months and offers the possibility of extending CAB release for more than 3 months. Our device represents an innovative strategy for long-term HIV PrEP administration to overcome the challenges with daily dosing and side effects of long-acting injectables.

Pharmacokinetic and pharmacodynamics

TUPEA107

Association between Integrase Strand Transfer Inhibitors and serum magnesium levels

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BACKGROUND: Concerns surround potential links between the Integrase Strand Transfer Inhibitor (INSTI) dolutegravir and neural tube birth defects (NTDs). That NTDs produced by depletion of the bifunctional protein TRPM7 can be prevented through magnesium supplementation, indicates a role for magnesium in neural tube closure. Maternal magnesium levels have been associated with NTDs in humans, although causality has not been established. Dolutegravir binds strongly to a magnesium moiety at the HIV integrase active site. The aim of this study was to explore associations between use of INSTI and magnesium levels.

METHODS: ART-treated subjects living with HIV recruited to the UCD Cohort provided demographic and clinical data alongside routine measurement of albumin and serum electrolytes. Unadjusted and adjusted differences between groups in magnesium parameters were assessed using the Wilcoxon rank sum test and linear regression respectively.

RESULTS: 149 subjects provided data, the median (IQR) age was 41 years, 58% were male, 45% Caucasian and 45% African. HIV transmission risk was through heterosexual contact (55%), men who have sex with men (20%), intravenous drug users (16%). 60% of patients were on INSTI ART. 90% had viral RNA < 40 copies/ml.

Magnesium levels were not significantly different between those on INSTI regimens versus non-INSTI regimens (0.82 [0.77-0.86] mmol/L vs 0.84 [0.79-0.87] mmol/L, p=0.09). Magnesium levels were significantly lower in those on DTG regimens versus non-DTG regimens (0.81 [0.76-0.87] mmol/L vs 0.84 [0.79-0.87] mmol/L, p=0.01). Corrected for age, gender and ethnicity, there remained significantly lower total magnesium levels (-0.026 mmol/L, p=0.05) in those on DTG regimens compared to those on non-DTG regimens. There were no significant differences in ionized magnesium levels between groups.

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	Effect on Total Mg	95% CI	P-value
DTG vs non DTG	-0.029	-0.054; -0.0029	0.03
(ii)			
DTG vs non DTG	-0.029	-0.055; -0.0031	0.03
Age (per 5 year increase)	-0.0012	-0.0084; 0.0059	0.73
(iii)			
DTG vs non DTG	-0.026	-0.052; 0.0002	0.05
Age (per 5 year increase)	-0.0012	-0.0083; 0.0059	0.74
Gender: Female vs Male	-0.021	-0.045; 0.004	0.10
(iv)			
DTG vs non DTG	-0.026	-0.052; 0.00024	0.05
Age (per 5 year increase)	-0.0011	-0.0083; 0.0061	0.76
Gender: Female vs Male	-0.021	-0.048; 0.0049	0.11
Ethnicity: Caucasian vs non-Caucasian	-0.0018	-0.028; 0.025	0.89
(v)			
DTG vs non DTG	-0.023	-0.048; 0.00087	0.06
Age (per 5 year increase)	0.0019	-0.0049; 0.0087	0.589
Gender: Female vs Male	-0.0078	-0.033; 0.017	0.54
Ethnicity: Caucasian vs non-Caucasian	-0.0033	-0.028; 0.021	0.791
Albumin (per g/L)	0.0081	0.0047; 0.012	<0.001

[Table 1- Linear Regression Model]

CONCLUSIONS: Dolutegravir use was associated with a statistically significant reduction in magnesium levels, which remained significant after correction. Given the role of magnesium in NTDs, these data support the need for further, larger studies in this area.

TUPEA108

Functional expression of antiretroviral drug efflux transporters and metabolic enzymes in human peripheral and testicular T cell subsets

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BACKGROUND: ATP-Binding Cassette (ABC) drug efflux transporters and drug metabolic enzymes play an important role in antiretroviral drug (ARV) disposition and could contribute to low ARV intracellular concentrations in HIV-1 target cells. The functional expression of these transporters and enzymes in various peripheral and testicular T-cell subsets are unknown. Studies have demonstrated the testis as an anatomic and pharmacologic sanctuary allowing HIV-1 to persist. Moreover, we previously demonstrated limited ARV penetration in testicular tissue of HIV-1 infected men. In this study, we investigated the expression and/or function of ABC transporters (P-gp, BCRP, MRP1) and metabolic enzymes (CYP3A4 and UGT1A1) in CD4+ and CD8+ T-cells isolated from peripheral blood mononuclear cells (PBMCs) and testicular tissues proposed to hold HIV-1 reservoirs.

METHODS: PBMCs were isolated from whole blood of HIV-uninfected participants using Ficoll-paque gradient centrifugation. Testicular tissue was obtained from participants undergoing gender affirmation surgery and interstitial cells were isolated by enzymatic digestion. Flow cytometry was performed to assess the expression and/or function of ABC transporters and metabolic enzymes in peripheral and testicular CD4+ and CD8+ T-cell subsets, as well as in peripheral naïve and memory CD4+ T-cell phenotypes. ABC transporter function was examined by performing efflux assays using fluorescent substrates in the presence or absence of selective transporter inhibitors.

RESULTS: ABC transporters (P-gp, BCRP and MRP1) and CYP3A4 were expressed in testicular and peripheral CD4+ and CD8+ T-cells, as well as in naïve, central, transitional and effector memory peripheral T-cell phenotypes. In addition, low levels of UGT1A1 was detected in peripheral and testicular CD4+ and CD8+ T-cells. P-gp was present on >90% of all T-cell subsets examined. Furthermore, the results demonstrated functional activity of P-gp and BCRP in both peripheral and testicular T-cell subsets.

CONCLUSIONS: Our findings reveal that ARV drug transporters and metabolic enzymes are present in HIV-1 target T-cells infiltrating the human testis. This is the first report documenting the expression and/or function of these transporters and enzymes in human testicular T-cells and various peripheral memory T-cell phenotypes. The activity of these transporters and enzymes could result in suboptimal intracellular ARV concentrations which could potentially contribute to residual HIV replication and HIV persistence.

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Drug efflux transporters and metabolic enzymes in circulating myeloid cells of HIV-infected individuals

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BACKGROUND: Drug efflux transporters and drug metabolic enzymes play an important role in drug disposition and could render antiretroviral drug (ARV) intracellular concentrations suboptimal in HIV-1 target cells such as myeloid cells. The expression and function of these transporters and enzymes in these cells are not well documented. In this study, we investigated the expression of drug efflux transporters (P-gp, BCRP, MRP1, MRP4) and metabolic enzymes (CYP3A4, CYP2D6, CYP2B6) in peripheral blood monocyte subsets and monocyte-derived macrophages (MDM) isolated from peripheral blood mononuclear cells (PBMCs) of uninfected (HIV-) and HIV-infected participants on ART (HIV+ART), in relationship with plasma and intracellular ARV concentrations.

METHODS: Monocytes were isolated from PBMC using magnetic activated cell sorting (MACS) and differentiated into MDM by 6 days culture in the presence of M-CSF. mRNA and protein expression of drug transporters and metabolic enzymes were analyzed by quantitative real-time PCR (qPCR), western blotting and/or flow cytometry. Plasma and intracellular (PBMCs, monocytes, MDM) ARV concentrations were quantified by LC-MS/MS analysis.

RESULTS: mRNA and/or protein expression of ARV drug efflux transporters (P-gp, BCRP, MRP1, MRP4) and metabolic enzymes (CYP3A4, CYP2B6, CYP2D6) were detected in monocytes and/or MDM by qPCR and/or western blotting analyses. In addition, P-gp protein expression was detected in classical (CD14⁺CD16^{neg}), intermediate (CD14⁺CD16⁺) and non-classical (CD14⁺CD16⁺) monocytes, and MDM of HIV+ART and HIV- participants by flow cytometry. P-gp expression was significantly lower in monocytes from HIV+ART (< 65%) compared to HIV- (>95%) and was similarly high in MDM of HIV+ART and HIV- individuals (>95%). Consistently, intracellular concentrations of ARVs known to be substrates of several efflux transporters (tenofovir, emtricitabine, lamivudine, elvitegravir) were readily detected in HIV+ART monocytes but were low to undetectable in HIV+ART MDM.

CONCLUSIONS: Herein, we document the expression of drug transporters and metabolic enzymes in monocytes and MDM of HIV- and HIV+ART participants, and provide evidence that their expression is altered by HIV infection in monocytes but not MDM. These proteins could significantly limit intracellular concentrations of several ARVs in infected macrophages and may contribute to residual HIV replication. These study findings prompt future investigations on different tissue-resident myeloid cells.

TUPEA110

The role of Raltegravir alone or combined with lamivudine as PrEP: A Phase 2 randomised controlled clinical trial

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BACKGROUND: Raltegravir is a promising PrEP candidate, but vaginal and rectal compartment penetration is unknown. Here, we evaluated raltegravir +/- lamivudine pharmacokinetics and pharmacodynamics (PK/PD) using a tissue explant model.

METHODS: Open label trial of 36 HIV- females and males (1:1) randomised to 7d raltegravir 400mg bd followed by 7d raltegravir 400mg/lamivudine 150mg bd (after washout) or vice versa, in 6 sampling blocks to capture

different times post-dose. Blood, saliva, rectal fluid (RF)/tissue, vaginal fluid (VF)/tissue were sampled at baseline, on PrEP (day2, 4 or 6) and off PrEP (day8, 10 or 12) for PK and antiviral activity (ex vivo challenge with R5-tropic HIV-1BaL virus with p24 levels after 15d of culture). Protection was defined as >50% reduction in p24 compared to baseline.

RESULTS: Steady state was reached by day4 in all compartments. Raltegravir in plasma was slightly higher than VF (~2-fold day6, 1.5-fold day12) and RF >500-times that of plasma at day6 vs. >3000-fold higher at day12 (raltegravir alone). Lamivudine concentrations were highest in rectum [day6 mean (CV%): 203177ng/ml (304%)] followed by VF [2151ng/ml (93%)] then plasma [169ng/ml (41%)]. Off PrEP, plasma and VF raltegravir concentrations declined rapidly but persisted in RF until day12 [101126ng/ml (322%)]. Lamivudine washout was most rapid in plasma, less so in VF with high concentrations persisting in RF.

At day 2, Raltegravir provided maximum ex vivo protection in 83% of rectal and 100% of vaginal samples. By day 12 protection decreased to 64% in rectal and 67% in vaginal samples. Raltegravir/Lamivudine provided 100% protection in rectal tissue from day 2 to 10, and from day 8 to 12 in vaginal explants. On day 12, there was 82% protection in rectal tissue and 100% in vaginal tissue.

CONCLUSIONS: Following discontinuation, high concentrations of raltegravir remained in RF (in contrast to rapid decline in plasma and VF concentrations) with persistent inhibitory activity in rectal tissue up to 4 days later. Addition of lamivudine increased inhibitory activity in rectal and vaginal tissue, with similar persistent inhibition associated with high RF concentrations 4 days after discontinuation. These data support further investigation of these agents for PrEP.

TUPEA111

Targeting lopinavir to gut-associated lymphoid tissue by lipophilic prodrug approach for improved treatment of HIV/AIDS

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BACKGROUND: Human immunodeficiency virus (HIV) can hide and escape from efficient antiretroviral therapy (ART) in reservoirs. Ritonavir-boosted lopinavir (LPV/r) is the most commonly used protease inhibitor (PI) in second-line ART regimens. Gut-associated lymphoid tissue (GALT) is one of the important HIV reservoirs. Delivering ARVs to GALT via intestinal lymphatic transport can lead to high levels of ARVs in this HIV reservoir. Since LPV itself does not possess the physicochemical properties necessary for intestinal lymphatic transport, in this project we designed and developed prodrugs of LPV with high intestinal lymphatic transport potential.

METHODS: The design of LPV prodrugs was based on our previously reported *in silico* model. LPV prodrugs were synthesized by means of the esterification of LPV and desired carboxylic acid. The chylomicron (CM) association assay was conducted by spiking tested compounds into human plasma-derived CM (1mg/mL) and incubation at 37 °C for 1 hour. After incubation, chylomicrons were separated by density gradient ultracentrifugation and analyzed for concentrations of LPV prodrugs by HPLC. The stability of LPV prodrugs was tested in rat plasma and fasted state stimulated intestinal fluid (FaSSIF) supplemented with esterases. LPV and most promising prodrugs were selected for pharmacokinetics and biodistribution studies. Blood samples were collected at predetermined time points following oral administration. Mesenteric lymph nodes (MLNs), lymph fluid and related HIV reservoirs were collected at t_{max} and t_{max-1} hour following oral administration and analysed for prodrugs and lopinavir levels.

RESULTS: The association of LPV with CM was negligible (< 4.5%), indicating low lymphatic transport potential. In accordance, no LPV was found in lymph fluid and MLNs at t_{max} hour post-administration of lipid-based formulation of LPV. On the other hand, the synthesized LPV prodrugs

demonstrated high affinity to human CMs. All synthesized LPV prodrugs were stable (degradation half-life > 20h) in both FaSSIF + esterase and rat plasma. The concentration of LPV released from selected prodrugs in lymph fluid was above therapeutic level for treatment of HIV.

CONCLUSIONS: We reported a lipophilic prodrug approach to deliver LPV to GALT, achieving a leap from zero to therapeutic level in this important HIV reservoir.

Diagnostics of co-infections and co-morbidities

TUPEB142

Evaluation of a computerized neuropsychological test battery for diagnosing HIV-associated neurocognitive disorders (HAND)

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BACKGROUND: Since the introduction of highly active antiretroviral therapy (HAART), nowadays called cART (combination antiretroviral therapy), into the treatment of HIV-infection in 1996, incidence and prevalence of HIV-associated dementia have constantly declined, but milder forms (HIV-associated neurocognitive impairment = ANI and mild neurocognitive disorder = MNCD) have risen at least in prevalence. Although being "mild", they affect patients' all days' life and worsen disease prognosis so that they should be diagnosed early to find therapeutic strategies. To screen patients for HAND simple and rapidly applicable methods are warranted and - so far - do not exist.

METHODS: 100 HIV-positive patients selected from a big cohort underwent 5 neuropsychological tests (Trail-Making-Test Form A+B, Digit-Symbol- and Stroop-Colour- as well as the finger tapping-Test) presented in a standard paper and electrophysiological variant as well as in a computerized form as an i-pad paradigm. In parallel, the i-pad paradigm was tested in 100 HIV-negative persons.

RESULTS: HIV-positive patients - as expected - performed worse in all i-pad tests in comparison with the HIV-negative control group. Neurocognitive deficits were reliably identified. In the patient group, there were no significant differences between the standard paper- and the i-pad test results. However, i-pad testing was performed in 10 minutes, whereas standard testing took 30 minutes.

CONCLUSIONS: Computerized short neuropsychological test batteries are simple and can be performed rapidly. Thus, they could be used as screening tools for confirming patient-reported neurocognitive deficits. They should not replace conventional broad neuropsychological testing.

TUPEB143

Performance evaluation of automated real-time PCR assays for diagnosis of TB in HIV infected individuals

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BACKGROUND: Tuberculosis (TB) remains as the leading cause of HIV/AIDS related mortality. Evidence of TB was found in about 32% and 67% of HIV infected adults during autopsy; emphasize the need for timely TB diagnosis. Due to longer turn-around time taken by conventional culture methods, faster and reliable diagnosis by direct molecular detection of *Mycobacterium tuberculosis* (MTB) complex DNA has gained widespread importance. This study evaluated the performance of different Real-Time PCR (RT PCR) platforms for TB diagnosis in HIV co-infected individuals from resource-limited settings.

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METHODS: A total of 40 processed sputum specimens from HIV infected individuals received for AFB culture using BD BACTEC MGIT 320, was used for this evaluation. Following AFB culture, remaining sputum specimens were tested using Real-Time PCR assays such as Cepheid Xpert MTB/RIF assay (Limit of detection: 131 CFU/mL), Abbott RealTime MTB assay (Limit of detection: 17 CFU/mL) and Roche COBAS TaqMan MTB assay (Limit of detection: 16 CFU/mL).

RESULTS: Abbott RealTime MTB assay showed a sensitivity and specificity of 100% and 87.5%, while the sensitivity and specificity of COBAS TaqMan MTB assay were 87.5% and 100% respectively, compared to MGIT 320. Xpert MTB/RIF assay showed 100% sensitivity and specificity with MGIT 320. Abbott RealTime MTB assay detected 4 MTB infections additionally while COBAS TaqMan MTB assay did not detect MTB in 1 specimen, which was detected by all the other assays studied (Figure 1).

CONCLUSIONS: Compared to MGIT 320, Abbott RealTime MTB assay showed higher sensitivity while COBAS TaqMan MTB assay showed higher specificity. Results of Xpert MTB/RIF assay were same as that of MGIT 320. Ability of Abbott RealTime MTB assay to detect dual targets in MTB DNA sequence could have resulted in diagnosing additional TB cases compared to other RT PCR assays. Among the 4 additional TB cases detected by Abbott RealTime MTB assay, 3 were positive for pulmonary TB confirmed by X-ray findings, 1 was positive for extra-pulmonary (abdominal) TB and they were not on anti-tuberculosis treatment. Considering the short turn-around time, reliability and higher sensitivity, these RT PCR assays could be used efficiently for MTB screening in TB suspected cases, especially in HIV settings.

TUPEB144

Pulmonary arterial hypertension in HIV positive patients in a low income country

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BACKGROUND: Worldwide, approximately 33 million patients are living with the human immunodeficiency virus (HIV). Pulmonary arterial hypertension is a rare complication of HIV, with prevalence varying from 1% in the United States to 7% in Sub-Saharan Africa. The prevalence of PAH in Guatemala is not known. The aim of the study was to determine the prevalence and predictors of PAH in patients with HIV at the main HIV care clinic in Guatemala.

METHODS: 221 patients with HIV underwent an echocardiogram to estimate mean pulmonary arterial pressure (mPAP) at Roosevelt Hospital in Guatemala between 2015 and 2017.

RESULTS: The mean age of the patients was 34 years and 56% were women, 7% used tobacco, 15% had hypertension and 7% had diabetes. The prevalence of PAH was 6.3%, the mPAP was 19 mmHg, 37 mmHg in patients with PAH and the mean left ventricular ejection fraction (LVEF) was more than 65%. Patients with a history of opportunistic infections (OI) had a greater risk of PAH (OR =2.13, p=0.041). Among those with OI, history of tuberculosis and PCP pneumonia increased the risk of PAH by 20% and 45%, respectively (OR = 1.32, p = .041; RP = 1.77, p = .048). Patients with PAH had a lower CD4 cell count compared to patients without PAH (mean 131 cells/microL and 357 cells / microL, respectively, p=0.037), as well as higher viral load values than patients without PAH (4547 copies / ml and 532 copies / ml respectively, p=0.029). Finally, ART treatment was associated with decreased risk of PAH (OR = .63, p = .031), and patients with treatment cessation and greater than mean viral load presented more risk of PAH (OR = 3.76, p = .036; OR = 3.66, p = .041, respectively).

CONCLUSIONS: The prevalence of PAH in HIV patients at a major tertiary center in Guatemala was 6.4%. Patients with history of tuberculosis, PCP, low CD4 counts, and high viral loads have increased risk of developing PAH. These results will help HIV care centers in Central America to better assess risk of PAH in patients with HIV.

TUPEB145

Point-of-care cryptococcal antigen screening predicts cryptococcal meningitis and mortality among people living with HIV in a South African Township

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BACKGROUND: Cryptococcal meningitis remains a leading cause of AIDS-related mortality. Point-of-care cryptococcal antigen (CrAg) lateral flow assays (LFA) could be used in clinics for rapidly identifying HIV-associated cryptococcal infections to prevent cryptococcal meningitis and death.

METHODS: A prospective study of adults presenting for HIV testing in Umlazi Township, KwaZulu-Natal, South Africa. We conducted laboratory-based serum CrAg enzyme immunoassay (EIA) testing, and a trained nurse performed clinic-based testing of venous whole blood, fingerprick capillary blood, and urine with rapid CrAg LFA (Immy Diagnostics, Norman, USA). We followed participants for 12 months to assess cryptococcal meningitis and all-cause mortality using medical charts, hospital records, phone calls, and national death registry. Results of CrAg LFA tests did not guide clinical care. We used Cox proportional hazards to determine the associations between baseline CrAg testing and progression to cryptococcal meningitis and/or death controlling for baseline CD4 count, patient demographics, and antiretroviral use during clinical follow-up.

RESULTS: Among 2,379 HIV-infected adults, mean age was 33 years, 1,370 (58%) were female, and median CD4 count was 318 (IQR 175-491) cells/mm³. Overall, 2.0% were CrAg LFA positive using venous whole blood, 3.2% by fingerprick capillary blood, and 8.4% by urine. After twelve months, 22 (0.9%) participants developed cryptococcal meningitis, 88 (3.7%) participants died, and 105 (4.4%) either developed cryptococcal meningitis or died. In adjusted analyses, CrAg LFA using venous or fingerprick blood positivity had a 3.7 (95% CI 1.6-8.4) and 4.8 (95% CI 2.3-10.3) greater hazard of death or cryptococcal meningitis (table), with the majority of events occurring within the first 3 months. The lab-based EIA test had a 6.8 (95% CI 3.1-14.9) greater hazard of death or cryptococcal meningitis.

CrAg Test Result	N	Events (n)	person-years	Incidence Rate	Adjusted Hazard Ratio (CI)	P-value
POC Fingerprick CrAg LFA Positive	50	7	35.6	19.7	3.7 (1.6, 8.4)	0.002
Negative or Indeterminate	1,538	63	1,169.5	5.4	Ref	
POC Venous Blood CrAg LFA Positive	32	8	22.5	35.6	4.8 (2.3, 10.3)	<0.001
Negative or Indeterminate	1,557	62	1,183.6	5.2	Ref	
Lab Serum EIA CrAg Positive	15	9	8.9	101.6	6.8 (3.1, 14.9)	<0.001
Negative or Indeterminate	1,284	52	967.0	5.3	Ref	

[Adjusted hazard of cryptococcal meningitis or death within 12 months of enrollment by POC LFA or laboratory-based EIA testing.]

CONCLUSIONS: When CrAg LFA testing was performed in the clinic as a point-of-care test by trained nurses, a positive result was strongly associated with HIV-associated cryptococcal meningitis or death. Clinic-based screening for CrAg LFA could lead to rapid anti-fungal prophylaxis or treatment initiation and improve HIV-associated outcomes.

TUPEB146

Patient and health system factors associated with pretreatment loss to follow up among patients diagnosed with tuberculosis using Xpert® MTB/RIF testing in UgandaS. Zawedde-Muyanja¹, A. Katamba², A. Cattamanchi³, C. Barbara¹, Y.C. Manabe^{1,4}¹Infectious Diseases Institute, College of Health Sciences Makerere University, Research, Kampala, Uganda, ²Makerere University College of Health Sciences, Medicine, Kampala, Uganda, ³University of California, Department of Medicine, San Francisco, Uruguay, ⁴Johns Hopkins University School of Medicine, Division of Infectious Diseases, Department of Medicine, Baltimore, United States

BACKGROUND: To achieve the global target to end the tuberculosis (TB) epidemic by 2035, Uganda must diagnose and place on appropriate treatment at least 90% of all incident TB cases annually. In 2017, Uganda placed only 46,000 patients (55% of incident cases) on TB treatment. Previous studies from Uganda have shown that pretreatment loss to follow up is an important contributor to suboptimal TB case notification. We aimed to describe the patient and health facility level characteristics associated with pretreatment loss to follow up among patients diagnosed with PTB at public health facilities in central Uganda.

METHODS: Ten health facilities comprising of three primary care facilities, four district hospitals and three tertiary referral hospitals were selected for this study. All health facilities had Xpert® MTB/RIF testing services on-site and used this assay as the initial diagnostic test to evaluate patients with symptoms of TB. We used data from laboratory registers to identify patients with bacteriological confirmation of TB. We compared diagnostic data with treatment initiation records in TB clinic registers. The proportion of patients not initiated on TB treatment within two weeks of diagnosis was described. Factors associated with not being initiated on TB treatment were examined using a multilevel logistic regression model accounting for clustering by health facility.

RESULTS: From January to June 2018, 6774 presumptive TB cases were identified at these health facilities. Of these, 511 patients (61% male and 31.5% HIV co-infected) were diagnosed with PTB. Overall, 101 (19.7%) patients were not initiated on TB treatment within two weeks of diagnosis. Not having a phone number registered in the TB clinic register (aOR 7.93, 95%CI 4.05-13.48); being diagnosed at a health facility performing more than 12 Xpert tests per day (aOR 5.78, 95%CI 2.16-15.48) and being HIV infected (aOR 1.83; 95% CI: 1.05-3.16) were significantly associated with pretreatment loss to follow up.

CONCLUSIONS: In public health facilities in Uganda, we found a high rate of pretreatment loss to follow up especially among TB/HIV co-infected patients diagnosed at high volume health facilities. Interventions to improve linkage to TB treatment aimed at this category of patients should be developed and implemented.

TUPEB147

Diagnostic performance of Xpert MTB/RIF for pulmonary tuberculosis screening in AIDS-associated Kaposi sarcoma in ZimbabweA. Bock¹, S. Fiorillo¹, R. Lyall², F. Manyeruke², T. Nyagura², T. Makoni², M. Borok², T. Campbell¹¹University of Colorado, Anschutz Medical Campus, Division of Infectious Diseases, Denver, United States, ²University of Zimbabwe College of Health Sciences, Parirenyatwa Hospital, Harare, Zimbabwe

BACKGROUND: Early identification and treatment of pTB could improve AIDS-KS treatment outcomes in African settings where there is a high burden of both pTB and AIDS-KS. However the performance of modern methods for pTB diagnosis has not been investigated in AIDS-KS where the presence of tumors in the lung (pKS) could affect pTB diagnosis. We investigated performance of Xpert MTB/RIF for TB screening in persons with a new diagnosis of AIDS-KS in a high TB burden country.

METHODS: AIDS-KS suspects were evaluated by clinical symptoms, chest radiography, spirometry, sputum collection and bronchoalveolar lavage (BAL). MGIT culture and Xpert MTB/RIF were performed on both

sputum and BAL. AIDS-KS was defined as either histological findings of KS on skin biopsy, or visualization of endobronchial KS lesions. pTB was defined as either a positive MGIT culture of sputum or BAL, or a positive BAL Xpert MTB/RIF. Baseline factors were compared between pTB cases and non-pTB by Fisher's exact test with $\alpha=0.05$. Point estimates were expressed with 95% confidence intervals (CI).

RESULTS: Among 172 AIDS-KS cases the prevalence of pTB and pKS was 9.9% (CI 5.4%, 14.4%) and 64.1% (CI 56.5%; 71.7%), respectively. Baseline characteristics did not differ between pTB and non-TB cases except that ACTG KS stage T1 was less common with pTB (P=0.04). Presence of any cough, fever, night sweats or weight loss was not different between pTB and non-TB cases (47% vs 52%; P=0.80), and there was no difference in six-month mortality (17.7% vs 17.3%; p=1.00).

Performance of single sputum Xpert MTB/RIF: Sensitivity 23.5% (CI 6.8%; 49.9%); Specificity 100% (CI 97.7%, 100.0%); Positive Predictive Value 100% (CI 40.0%; 100.0%); Negative Predictive Value 92.3% (CI 87.1%; 95.8%).

		Pulmonary TB		
		Yes	No	
Sputum Xpert MTB/RIF	Positive	4	0	4
	Negative	13	155	168
		17	155	172

[Performance of sputum Xpert MTB/RIF]

CONCLUSIONS: Both pTB and pKS were common among people with AIDS-KS in Zimbabwe. WHO criteria for TB screening did not differentiate pTB from non-TB patients in this setting and a single sputum Xpert MTB/RIF had high specificity but low sensitivity for pTB diagnosis. Better approaches are needed to screen for pTB in Africans with AIDS-KS.

Opportunistic infections (excluding tuberculosis)

TUPEB150

Kaposi's Sarcoma Herpesvirus (KSHV) in Cuba: Prevalence and molecular epidemiologyV. Kourí¹, C.M. Limia¹, P.A. Martínez¹, V. Capó², O. Blanco³, N. Jiménez², Y. Soto¹, L. Pérez¹, A.L. Añé-Kourí⁴, Y. Pintos¹, Y. Baños¹, U. Hengge⁵
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BACKGROUND: Kaposi's Sarcoma Herpesvirus (KSHV) is not ubiquitous, demonstrating an extremely unusual distribution pattern around the world. This study aims to extend the knowledge of the prevalence and molecular epidemiology of KSHV subtypes in Cuba.

METHODS: The study included 627 Cuban individuals with high or low risk for KSHV infection/disease: blood donors, patients with KSHV-associated diseases, HIV seropositives without KS and sexual contacts of KS patients. KSHV antibodies was screened using immunofluorescence or ELISA. Molecular characterization of the virus was performed by sequencing ORFK1 (118 samples), ORFK15 (36 samples) and ORF26 (31 samples).

RESULTS: Serological analysis revealed that 1.5% of blood donors, 88.6% of KS patients, 18.8% of HIV seropositives and 66.7% of contacts were infected with KSHV. Molecular characterization of KSHV ORF K1 showed a wide range of subtypes including African subtypes (B and A5). Subtype A:39.8%; Subtype B:23.6%, Subtype A5:12.2%, Subtype C:20.3% and Subtype E:4.1%. This was also observed for the ORF26 gene with Sub-Saharan African (R) and Eurasian (A/C, J, K) patterns. Subtype A/J: 51.8%; J: 14.8%, R: 3.7%. Eight other samples represent potential intragenic chimeric recombinants (R/Q and R/J, four samples each). Genotyping of the K15 loci revealed a predominance of P subtype, but interestingly, 20.7% of the specimens sequenced were M variant of K15.

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Among the AIDS-KS samples where the three viral genes were simultaneously sequenced (32 samples), both, P (81.2%) and M (18.8%) variants of K15 were detected and only K1 A and C subgroups displayed the M allelic variant. Comparison of the subtype assignments at ORF26 and K1 region resulted in a linkage between the two loci: K1 B, A5 and C sequences were linked to R, K and J ORF26 subtype, respectively.

CONCLUSIONS: The virus is not ubiquitous among Cuban population, but is highly prevalent in specific groups. High diversity of KSHV was observed, suggesting that KSHV has been disseminated in Cuba from different geographical origins. The detection of recombination intragenic and between multiple genomic loci, suggest the presence of complex patterns of KSHV genome chimerism in Cuban sequences, however comparison of the subtype assignments reveals that there is a linkage between the genes analyzed.

TUPEB151

The changing epidemiology of HIV-associated adult meningitis, Uganda 2015 - 2017

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BACKGROUND: CNS infections remain a major public health problem in Sub-Saharan Africa causing 20-25% of AIDS-related deaths. With the widespread availability of antiretroviral therapy (ART) and the introduction of improved diagnostics, the epidemiology of infectious meningitis is evolving.

METHODS: We prospectively enrolled adults presenting with HIV-associated meningitis in Kampala and Mbarara, Uganda from March 2015 to September 2017. Participants had a structured, stepwise diagnostic algorithm performed of blood cryptococcal antigen (CrAg), CSF CrAg, Xpert MTB/RIF for TB meningitis, Biofire multiplex PCR, as well as traditional microscopy and cultures.

RESULTS: We screened 842 consecutive HIV-infected adults with suspected meningitis. 57% were men, median age was 35 years, median CD4 count 26 cells/mcL, and 55% presented on ART. Overall 67% (563/842) were diagnosed with cryptococcal meningitis by CSF CrAg or culture; 14% (78/563) of whom reported a previous cryptococcosis episode. Participants receiving ART for ≤ 3 months more frequently had cryptococcosis (74 %) compared with 62 % among ART >3 months or 71% among ART-naïve ($p=0.01$). Definite/probable TB-meningitis was the primary diagnosis in 6.4% (54/842); 5% ($n=42$) having microbiologically-confirmed (definite) TB-meningitis. An additional 71% (60/842) received empiric TBM therapy. Bacterial and viral meningitis were diagnosed in 1.3% and 0.7%, respectively.

CONCLUSIONS: Despite the widespread ART availability, *Cryptococcus* remains the leading cause of HIV-associated meningitis. The second commonest etiology was TB-meningitis diagnosed in 13.5% overall. The increased proportion microbiologically-confirmed TBM cases, reflects the impact of new improved molecular diagnostics. The adoption of a cost effective stepwise diagnostic algorithm allowed 79% to have a confirmed microbiological diagnosis at a cost of \$44 per person.

Tuberculosis and other mycobacteria

TUPEB152

CD4 count-based guidelines for tuberculin skin testing and tuberculosis preventive therapy in people living with HIV

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BACKGROUND: In Brazil, guidelines for tuberculosis (TB) preventive therapy for people living with HIV (PLWH) were recently changed to incorporate CD4 count, with TB preventive therapy recommended for 1) tuberculin skin test (TST)-positive patients with CD4>350 and 2) all patients with CD4 \leq 350, regardless of TST. However, the effectiveness of CD4-based guidelines to guide TST and TB preventive therapy is unclear.

METHODS: We analyzed data from patients in the TB/HIV in Rio (THRio) study, a cluster-randomized, stepped-wedge trial of TB preventive therapy conducted from 2005-2009, when isoniazid preventive therapy (IPT) for 6-months was recommended based on TST status. We included all PLWH newly-registered at THRio clinics and followed patients until TB diagnosis, death, or administrative censoring in 2011. We compared TB incidence rates between CD4, TST, and IPT categories.

RESULTS: Among 4,255 newly-registered PLWH, 2,101 (49%) had baseline CD4 \leq 350, 1,962 (46%) had baseline CD4>350, and 192 (5%) had an unknown baseline CD4 (Table 1). 1,482 (71%) with CD4 \leq 350 had a TST placed and read, of whom 279 (19%) were TST-positive. 1,441 (73%) with CD4>350 had a TST placed and read, of whom 381 (26%) were TST-positive. Overall, 628 (15%) received IPT and 299 (7%) developed TB. For patients who did not receive IPT, TB incidence was higher among those with CD4 \leq 350 than those with CD4>350 for TST-negatives (2.39 vs. 1.27 per 100 person-years, $p=0.004$), TST-positives (15.25 vs. 9.11 per 100 person-years, $p=0.07$), and TST-unknowns (10.04 vs. 5.41 per 100 person-years, $p=0.003$). IPT reduced TB incidence among both TST-positives with CD4 \leq 350 (IRR 0.16, 95%CI 0.06-0.37) and CD4>350 (IRR 0.29, 95%CI 0.13-0.61). There were 2 TB cases among TST-negatives who received IPT; both had CD4 \leq 350.

CONCLUSIONS: TB incidence was high among all patients who did not receive IPT, including those with CD4>350 and TST-negatives. In medium- and high-TB burden settings, TB preventive therapy should be provided to all PLWH, regardless of CD4 count.

TST / IPT category	CD4 \leq 350 (n=2,101)			CD4>350 (n=1,962)			CD4 unknown (n=192)		
	TB cases / Person-years	Incidence rate per 100 pys	Incidence rate ratio (95% CI)	TB cases / Person-years	Incidence rate per 100 pys	Incidence rate ratio (95% CI)	TB cases / Person-years	Incidence rate per 100 pys	Incidence rate ratio (95% CI)
TST-negative / no IPT	64 / 2677	2.39	REF	28 / 2197	1.27	REF	0 / 16	0	REF
TST-negative / IPT	2 / 45	4.44	1.84 (0.22-6.93)	0 / 38	0	—	0 / 1	0	—
TST unknown / no IPT	71 / 707	10.04	REF	31 / 573	5.41	REF	31 / 123	25.23	REF
TST unknown / IPT	0 / 9	0	—	0 / 11	0	—	0 / 0.5	0	—
TST-positive / no IPT	27 / 177	15.25	REF	22 / 242	9.11	REF	2 / 4	51.88	REF
TST-positive / IPT	8 / 318	2.52	0.16 (0.06-0.37)	12 / 459	2.61	0.29 (0.13-0.61)	1 / 4	28.32	0.55 (0.01-10.48)

[Incidence of TB among THRio study participants by TST and IPT status, stratified by baseline CD4 count]

TUPEB153

Changes of NK cell repertoire related to the onset of immune reconstitution inflammatory syndrome in TB/HIV co-infection

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BACKGROUND: Tuberculosis (TB) and HIV co-infection (TB/HIV) poses enormous clinical, scientific and public health challenges. Although the use of the combined antiretroviral therapy (cART) during TB-treatment improves survival of patients, immune reconstitution inflammatory syndrome (IRIS) can occur in a varied fraction of them. This work aimed to evaluate the participation of NK cells in the onset of IRIS among TB/HIV patients.

METHODS: Four IRIS and 29 non-IRIS TB/HIV patients, 27 TB-patients and 25 HIV-monoinfected ones were evaluated previously to the TB-treatment and/or antiretroviral therapy. Twenty-five healthy donors (HD) were also included as controls. *Ex vivo* characterization of NK cells included analysis of the whole population and the expression of about twenty NK cell repertoire receptors from different families as KIR, NCR, SLAMF, C-type Lectin Receptor, ILT and Ig-Family, by multiparametric flow cytometry. The NK cells were defined based on the lymphocytes population and the results presented as percentage of circulating CD56⁺/CD16⁺/CD3⁻ cells.

RESULTS: Both HIV-infected and TB/HIV groups presented very low CD4⁺ T cell counts (medians < 65 cells/ μ l). TB/HIV coinfecting patients presented lower percentage of NK cells ($p=0.027$) than HD, and the same was observed when compared to TB patients ($p=0.024$), confirming the negative impact of HIV infection on circulating NK cells. On the context of NK repertoire cell profile, many receptors were misrepresented among TB/HIV patients compared to the other groups, especially against HD, as CD161 ($p<0.0001$), NKG2A ($p=0.024$), NKG2D ($p=0.0042$) and NKG2C ($p<0.0001$). Of interest, significantly higher expression of important NK receptors as CD158a ($p=0.025$), NKp80 ($p=0.033$) and NKG2C ($p=0.0076$) were identified among TB/HIV IRIS patients.

CONCLUSIONS: HIV infection impacts negatively the frequency of circulating NK cells on TB/HIV patients. NK receptor repertoire is misrepresented in TB/HIV coinfection, including NKG2C, a receptor playing a role against other viral infections, as CMV.

IRIS patients presented highest levels of NK cells expressing CD159a, NKp80 (NK maturation marker) and NKG2C before starting any treatment, suggesting a more preserved profile of NK cells, capable to have a better response, induce a viral adaptive response, and participate on the onset of IRIS.

TUPEB154

Impact of late presentation and late ART initiation on TB incidence across four countries

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BACKGROUND: Tuberculosis (TB) remains the leading cause of mortality worldwide in HIV-infected. Late presentation to care (LP) and late ART initiation (LI) appear to increase TB risk but supporting data are scarce. We evaluated whether there is a causal link between LP and LI and the risk of TB by using the attributable risk (AR) and population attributable fraction (PAF) in four countries with different TB-HIV burdens.

METHODS: Patients enrolled from 2007-2016 with recent HIV diagnosis (< 3mo), were included. LP was defined as accessing care with

CD4 \leq 350cells/mm³; and LI as starting ART with CD4 \leq 350cells/mm³ among non-LP. The risk of TB was compared in LP vs. non-LP using survival curves and a weighted Cox regression model with inverse probability weights (IPW). A marginal structural model (MSM) which mimicked a 2 arm-randomized trial:

1) Initiating ART with CD4>350(non-LI) vs.

2) Initiating ART with CD4 \leq 350(LI) was used to evaluate the impact of LI on risk of TB.

Weighted hazard ratios (wHR) for TB in LI vs. non-LI were estimated by pooled logistic regression with interaction between time and strategy of ART initiation. Results were used to estimate AR and PAF.

RESULTS: 19,339 patients included: 10,147 from Uganda; 2,661 from Peru 6,014 from Italy and 517 from Mexico. 11,423 (59%) were LP; 877 TB cases were reported: 681 (78%) in LP and 196 (22%) in non-LP. wHR for TB among LP vs. non-LP was 2.24 [2.02-2.48]. Among LP, the 1-year AR was 75% (71-79) and the 5-year AR was 65% (55-66) while PAF was 62% (57-68) and 48% (41-54), respectively. Among 7,899 non-LP included in the MSM, 2,384 (30%) never initiated ART (NI), 1,521 (19%) started as LI, and 3,994 (50%) were non-LI. 34/195 reported TB cases occurred in NI, 108 in LI and 53 in non-LI. wHR for TB among LI vs. non-LI was 0.87 (0.41-1.86). The 1-year AR among LI was 14% (0-27) and 5-year 34% (16-49) and PAF were 8% (0-17) and 30% (14-44) respectively.

CONCLUSIONS: In this 4-country cohort of PLWH with different TB burden, early diagnosis of HIV caused a reduction in risk of TB. Delaying ART initiation was also detrimental for TB, with variation by country. Our findings support the efforts to expand HIV testing and immediate ART initiation.

TUPEB155

Incidence and predictors of active tuberculosis among HIV-infected adults receiving long term antiretroviral therapy in Thailand

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BACKGROUND: Almost 2/3 of estimated new tuberculosis (TB) cases and more than 1/5 of estimated TB-HIV co-infection globally are in Asia and the Pacific. However, the uptake of latent TB treatment (LTBI) among people living with HIV (PLHIV) in this region is relatively low. The findings of incident TB after antiretroviral therapy (ART) is important to guide the policy of LTBI treatment in this region. So far, there is limited data of incident TB among PLHIV who received long term ART in Asia. We therefore determined incidence and predictive factors associated with TB after ART initiation in Thailand.

METHODS: This was a prospective observational study among 2021 adult PLHIV since 1996. The data was censored at time of new TB after ART initiation (incident TB group) and 31 July 2018 for non TB group. Predictive factors associated with TB was analysed by A Cox proportional hazard model.

RESULTS: Of 2021 PLHIV (61% male), 1866 cases (92.3%) had no TB prior ART initiation. During median 16 years on ART, 142 cases developed TB, corresponding to an overall incidence rate of 7.2 (95% CI 6.1-8.5) per 1000 person year follow-up (PYs). Median (IQR) time from ART to first onset of TB was 2.7 (IQR 0.9-5.5) year. Median baseline CD4 was 255 cells/mm³. Those with CD4 < 350 cells/mm³, VL > 50 copies/ml and duration of ART < 1 year had much higher incident TB: incident rate 32.6 (95% CI 26.2-40.4), 34.2 (95% CI 26.6-44), and 560.2 (95% CI 405.9-773.2) per 1000 PYs, respectively.

The risk of TB was significantly decreased with increasing duration of ART. In multivariate analysis, incident TB was significantly associated with prior AIDS defining illness (CDC C): HR 2.74 (95% CI 1.83-4.11), $p<0.001$.

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TUPEB158

ART initiation within 8 weeks of TB treatment Leads to superior TB outcomes in ART-naïve children and adolescents living with HIV: Results from six high TB/HIV burden countries

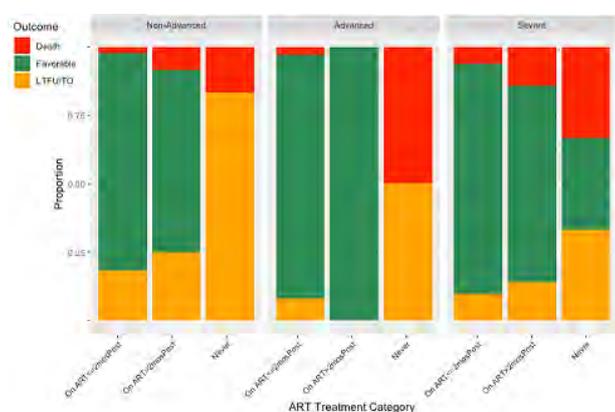
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BACKGROUND: Early initiation of antiretroviral therapy (ART) reduces tuberculosis (TB) mortality among adults with AIDS. However, the optimal timing of ART initiation in ART-naïve children and adolescents with HIV (C/ALHIV) with associated TB has not been as clearly demonstrated. This multi-site study measured clinical TB outcomes relative to timing of ART and anti-TB treatment (ATT) initiation among ART-naïve C/ALHIV.

METHODS: Patient data from 2013 to 2017 was extracted from electronic medical records (EMR) and national paper registers at seven BIPAI Centres of Excellence: Botswana, Eswatini, Lesotho, Malawi, Tanzania-Mbeya, Tanzania-Mwanza, and Uganda. Data was analyzed on ART-naïve C/ALHIV with associated TB (ages 0-18.99 years for Tanzania; ages 0-19.99 years for the remaining sites). TB outcomes were assigned in accordance with WHO definitions. An Adaptive Lasso Multi-Variate Regression approach was used to provide consistent unbiased estimates and to perform variable selection.

RESULTS: Of the 463 ART-naïve C/ALHIV with TB analyzed, 73.4% (340/463) had favorable outcomes (cured or treatment completed), 17.7% (82/463) transferred out/lost-to-follow up, and 8.9% (41/463) died. Favorable outcomes were associated with ART initiation < 8 weeks (Figure) and older age irrespective of immune status. C/ALHIV who initiated ART < 2 months of ATT initiation were 65% less likely to have unfavorable outcomes (OR = 0.35, p = 0.04, 95% CI 0.10-0.89), while those with no documentation of ART initiation were 12 times more likely to have unfavorable outcomes (OR = 12.55, p = < 0.01, 95% CI 2.57-66.76) (Figure). Older children were 43% more likely to have favorable outcomes (OR = 0.57, p = < 0.01, 95% CI 0.34-0.70).

CONCLUSIONS: Our findings demonstrate that initiation of ART within 8 weeks of ATT initiation leads to favorable outcomes for ART-naïve C/ALHIV with HIV-associated TB. Special attention must be given to younger ART naïve patients, as their risk of poor TB outcomes is higher than their older counterparts.



[ART Naïve Abstract (Bacha) - BCM]

TUPEB159

Evaluation of the World Health Organization (WHO) 4 symptom screening for intensified Tuberculosis (TB) case finding among people living with HIV (PLHIV) in India

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BACKGROUND: HIV- TB dual infection has grave consequences and TB is the leading cause of mortality among PLHIV in India. Intensified case finding (ICF) is critical for early diagnosis and treatment of TB. The WHO 4 symptom (4S) screening is a simple tool developed for ICF of TB among PLHIV. This study tested the efficacy and ease of implementation of the WHO 4S algorithm among ART naïve PLHIV attending a public health facility.

METHODS: 100 pre-ART PLHIV attending an ART center in New Delhi were screened for TB using the WHO 4S algorithm. The 4S tool detects the presence of any one of four: fever, cough weight loss and night sweats. All those screening 4S positive, the TB suspects, were further investigated for active TB with chest X-ray, sputum for Xpert/MTB Rif, ultrasound abdomen and other investigations for extrapulmonary TB as indicated. The performance of the algorithm was assessed in terms of sensitivity, specificity, positive and negative predictive values.

RESULTS: 47% of the subjects screened positive with the WHO 4S tool. The commonest symptom was fever (61.7%) followed by cough (48.9%). Among the TB suspects, 80.9% had active TB disease on investigation. The sensitivity of the 4S tool was 100%, specificity 85.48% and positive predictive value was 80.9%. Notably, the negative predictive value of the algorithm was 100%. The addition of an abnormal chest X-ray to the algorithm did not augment its sensitivity/ specificity. Male gender (p=0.007), CD4 cell < 100 cells/mm³ (p=0.002), presence of other OIs (p= 0.000) and past TB (p=0.000) were significant risk factors for 4S positivity. The 4S screen is easy, uncomplicated to administer by non medical personnel even in busy clinics.

CONCLUSIONS: The WHO 4S screening is a useful, simple method for TB ICF in PLHIV in a public health approach. Although a positive 4S screen has low specificity, the very high negative predictive value is indispensable - PLHIV with a negative screen are extremely unlikely to have active TB disease. It is imperative that all PLHIV are diligently screened with this effective, simple clinical algorithm at each clinic visit for early, timely TB detection.

TUPEB161

Identification of biomarkers to predict disease progression at time of TB diagnosis

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BACKGROUND: There is a need to identify biomarkers that can predict poor outcomes of MTB (Mycobacterium Tuberculosis). Accurate biomarkers predictive of TB progression and treatment outcome are needed.

METHODS: Eighteen TB-infected cases that started anti-tuberculosis treatment and died during treatment were selected for this study. Their cryopreserved peripheral blood mononuclear cells (PBMC) and serum at the time of TB diagnosis were used. Another 18 TB-infected patients who were cured from TB treatment were used as controls. Controls were

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matched for sex, age and HIV status. We evaluated the cytokine responses of the PBMC to MTB antigens (combination of peptides CFP-10 + ESAT-6). We measured the production of IFN- γ , TNF, IL-2, IL-4, IL-6, IL-10, granzyme A, granzyme B and inducible protein (IP)-10 after stimulation with TB peptides. We also measured for *ex vivo* serum cytokine concentrations of the same analytes without antigens stimulation using the Luminex and ELISA methods. 25-OH vitamin D serum level was determined in both groups.

RESULTS: A total of 36 participants were studied. The median age of all study participants was 35.5 (IQR, 30-50) years and 12/18 (67%) were HIV infected. The median CD4 T cell count for HIV cases was 21.5 (IQR, 9-45) cells/ μ l and 152 (IQR, 28-310) cells/ μ l for the controls ($P=0.05$). Significant differences were observed in the levels of IFN- γ , granzyme A and granzyme B after the PBMCs were stimulated with TB peptides. This finding indicated that these 2 groups were immunologically different at the time of diagnosis. Patients with deficient levels of IFN- γ are at risk of acquiring TB. IFN- γ is vital in the defense against MTB. Detection of IFN- γ in the supernatants after antigen stimulation may be used as a potential surrogate marker to assess disease progression. None of the participants had sufficient (>30 ng/mL) levels of 25-OH vitamin D.

CONCLUSIONS: IFN- γ , granzyme A and granzyme B are the most promising biomarkers that can identify mortality risk for TB. These data can be used to manipulate the immune responses and clinically manage MTB infection. Further research is warranted to determine the functional role of granzymes in host defense against MTB.

TUPEB162

Treatment outcomes of HIV-TB co-infected children below 18 years of age: A cohort study

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BACKGROUND: Tuberculosis (TB) is a leading cause of morbidity and mortality in children living with HIV-AIDS (CLHA). Co-infected patients require simultaneous anti-tubercular (ATT) and antiretroviral therapy (ART). This may cause treatment failure due to noncompliance resulting from high pill burden and adverse drug events (ADE). The impact of two recent national policy changes in India (provision of ART to all CLHA and changeover from intermittent to daily ATT) is unknown. We evaluated clinical status, pill adherence and ADE in HIV-TB co-infected CLHA and isolated CLHA at 2 and 6 months and treatment outcomes at 6 months.

METHODS: A hospital-based prospective cohort study was conducted in New Delhi from November 2016 to March 2018. Cases included co-infected 30 CLHA on ART and ATT. Controls were 60 CLHA, age and sex matched. Drug resistant TB and other opportunistic infections were excluded. Data related to study objectives was obtained after informed consent at enrolment, 2 and 6 months. Appropriate descriptive and comparative statistical tests were used.

RESULTS: The mean age of cases and controls was 9.7 ± 4.9 and 7.8 ± 4.4 years respectively. Male-female ratio was 1.3 and 1.4 respectively. There were 21 new (6 earlier, 14 early and 4 delayed initiation) and 9 previously treated cases. Out of these, 1 child expired. There was a significant improvement in increase in BMI and CD4 counts in the co-infected group at 2 months, compared with controls. Other clinical parameters, pill adherence and ADE were comparable. At 6 months significant improvement was seen in the BMI and WHO clinical staging in the cases. Other variables were comparable. At 6 months TB cure was seen in 100% cases of 11 co-infected cases who completed 6 months ATT.

CONCLUSIONS: Simultaneous treatment with ATT and ART resulted in better catch-up growth and clinical staging in co-infected children. There were no significant differences in ADE or pill adherence or treatment outcomes related to ART. Conclusions related to ATT success could not be drawn due to heterogeneity of ATT duration in co-infected CLHA.

TUPEB163

Severe adherence challenges in the treatment of multi- and extensively drug resistant tuberculosis and HIV: Electronic dose monitoring and mixed methods to identify and characterize high-risk subpopulations

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BACKGROUND: The first new TB drug in 40 years, Bedaquiline, was introduced operationally in South Africa in 2014 for the treatment of drug-resistant tuberculosis (DR-TB). The majority of South African DR-TB patients are HIV co-infected and on antiretroviral therapy (ART); adherence to each regimen (DR-TB HIV) is critical, yet understudied and poorly understood. We hypothesized that a next-generation electronic dose-monitoring device (Wisepill) would allow us to identify DR-TB HIV patients with severe adherence challenges in real-time and a mixed methods approach would allow us to further characterize challenges.

METHODS: Prospective cohort study of adult patients initiating treatment on Bedaquiline-containing regimens and on standard Nevirapine or Lopinavir-based ART in KwaZulu-Natal, South Africa. Each participant received two separate Wisepill devices; one for Bedaquiline and the other for ART administration through 6 months. Cumulative adherence was calculated as recorded compared to expected Wisepill openings. Patients with < 85% adherence to both ART and Bedaquiline were considered severely adherence-challenged. Focus groups, behavioral, sociodemographic and clinical questionnaires were used to characterize adherence challenges.

RESULTS: 31/198 (15.7%) prospectively enrolled DR-TB HIV patients were severely adherence-challenged. Compared to higher adherence patients, they had higher baseline HIV viral load (IQR 74,274 vs. 91, $p=0.0003$), and shorter average inpatient hospitalization (78 vs. 112 days, $p<0.0001$). Challenges included stigma, low social support, mental health, poverty, housing and unemployment issues, and drug and alcohol use. Severely adherence-challenged patients experienced higher levels of mortality at 6 months (19% vs. 6%, $p=0.04$).

6-Month Cumulative Adherence	N= 198	Mortality n (%)	p-value
High BDQ/High ART	111 (56%)	7 (6%)	Reference
High BDQ/Low ART	53 (27%)	9 (17%)	0.047*
Low BDQ/Low ART	31 (16%)	6 (19%)	0.037*
Low BDQ/High ART	3 (1%)	1 (33%)	0.198

[Mortality by 6-month cumulative adherence to Bedaquiline and ART]

CONCLUSIONS: A substantial portion of DR-TB HIV patients experience severe adherence challenges with low measured adherence to both Bedaquiline and ART. Electronic dose monitoring has the potential to identify these patients prior to treatment failure or loss to follow-up. Mixed-methods reveal intense behavioral, mental health, and structural barriers. Rates of clinical, virologic and microbiologic failure were unsurprisingly high in the severe adherence challenges group. Our data informs development of targeted interventions to support adherence for at-risk sub-populations of DR-TB HIV patients.

TUPEB164

Examining isoniazid concentrations in hair as a novel metric of adherence among HIV/TB co-infected persons receiving TB prophylaxis in Uganda

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BACKGROUND: Isoniazid (INH) preventive therapy (IPT) reduces tuberculosis (TB) morbidity and mortality in persons with HIV by 30-50% beyond the benefits of antiretroviral therapy (ART). Self-reported INH adherence is subject to bias and electronic medication monitoring (EMM) might not reflect pill ingestion. Objective measures, such as drug and metabolite concentrations in hair, proven useful for ART monitoring, have not yet been examined for INH.

METHODS: HIV/TB co-infected adults on ART (n=93) at the Mbarara Regional Referral Hospital (Uganda) had hair collected after 3 (n=93) and 6 months (n=58) of daily INH (300 mg). INH and acetyl-INH (a metabolite that is dependent on host acetylation status) were measured in hair (2mg, 2cm) using liquid chromatography/tandem mass spectrometry, quantified by the isotope dilution method (internal standards: INH-d4 and acetyl-INH-d4). We calculated Spearman correlations between hair INH and acetyl-INH concentrations and prior month adherence measures (EMM as % daily pill bottle opening and % self-reported adherence via a visual analog scale). We calculated bootstrap 95% confidence intervals (CIs) to account for repeated measures.

RESULTS: Half (49%) were female and median age was 40 years (interquartile range [IQR] 35-46). Median adherence was 93.3% (IQR: 83.3-100) by EMM and 100% by self-report (IQR: 97-100); these were moderately correlated (Spearman $r=0.45$ [95% CI: 0.31, 0.58]). The median INH and acetyl-INH concentrations in hair were 3.12 ng/mg (IQR: 1.58-5.48) and 2.08 ng/mg (IQR: 0.93-4.46), respectively. The correlations between INH concentration and EMM and self-reported adherence were -0.13 [95% CI: -0.32, 0.03] and -0.16 [95% CI: -0.30, -0.01] respectively. The correlations of acetyl-INH with EMM and self-report were 0.11 [95% CI: -0.11, 0.30] and -0.05 [95% CI: -0.19, 0.11], respectively.

CONCLUSIONS: This is the first examination of INH hair levels in real-world use of IPT. Neither INH nor acetyl-INH concentrations were correlated with prior-month EMM nor with self-reported adherence, while EMM and self-reported adherence measures were moderately correlated. Antiretroviral drug concentration in hair has been highly correlated with clinical outcomes for HIV. However, more work is needed to determine best measures of INH adherence, including how to employ INH and acetyl-INH in hair, in the setting of IPT.

TUPEB165

Prevalence of latent tuberculosis infection in HIV-infected patients using tuberculin skin test and Interferon-Gamma Release Assay

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BACKGROUND: Tuberculosis is still the leading cause of death among HIV infected patients, for this reason, the diagnosis of latent tuberculosis infection (LTBI) is important. The aim of this study was to determine the prevalence of LTBI among HIV-infected patients using two different methods.

METHODS: A cross-sectional study to evaluate the prevalence of LTBI using tuberculin skin test (TST) and QuantiFERON TB Gold In-tube (QTF-GIT) was performed in HIV-infected adults in Guanajuato, Mexico. Concordance between both methods was evaluated using kappa coefficients.

RESULTS: Five hundred sixty-seven patients were evaluated, with a median age of 40 years (range 18-82 years), most of the patients were male (82.4%), with a median CD4+ count of 542 cells/mm³ (IQR 339-775). All

the patients completed the evaluation by QTF-GIT, while only 66% of the patients completed the TST process, the rest of them did not return to the measurement of the induration. The prevalence of LTBI was 8.11% using TST, 6.34% using QTF-GIT, and 9.17% considering either positive test. Moderate concordance was observed between TST and QTF-GIT ($k = 0.44$; 95%CI, 0.35-0.529).

CONCLUSIONS: The moderate concordance between the methods makes complicated to choose one of them as a screening method for diagnosis of LTBI. TST is cheaper than QTF-GIT but requires to be measured 48-72 hours later complicating to complete the process, on the other hand, QTF-GIT is a one-step process but is more expensive and requires trained staff and laboratory equipment.

TUPEB166

Characteristics and risk of mortality among TB/HIV co-infected patients at a large HIV clinic in the era of test and treat in Uganda

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BACKGROUND: Benefits of starting antiretroviral therapy (ART) early including HIV/TB co-infected individuals has been documented widely. However characteristics and the risk of mortality among HIV/TB patients in the test and treat era has not been evidenced. We therefore sought to bridge this knowledge gap using secondary data at a large HIV clinic in Rwenzori, western Uganda.

METHODS: A retrospective cohort review of 521 charts was conducted for all individuals starting on TB treatment between June 2016 and June 2017. Time from starting TB treatment to death as documented in registers was the main outcome. TB treatment outcomes including their characteristics were descriptive analysed. Risk of mortality by timing of ART i.e. (within 7, 8-14 and above 14 days) among those who started ART between 2016 and 2018 was assessed using Kaplan Meier curves and estimates measured as per 1000 person years.

RESULTS: A TB treatment success rate of 84% (437/521) and a fifteen percent (14.8%, 77/521) mortality rate were registered at 12 months after starting TB treatment. Males and clients 30 years and above were disproportionately affected; mortality rate (64.9%, 50/77) and (66.8%, 53/77) respectively. Of the 521 registered TB clients, 247 (47.4%) were co-infected with HIV and of these 45.3% (112/247) started ART between 2016 and 2018 while 54/247 (21.9%) were dead by 12 months after TB treatment. Mortality was higher (87%, 47/54) among those who were not on TB treatment at the time of starting ART compared to those who started ART after TB treatment. Pulmonary clinically diagnosed (PCD) and extra pulmonary TB cases contributed 40.7% (22/54) and 16.7% (9/54) of all mortalities registered among HIV/TB cases. Risk of mortality among co-infected clients who started ART within seven days after diagnosis was significantly higher (4.27 person-years, 95%CI: 2.62 - 6.98) compared to those who started 8-14 days (2.37 person-years, 95%CI: 0.59 - 9.46) and beyond 14 days (0.59 person-years, 95%CI: 0.28 - 1.24).

CONCLUSIONS: Unmasking TB inflammatory reconstitution syndrome might be the leading cause of mortality among HIV/TB clients starting ART in the Test and Treat era. We recommend earlier diagnosis and treatment of clinically diagnosed TB cases before starting ART.

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Viral hepatitis B and D

TUPEB167

In silico prediction of major histocompatibility complex (MHC) class II epitopes associated with hepatitis B virus (HBV) infection in BotswanaW.T. Choga^{1,2}, M. Anderson¹, T. Mbangiwa^{1,3}, B. Phinius¹, J. Blackard⁴, S. Moyo^{1,5}, S. Gaseitsiwe^{1,5}¹Botswana Harvard AIDS Institute Partnership, Research Laboratory, Gaborone, Botswana, ²University of Cape Town, South Africa, Pathology, Capetown, South Africa, ³University of Botswana, Medical Laboratory Sciences, Gaborone, Botswana, ⁴Cincinnati, College of Medicine, Cincinnati, United States, ⁵Harvard T.H. Chan School of Public Health, Boston, United States

BACKGROUND: Hepatitis B virus (HBV) is the primary cause of liver-related malignancies worldwide, and there is currently no cure for chronic hepatitis B infection (CHB). Strong immunological responses induced by T cells are associated with HBV clearance during acute infection; however, the repertoire of epitopes presented by major histocompatibility complexes (MHCs) to elicit these responses in various populations is not well understood. Determining the epitopes expressed by MHC class II to elicit CD4⁺T cells may be a key strategy for the identification of effective therapeutic vaccine-peptides for treating CHB and for designing highly sensitive diagnostic kits.

METHODS: *In silico* approaches were used to map and investigate 15-mer epitopes restricted to 9 MHC class II alleles that have high population coverage in Botswana. Total of 92 non-recombinant, complete HBV surface-gene (PreS/S) sequences were genotyped using 3130 xl Genetic Analyser and used in the analysis. Sequences were isolated from 25 patients with occult HBV infection (OBI) and 67 patients with CHB in Botswana. Profiles of epitopes were compared between genotypes (A versus D), proteins (PreS1 versus PreS2 versus S), and relative clinical outcomes (chronic versus occult infection).

RESULTS: The HBV genotypes were 44 (48%) for A1 and 48 (52%) for D3. Of the 2,022 total epitopes predicted, 12.6% were strong-binders (SB) and those with amino acids containing: WSPQAQGIL, TNLVSPNPL, ILAT-VPAPV, YFPAGGSS, VRGLYFPAG, FLLTRILTI, FIPLLPPIFF, VGLSPTVWL, YQGMPLVCP, and WYWGPSLYN were binding to most alleles for both genotypes (A or D) and clinical outcomes (CHB or OBI). Although epitope-densities between genotype A {PreS1(8%), PreS2(34%), S(34%)} and genotype D {PreS1(13%), PreS2(21%), S(37%)} were different, majority of binding epitopes were from the S proteins. Polymorphisms that hindered HLA-epitope binding were 86T, 90T and 94P in PreS1_A; 54P, 79E, 84S, and 85Q in PreS1_D; 12I, 31I, and 54P in PreS2_A; 5F, 22H, 22L, 22P, 32H, 36L, and 42S in PreS2_D.

CONCLUSIONS: To our knowledge this is the first study to use *in silico* approaches to investigate predicted epitopes when using genotype, A and D sequences isolated from patients with CHB and OBIs. Predicted epitopes and polymorphisms are the potential candidates for *in vitro* studies during designing genotype-based epitope-vaccines and diagnostic kits.

TUPEB168

Cell-associated HIV DNA levels in peripheral blood similar among hepatitis B and C virus coinfecting and HIV mono-infected Chinese patientsJ. Xie, Y. Yue, Y. Han, T. Zhu, W. Lv, W. Cao, X. Song, Y. Li, Z. Qiu, T. Li
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BACKGROUND: A high prevalence of hepatitis B and C virus (HBV and HCV) coinfection exists in HIV-infected population. However, limited data exist on the effect of hepatitis virus coinfection on cell-associated HIV DNA levels.

METHODS: HIV-infected treatment-naïve patients were recruited from two parent cohorts established during 2008-2010 and 2012-2014 (ClinicalTrials.gov identifier NCT00872417 and NCT01844297). Plasma HIV RNA, CD4⁺T-cell counts, ALT, AST, AST-to-platelet ratio index (APRI), fi-

brois-4 (FIB4) values, HBsAg and anti-HCV status were obtained from the parent databases. Plasma HBV DNA and HCV RNA were determined in HBsAg⁺ and anti-HCV⁺ patients. HIV DNA in the white blood cells (WBCs) of peripheral blood was quantified for LTR gene using a fluorescence-based real-time SUPBIO HIV Quantification Kit (SUPBIO, Guangzhou, China) with a range of 20-5 000 000 copies/10⁶ WBCs. The amount of HIV DNA/10⁶ PBMCs was calculated. Chi-square, Kruskal-Wallis, Mann-Whitney *U* tests and Spearman correlation were used for analysis, as appropriate.

RESULTS: Of 802 HIV-infected participants from twelve provinces across China, 93 (11.6%) were HBsAg⁺ (HIV-HBV coinfecting), 34 (4.2%) were anti-HCV⁺ and HCV RNA⁺ (HIV-HCV coinfecting), and 675 were HIV mono-infected. The hepatitis virus coinfecting participants had similar median CD4 counts compared to the HIV mono-infected participants. Neither the HIV RNA nor the cell-associated HIV DNA levels differed among the three groups. ALT and AST values were highest in the HIV-HCV coinfecting participants and lowest in the HIV-mono-infected participants. Similar results were seen with APRI and FIB4 scores. Among the entire cohort, no significant correlation was found between cell-associated HIV DNA level and liver disease parameters including ALT, AST, APRI and FIB4. In the hepatitis virus coinfecting subsets, neither HBV DNA nor HCV RNA were significantly associated with cell-associated HIV DNA level.

CONCLUSIONS: Neither HBV- nor HCV-coinfection significantly associated with cell-associated total HIV DNA levels in peripheral blood in treatment-naïve HIV patients.

	HIV mono-infection	HIV-HBV coinfection	HIV-HCV coinfection	P
Age (years)	34(27-42)	34(29-44)	41(35-46)	0.002
Number of male gender (%)	486(72%)	77(83%)	24(71%)	0.08
CD4 ⁺ T cell count (μL)	250 (148-335)	209 (117-310)	215 (130-289)	0.16
HIV RNA (lg copies/mL)	4.71 (4.28-5.14)	4.61 (4.25-5.15)	4.68 (4.30-5.21)	0.94
HIV DNA (lg copies/10 ⁶ PBMCs)	2.78 (2.38-3.25)	2.88 (2.23-3.30)	2.79 (2.56-3.25)	0.87
ALT (U/L)	21(16-31)	28(20-39)	45(33-55)	<0.001
AST (U/L)	24(20-29)	27(23-37)	41(31-55)	<0.001
APRI	0.31 (0.24-0.43)	0.37 (0.29-0.56)	0.61 (0.42-1.02)	<0.001
FIB4	0.92 (0.66-1.33)	1.02 (0.76-1.62)	1.77 (1.14-2.46)	<0.001

[HIV and liver disease parameters of study participants by HBV and HCV coinfection status [median (interquartile range) unless otherwise indicated]]

TUPEB169

Continued virological benefits but stabilised HBsAg loss after 8 years of tenofovir-inclusive ART regimens in HIV-HBV co-infectionJ. Audeley¹, M. Littlejohn², S. Bowden², G. Matthews³, C.K. Fairley^{4,5}, A. Avihingsanon⁶, S. Lewin^{1,7}, J. Sasadeusz^{7,8}¹The University of Melbourne, The Peter Doherty Institute for Infection and Immunity, Melbourne, Australia, ²Royal Melbourne Hospital at the Doherty Institute, Victorian Infectious Diseases Reference Laboratory, Melbourne, Australia, ³The Kirby Institute, University of New South Wales, Sydney, Australia, ⁴Melbourne Sexual Health Centre, Melbourne, Australia, ⁵Monash University, Central Clinical School, Melbourne, Australia, ⁶Thai Red Cross AIDS Research Centre, HIV-NAT Research Collaboration, Bangkok, Thailand, ⁷Alfred Health and Monash University, Department of Infectious Diseases, Melbourne, Australia, ⁸Royal Melbourne Hospital at the Doherty Institute, Victorian Infectious Diseases Service, Melbourne, Australia

BACKGROUND: Tenofovir (TDF) effectively suppresses HIV and HBV replication in HIV-HBV co-infection and initial rates of HBsAg loss are high, although HBV DNA can persist in some individuals on TDF-containing combination antiretroviral therapy (ART). We initiated a prospective longitudinal study to determine durability of HBV virological control and clinical outcomes after prolonged TDF-based ART in HIV-HBV co-infection.

METHODS: 92 HIV-HBV co-infected participants on, or about to commence, TDF-containing ART from Australia (n=41) and Thailand (n=52) were enrolled. Participants were followed every 6 months for the first 2

years, then annually to 8 years. Laboratory and clinical assessments and serum samples were collected at study visits. These analyses compare follow-up at 5 and 8 years.

RESULTS: At years 5 and 8, data were available for 68.2% (n=64) and 54.3% (n=50) of the cohort respectively. Median duration on TDF was 9.4 years (IQR 8.6-12.1) after 8 years of follow-up, median age was 49.3 years (IQR 46.1-54.5) and 68% of the cohort were male. By year 5, 98.4% had undetectable HBV DNA (< 20 IU/ML) which remained stable at year 8 (97.6%). The one individual with detectable HBV DNA also reported sub-optimal issues. Three participants died between years 5 and 8, bringing total deaths over 8 years of follow-up to 6.5% (n=6) of the original cohort. Continued decreases in some liver parameters were observed with significantly lower ALT (p=0.046) and LDH (p=0.024) at year 8 compared to year 5 (Wilcoxon signed-rank test). There were no significant differences in CD4 and CD8 total cell counts or percentages, however there was a significant difference in CD4:CD8 ratio at year 8 compared with year 5 (0.79 and 0.93, respectively, p=0.047). There was a statistically significant decrease in quantitative HBsAg between study entry and year 8 (p=0.017) although no additional HBsAg loss was observed between year 5 and year 8 (15.3% at year 5).

CONCLUSIONS: Detectable HBV DNA by 8 years of follow-up was rare in HIV-HBV co-infected participants on TDF-based ART and was associated with suboptimal adherence. There were improvements in some liver parameters and CD4:CD8 ratio. HBsAg loss was high at 15% but had plateaued after 5 years on ART.

TUPEB170

Inflammatory markers associated with mortality in HIV-positive individuals from Côte d'Ivoire: Role of HIV-HBV co-infection

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BACKGROUND: Higher levels of inflammatory markers are often observed in HIV-positive individuals despite antiretroviral therapy (ART)-induced viral suppression, while some are strongly associated with mortality. We aimed to evaluate the association between markers of inflammation or immune activation and overall mortality in the ANRS Temprano trial conducted in Côte d'Ivoire. As the risk of mortality is increased in HIV-hepatitis B virus (HBV) co-infected patients, we also determined whether inflammatory markers mediate this association.

METHODS: HIV-1-positive individuals enrolled in the trial and randomized to receive ART according to concomitant World Health Organization recommendations were included. Soluble markers of inflammation (sVCAM-1, sCD14, IP-10, IL-6, IL-1, fibrogen, CRP, CD163, albumin, D-dimer) were quantified at inclusion. Hepatitis B surface antigen (HBsAg) and HBV-DNA viral loads were also determined at inclusion. Cox proportional hazards models were used to assess the association between baseline marker levels and overall mortality.

RESULTS: Of 1023 included patients, median age was 35 years (IQR=30-42) and 77% were female. At inclusion, median CD4+ T cell count was 459/mm³ (IQR=362-567) and HIV-RNA viral load 4.63 log₁₀ copies/mL (IQR=3.96-5.21). 91 (9%) patients were HBsAg-positive. During a median follow-up of 58 months (IQR=40-69), 801 (78%) patients initiated ART and 49 deaths occurred. The only markers associated with mortality were higher CD163 (aHR=1.96, 95%CI=1.06-3.62) and lower albumin levels (aHR=0.51, 95%CI=0.29-0.90) after adjusting for age, gender, CD4+ cell count and HIV-RNA viral load. Median CD163 and albumin levels, respectively, were significantly different in HIV-HBV co-infected participants with HBV-DNA >10,000 copies/mL (1856 ng/mL, IQR=1399-2427 and 34.0 mg/L, IQR=30.0-40.0) compared to those with HIV-HBV co-infection and HBV-DNA ≤10,000 copies/mL (1552 ng/mL, IQR=1225-2096 and 36.6 mg/L, IQR=32.8-41.0) or HIV mono-infection (1518 ng/mL, IQR=1073-2129, and 36.9 mg/mL, IQR=32.5-41.7) (overall p=0.05 and p<

0.001). Of note, the significant association between HIV-HBV co-infected individuals with HBV-DNA >10,000 copies/mL and mortality (aHR=2.86, 95%CI=1.02-8.01) was attenuated when additionally adjusting for baseline CD163 and albumin levels (aHR=2.25, 95%CI=0.79-6.37).

CONCLUSIONS: CD163 and albumin levels are associated with overall mortality in HIV-infected individuals and appear to mediate the association between HIV-HBV co-infection with high HBV-DNA viral loads and mortality. The reasons for increased CD163, in particular, warrant further study.

TUPEB171

An investigation of the mechanisms and changes in chronic immune activation in patients with HIV/HBV co-infection after receiving HAART

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BACKGROUND: We conducted this study to observe the change patterns of chronic immune activation and investigate their associated mechanisms in patients with HIV/HBV co-infection after receiving highly active antiretroviral therapy (HAART).

METHODS: This study enrolled 40 patients with HIV/HBV co-infection (co-infection group), 38 patients with HIV-1 single infection (HIV single infection group), and 20 healthy blood donors (healthy control group). Markers of chronic immune activity (SCD4, SCD13, CD4+HLDR+CD38+ and CD8+HLDR+CD38+) and regulatory T cells (Treg cells) were assessed prior to treatment (baseline) and at week 12, 24, 36, and 48 after treatment.

RESULTS: There were no significant differences in age, gender, baseline CD4 count, and HIV viral load between patients with HBV/HIV co-infection and patients with HIV single infection (all p values>0.05). In both groups, the CD4 count rose after treatment, indicating HIV viral suppression (all p values<0.05), and there was no significant difference in the CD4 count recovery and HIV viral suppression rates between the two groups (both p values>0.05). There was no significant difference in the baseline chronic immune reactivity indicators and baseline Treg cells (both p values>0.05) between the two groups. Both groups had significantly higher levels of chronic immune reactivity indicators and Treg cells than the healthy controls (all p values<0.05). After receiving HAART, the SCD13, CD4+HLDR+CD38+ and CD8+HLDR+CD38+ of both groups declined compared to baseline (both p values<0.05), but remained higher than those of the healthy controls at week 48 (both p values<0.05). In addition, there were no significant statistic differences between the co-infection and single infection groups (both p values>0.05). The SCD14 of patients with HBV/HIV co-infection and patients with HIV single infection decreased after HAART (both p values<0.05). The SCD14 level of HIV single infection group decreased to that of healthy controls since week 24 but it still remained higher in co-infection group than healthy controls (p value<0.05). The variation trends of both SCD14 and Treg cells were the same (p value<0.05).

CONCLUSIONS: Compared to patients only with HIV infection, chronic immune activation is more severe in patients with HBV/HIV co-infection even after effective HAART, which is possibly related to Treg cells.

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Viral hepatitis C

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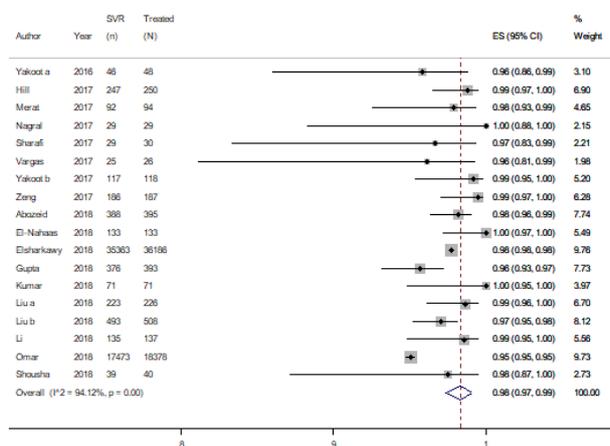
Effectiveness of generic direct-acting agents to HCV treatment: A systematic review and meta-analysis

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BACKGROUND: The use of generic direct-acting agents (DAAs) for hepatitis C virus (HCV) treatment could, due to lower costs, allow for universal access in limited-resources settings. This systematic review and meta-analysis assessed the pooled 12-weeks sustained virologic response (SVR12) rates for HCV treatment by generic DAAs.

METHODS: A systemic search was performed to identify studies that evaluated the SVR12 of generic DAAs in HCV-infected patients with or without comparison with brand name drugs [PROSPERO CRD42019117610]. Abstracts were screened by two investigators independently; conference papers, editorials and letters were excluded. The primary end-point was the pooled SVR12 for generic DAAs. If available, the pooled relative risk (RR) of SVR12 by random-effect model (DerSimonian-Laird Method) was performed to compare effectiveness of generic and brand name DAAs. Heterogeneity was assessed using the Cochran Q-statistics and I² statistics.

RESULTS: We identified 19 studies comprising 57,433 individuals from eight countries and regions. The pooled overall SVR12 rates [95% confidence interval [CI]] were 98% (97-99; I²=94.1%) and 96% (93-98; I²=68.1%) by per-protocol (18 studies) [Figure] and intention-to-treat analysis (8 studies), respectively. The risk of SVR12 with generic DAA was similar to treatment with brand name drugs [RR=1.00 (95%CI 0.98-1.02; I²=0.0%)] in four studies. The risk of SVR12 was significantly higher in patients without cirrhosis compared to those with cirrhosis [7 studies; RR=1.034 (95%CI 1.012-1.057), p=0.003], but not different according to previous treatment (n=3) or HIV co-infection (n=3). In a sensitivity analysis, a lower heterogeneity was achieved when stratified by regions (I²=43% for Asia), by presence of cirrhosis (I²=18%) and by quality assessment of studies (I²=54% for good-quality).



[Overall SVR12 rates by generic DAAs [per-protocol analysis]]

CONCLUSIONS: Generic DAAs were highly effective for HCV treatment and non-inferior to brand name drugs. Generic DAAs might be used in limited-resources settings to decrease the burden of liver disease in HCV-infected patients as well as the costs of treatment.

TUPEB173

Incidence of hepatitis C virus infection among HIV-positive men in Singapore: Trends and epidemiological risk factors

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BACKGROUND: Co-infection of hepatitis C virus (HCV) with HIV leads to accelerated disease progression and increases the risk of hepatic complications and death. The aim of this study was to estimate the incidence rate of and epidemiological factors associated with HCV infection among HIV-positive male patients who sought HIV care in Singapore.

METHODS: A retrospective study was conducted using a clinical database maintained by the Clinical HIV Programme at the National Centre for Infectious Diseases, Singapore. HIV-infected male patients with a negative HCV result at baseline who had undergone at least one subsequent HCV test during the period from 2006 to 2017 were included. To assess the trend of HCV seroconversion, the follow-up duration was grouped into four time intervals: 2006-2008, 2009-2011, 2012-2014, and 2015-2017. Factors associated with incident HCV infections were determined using Cox regression analyses.

RESULTS: A total of 834 HIV-infected male patients were tested for HCV at least once following their negative baseline test between 2006 and 2017, and they contributed a total of 3,870 PYFU. The mean age of these patients was 39 years (range: 17-76).

Sixty-three patients (7.6%) subsequently tested positive for HCV, giving an overall incidence of 1.63 per 100 PYFU (95% CI 1.25 - 2.08). The incidence rate of HCV seroconversion increased from 0.57 per 100 PYFU (95% confidence interval [CI] 0.07 - 2.05) in 2006-2008 to 3.90 per 100 PYFU (95% CI 2.77 - 5.33) in 2015-2017.

In the multivariable Cox regression analysis, HIV transmission via men having sex with men and sexual and intravenous drug injection, HIV diagnosis in the recent periods of 2012-2014 and 2015-2017, diagnosis of AIDS-defining illness within one year of HIV diagnosis, and self-reported history of using recreational or illicit drugs were associated with increased risk of incident HCV infection.

CONCLUSIONS: An increasing trend of incident HCV infection was seen in HIV-infected men. Preventive interventions such as risk-stratified screening, regular testing and treatment, and behavioural intervention programmes should be targeted at HIV-infected individuals with the risk factors identified to be associated with acquisition of HCV infection.

TUPEB174

Use of the HCV-MOSAIC risk score for identification of hepatitis C virus (HCV) reinfection in HIV-infected men who have sex with men (MSM)

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BACKGROUND: After successful treatment or spontaneous clearance of HCV-infection, HCV-reinfection occurs frequently in HIV-infected MSM. The HCV-MOSAIC risk score has been previously validated for identifying HIV-infected MSM at high-risk for acute HCV-infection. We aimed to determine whether this score is useful to predict for HCV-reinfection in this population.

METHODS: The HCV-MOSAIC risk score is calculated by summing coefficients specific to six self-reported risk factors when present: receptive condomless anal sex < 6 months (beta 1.1), sharing sex toys < 6 months (beta 1.2), unprotected fisting < 6 months (beta 0.9), injecting drug use < 12 months (beta 1.4), sharing straws during nasally-administered drug use < 12 months (beta 1.0), and ulcerative sexually transmitted infection < 12 months (beta 1.4). A score of ≥ 2.0 was the optimal cut-off point for acute HCV-infection. For this study, HIV-infected MSM with HCV-reinfection (cases) were compared to those without reinfection (controls) and a follow-up ≥ 6 months using data from the Dutch MOSAIC study (2009-2017). Area under the ROC curve (AUC) was estimated and the optimal cut-off point was determined along with its sensitivity, specificity, and the proportion to be tested.

RESULTS: Of 111 HIV-infected MSM included with a history of cured HCV-infection, 28 were cases, with ≥ 1 HCV-reinfection(s), and 83 were controls. Median age was 47.0 years (IQR=41.4-51.3) and 83.6% were born in the Netherlands. Cases versus controls were more likely to engage in receptive condomless anal sex (85.7% vs. 53.0%), sharing sex toys (46.4% vs. 16.9%), unprotected fisting (46.4% vs. 19.3%) and injecting drug use (17.9% vs. 3.6%) [all $p < 0.05$]. Median HCV-MOSAIC risk score was 2.5 (IQR=1.15-3.4) for cases and 1.1 (IQR=0-2.3) for controls ($p < 0.001$). AUC for HCV-reinfection was 0.76 and optimal cut-off was ≥ 1.2 . At this cut-off, sensitivity was 75.0%, specificity 62.7%, and proportion to be tested 46.8%.

CONCLUSIONS: The HCV-MOSAIC risk score can identify individuals at high-risk of HCV-reinfection with comparable accuracy to that of primary acute HCV-infection, for which the score was originally developed. Given that the optimal cut-off point was lower for reinfection, the score would need to be adapted for guiding HCV-RNA testing in MSM with a history of HCV-infection.

TUPEB175

Self-reported risk factors to better predict HCV infection in general population

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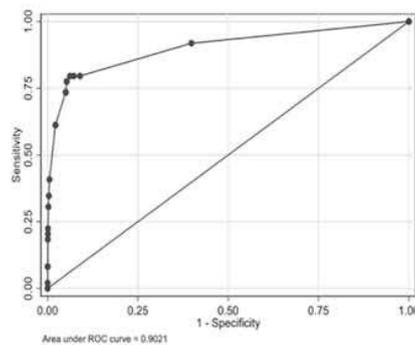
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BACKGROUND: Currently there is a high percentage of undiagnosed HCV-infected population. Screening recommendations according to the clinical guidelines have not been fully effective. Our objective is to evaluate which self-reported risk factors are associated with higher infection rates, in order to create a prediction model that can be used in routine clinical practice.

METHODS: Sub-analysis of the DRIVE03 study (NCT03145753), which was carried out in 4 Health Centers of Madrid (Spain), in which non HIV-infected patients aged between 18-70 years were prospectively included. After completing an HIV/HCV risk of exposure and indicator conditions questionnaire, HCV screening was performed using rapid tests in those with at least one positive response in HCV-related questions, and in all those aged 50 to 70 years old, even if they did not have any positive answer. A multivariable model was created, including those variables that showed the greatest association with HCV infection in the univariate analysis.

RESULTS: A total of 4705 HCV tests were performed, of which 46 (0.98%) were positive. Eight out of 22 questions showed a significant association with the positive result of the HCV test. In addition, male gender was associated with a higher proportion of HCV-positive results. Being over 50 years old was not identified as an independent risk factor for HCV infection in our cohort. In the multivariate analysis, male gender, three questions related to risk of exposure and one indicator condition were associated with an HCV positive result. The final model showed an area under the ROC curve of 0.902 (Figure 1).

Questionnaire items answered as "yes"	Adjusted OR (CI95%)	p
Have you ever had an HIV or HCV-infected partner?	9.22 (3.49-24.36)	.000
Have you received any hemoderivate transfusion before 1990?	2.68 (1.05-6.89)	.040
Have you ever used parenteral illicit or recreational drugs?	13.91 (4.39-44.05)	.000
Have you had hepatitis or unexplained liver disease?	32.98 (16.67-65.24)	.000
Male gender	2.36 (1.24-4.50)	.009



[Figure 1. Best HCV infection predictors in a multivariable regression analysis.]

CONCLUSIONS: Five easily self-reported exposure risk factors and clinical conditions accurately identified HCV infected patients. The use of a structured questionnaire could be a useful strategy for directing HCV screening in the general population and contribute to its eradication.

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TUPEB176

Hepatitis C virus co-infection and the risk of peripheral artery disease among HIV-infected patients: Population-based studyJ. Asubonteng, K. Flower, S. Verma, R. Mera-Giler
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BACKGROUND: Among HIV-infected patients, the association of hepatitis C virus (HCV) co-infection and peripheral arterial disease (PAD) remains unclear.

METHODS: Data were extracted from a large administrative health care claims database of commercially insured patients in the United States between 2008 and 2018. Demographic and clinical characteristics of the HIV cohort were evaluated. All patients were followed for the incidence of PAD or until the end of 2018. The Cox proportional regression model was used to evaluate the events of PAD by HCV status among HIV-infected patients.

RESULTS: A total of 148,149 HIV-infected patients, 4.52% of whom were HCV co-infected (HIV/HCV), contributed 316,094 person-years of follow-up. HCV co-infection was associated with higher rates of hypertension (23.49% in HIV/HCV vs. 17.45% in HIV-only patients; $P < 0.0001$), congestive heart failure (4.39% vs. 1.41%; $P < 0.0001$), chronic renal insufficiency (7.06% vs. 3.08%; $P < 0.001$), type 2 diabetes (10.59% vs. 5.51%; $P < 0.0001$), hypercholesterolaemia (13.55% vs. 5.62%; $P < 0.0001$), dyslipidaemia (19.24% vs. 12.05%; $P < 0.0001$), drug abuse (11.68% vs. 7.35%; $P < 0.0001$) and smoking (12.93% vs. 8.22%; $P < 0.0001$). The rates of PAD were significantly higher among HIV/HCV co-infected patients when compared to HIV-monoinfected patients: 4.9 vs. 2.8 events per 100 person-years, respectively. In an adjusted multivariate model, after controlling for type 2 diabetes, hypertension, age, calendar year of exposure to antiretroviral therapy, and other risk factors for PAD, hazard ratios (HRs) among those with HIV/HCV vs. HIV was 1.24 [95% confidence interval (CI): 1.11-1.39]; $P < 0.0001$). Congestive heart failure (HR 1.76; $P < 0.0001$), chronic renal insufficiency (HR 1.64; $P < 0.0001$), drug abuse (HR 1.18; $P = 0.0267$), and calendar year of exposure to antiretroviral therapy (HR 0.82; $P < 0.0001$) were significantly associated with greater risk of PAD in the adjusted model.

CONCLUSIONS: In the era of direct-acting antivirals and highly active antiretroviral therapy, HCV co-infection was associated with a significant risk of PAD among HIV-infected patients.

TUPEB177

Characteristics of patients diagnosed with hepatitis C across different care settings: Implications for improving diagnosis and linkage to careD.C.S. Im¹, S. Reddy², C.A. Hawkins², S.R. Galvin²
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BACKGROUND: Chronic hepatitis C virus (HCV) infection is a significant public health problem. Similar to HIV, prompt diagnosis and linkage to care (LTC) are the critical first steps in the care continuum. Therefore, strategies to identify larger numbers of undiagnosed chronic HCV infection and effectively link them to care are needed. We compared characteristics, treatment and LTC rates among individuals with chronic HCV in different health care settings to understand if these populations differ in screening positivity and LTC.

METHODS: Retrospective chart review study of newly diagnosed HCV antibody positive patients from 2015 to 2018 within settings of acute care, inpatient and outpatient in one health system. LTC was defined as having attended at least 1 referral visit to Infectious Diseases or Hepatology within the study period.

Treatment rate was defined as those who were eventually started on HCV medication per prescription history. LTC and treatment rate were analyzed only for HCV RNA positive patients. Chi-square, one-way ANOVA and logistic regression were used to look to compare the characteristics of the 3 care settings. Acute care patients were excluded from multivariate analysis due to low sample size.

RESULTS: 43, 368 and 1159 anti-HCV+ individuals were identified in acute care, inpatient and outpatient respectively. Rates of RNA positivity in acute, inpatient and outpatient were 47.83%, 60.34% and 29.18% respectively. A higher proportion of HCV+ individuals were identified in the birth cohort 1945-65 in inpatient and outpatient than acute care (39.5% acute, 60.60% inpatient and 64.80% outpatient, $p = 0.002$). Rates of LTC were 27.27%, 30.11% and 64.98% in acute, inpatient and outpatient respectively ($p < 0.00001$). The eventual HCV treatment rates were 18.18%, 23.86% and 62.96% respectively during study period. After adjusting for age, insurance type, race, and gender, outpatients had higher odds of LTC and of treatment rate (OR 4.691 [2.935, 7.616] and 4.51 [2.829, 7.284]).

CONCLUSIONS: Overall, LTC rates were low in acute and inpatients. Prior studies have shown that LTC coordinators and the provision of integrated service for specialty care can improve LTC. We speculate that use of these strategies may optimize LTC and treatment rate in these settings.

TUPEB178

Association between tenofovir disoproxil fumarate exposure and reduced bone mineral density in a cohort of HIV-positive patients: Results from 21 years of follow-upM. Dakou^{1,2}, H.T. Trottier², N. Machouf^{2,3}, S. Dufresne³, F. Laplante³, B. Lessard³, M.N. Sangare⁴, J.-G. Barril^{2,3}
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BACKGROUND: With HAART, HIV infected individuals are living at least 30 years beyond their age at diagnosis, thus increasing the probability of developing problems with bone density. Tenofovir Disoproxil Fumarate (TDF) has been associated with a greater risk of bone loss at lumbar and hip locations. Studies on BMD and the use of TDF and/or PIs are limited because of short-follow up periods ranging from 96 weeks to 168 weeks, very few studies explore the combined effect of TDF+PIs.

METHODS: We used data from an open cohort of 2587 HIV-infected patient seen at the Clinique Médicale du Quartier Latin in Montreal. Data have been collected since July 1997.

We performed an extended Cox model for estimating the risk of osteoporosis and osteopenia considering the exposure to TDF. We explored the recent exposure to TDF at 6 months and 12 months. The study was approved by the ethics committee of McGill University.

RESULTS: Of 2587 patients, 582 patients > 50 yo, had at least one T score between January 2002 and March 2018. Median length of Duration of HIV infection was 15.5 years, median age at T-score test date was 57 years, 97.94% were male, 89.18% were homosexual, 32.82% were smoker, 10.82% were drug user.

Any exposure to TDF+PIs increased the risk of osteoporosis by 152% (adjusted HR, 2.52 [1.48, 4.27]; $P = 0.0006$) compared with patients unexposed to TDF. Any TDF exposure without PIs has no statistical significant risk of osteoporosis (adjusted HR, 1.57 [0.81, 3.04]; $P < 0.1771$) compared to patients unexposed to TDF, but recent TDF exposure within 6 months increased the risk of both osteoporosis by 64% (adjusted HR, 1.64 [1.06, 2.55]; $P = 0.0279$) and osteopenia by 49% (adjusted HR, 1.49 [1.21, 1.83]; $P = 0.0001$) compared with patients unexposed to TDF.

We did not find any significant association between osteoporosis and the biomarkers such as Fe PO₄, albumin/creatinine, TSH, PTH, C-, Vitamin D and testosterone in men.

CONCLUSIONS: Any past exposure to TDF + PIs contributes to more osteoporosis than other antiretroviral regimens but not exposure to TDF alone although when limited to recent exposure TDF is correlated with osteopenia and osteoporosis.

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TUPEB179

Treatment outcome of simplified HCV testing and generic sofosbuvir/velpatasvir in Myanmar (USAID/EQUIP project)

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BACKGROUND: Hepatitis C Virus (HCV) and HIV Co-infection is high amongst key population groups including People Who Use Drugs (PWIDs). Access to HCV testing and treatment is costly and limited due to low income, stigma and discrimination or fear. We explored simplified HCV testing and direct acting antiviral (DAA) sofosbuvir/velpatasvir (SOF/VEL) treatment for those with HCV infection with or without HIV co-infection in Myanmar.

METHODS: Participants were screened for HCV/HIV/HBV, and HCV viral load. Pangenotypic treatment with generic oral SOF/VEL with or without ribavirin (RBV) for 12 weeks was provided. Genotyping was performed using ABL DeepChek-HCV genotyping assay. A subset of participant samples was tested for HCV RNA compared three methods (Roche Amplicor-HCV, GeneXpert-HCV and ABL UltraGene-HCV) with Roche as gold standard at baseline and 24 weeks. The primary outcome was sustained virologic response at 12 weeks after treatment (SVR12). All patients were monitored for adverse events.

RESULTS: Of 1007 HCV antibody positive participants screened for treatment, 88.4% were HCV RNA positive; 47.9% were HIV/HCV; 2.4% were HCV/HBV and 2.5% were HIV/HCV/HBV co-infected. The median (IQR) age was 44.6 years (36.6, 54.1), 81% male, 70% rural, 42% PWID and 61% of these were on opioid substitution therapy. A total of 803 were initiated on SOF/VEL +/- RBV and to date 722 (89.9%) have completed 12-week treatment with 9 early treatment discontinuations. The common genotypes (N=347 to date) were 3 (45.2%) and 6 (43.9%), with 3b (35.4%) and 6n (24.5%) the most common subtypes. By intention to treat analysis, the overall SVR12 rate is 94.6% for 483 participants with primary endpoint to date. No treatment related serious adverse events were reported. GeneXpert and ABL assays were 100% sensitive and specific compared to Roche for detection of HCV RNA at both baseline and 12 weeks after treatment. There was perfect agreement and high correlation between the assays for quantitative HCV viral load.

CONCLUSIONS: Generic SOF/VEL was highly effective regardless of HCV genotype and HIV and HBV co-infection. Alternative diagnostic point of care and conventional testing (Gene-Xpert and ABL UltraGene-HCV) accurately detected HCV RNA.

TUPEB180

Correlates of unsuccessful HCV therapy: HIV co-infected vs. HCV mono-infected people who use drug (PWUD)

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BACKGROUND: People who use drugs (PWUD), especially those co-infected with HIV, are among the prioritized populations to receive hepatitis C virus (HCV) therapy, with current all oral directly acting antiviral (DAA) therapies achieving cure rates similar to those achieved in other populations. There remain concerns about treatment failure (for both virologic and non-virologic reasons) in this group, and an urgent need to identify specific factors that may be associated with such treatment failure.

METHODS: We undertook a retrospective mixed method analysis of PWUD receiving HCV treatment at our centre between 03 / 14 - 12 / 17. The primary outcome was achievement of a sustained virologic response (SVR), or cure. Statistical analyses to define predictors of non-SVR were conducted using Chi square and logistic regression models with SPSS IBM V24.

RESULTS: There were 215 patients eligible for evaluation, 32 co-infected with HIV (32/32 with full response to antiretroviral therapy), with 39 % active drug users (n = 83). There were more males among the HIV co-infected group (90.6%; 29/32 vs. 71.6%; 131/183, p = 0.023). During the 282.7 patient-years of follow-up among 215 patients, there were 19 (8.8%) cases where SVR was not achieved: loss to follow-up (5), incomplete treatment (5), virologic failure (9). There were no cases of recurrent viremia post-SVR. SVR was achieved in 91.8% (168/196) mono-infected versus 87.5% (28/32) co-infected individuals (p=0.496). Homelessness was the most significant independent correlate of an inability to achieve SVR [OR: 8.92; CI: 95 % (2.88 - 27.69); p ≤ 0.0001]. HIV co-infection was not associated with a risk of unsuccessful HCV treatment.

CONCLUSIONS: High SVR rates were documented among PWUD receiving all oral HCV therapies, with no significant difference between mono-infected and HIV co-infected individuals. In our analysis, homelessness was the key predictor of non-SVR. Multidisciplinary programs managing HCV infection and HIV co-infection in this population must include strategies to address unstable housing to enhance their success and impact.

TUPEB181

Predictors of decreasing bone mineral density after switching from TDF to TAF in Japanese subjects with HIV

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BACKGROUND: Antiretroviral regimens containing tenofovir disoproxil fumarate(TDF) have been reported to be associated with reduced bone mineral density (BMD) and switching from TDF to Tenofovir alafenamide (TAF) has been reported to recover BMD. But no study was reported focused on Asian population. Recently TDF was quickly replaced by TAF in Japan, however, we often encountered patients' BMD continued to decrease after switching from TDF to TAF. Therefore, we performed retrospective analysis to evaluate the change of BMD after switching from TDF to TAF, the proportion of patients who continued to decrease BMD.

METHODS: We examined the BMD in lumbar spines, total hip and femoral neck before and 12 months after switching by using the same DEXA scan among HIV-infected patients who changed from TDF to TAF between January 2017 and December 2017 in IMSUT hospital, the University of Tokyo. Also the data, including age, sex, nationality, mode of HIV transmission, the year of HIV diagnosis's, duration of TDF use, height, weight, CD4 count, HIV-RNA, kidney function and bone turnover markers were collected.

RESULTS: 52 Japanese HIV-infected subjects were examined BMD.96.2% were male, median age, height,body weight were 47.0, 170.5cm, 70.1kg, respectively. Median duration after HIV diagnosis and use of TDF were 9.0 years,8.0 years, respectively.Median CD4 count was 517/μl and all were under 50 copies/ml in HIV-RNA. At the baseline, subjects with osteopenia and osteoporosis were 1(1.9%),28 (53.8%),respectively. By comparing BMD at two time points, median percent change in spines and total hip were1.962 and 0.953, respectively, however, that in femoral neck was -0.525 and it was statistically significant from other two sites(p=0.006,0.01). There was the tendency the group with decreased BMD in three sites had longer exposure of TDF, shorter height and lower intact PTH, higher%TRP compared with those with increased BMD in all sites.Also there was a tendency of low baseline TRACP5b and total P1NP.
CONCLUSIONS: In addition of previous reports,PLWHIV in Japan showed continuing BMD loss after switching TDF to TAF especially those with shorter height and lower weight.

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Human papillomavirus

TUPEB182

High risk human papillomavirus oral infection in people with HIV/AIDS, before and after combined antiretroviral therapy initiation

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BACKGROUND: The incidence of oral and oropharyngeal high risk human papillomavirus (HR-HPV) infection has increased among HIV/AIDS patients in the post-cART (combined antiretroviral therapy) era; it has been also described a higher susceptibility to HR-HPV persistence. The aim of the present study was to assess the prevalence, incidence, persistence and/or clearance of oral and oropharyngeal HR-HPV infection among treatment-naive HIV/AIDS subjects at baseline and at three-month visit after cART.

METHODS: Longitudinal, observational, and analytical study performed in a cohort of HIV/AIDS subjects in Mexico City (February 2018-August 2018). The study was approved by institutional committees. Demographic and clinical data were registered. At the baseline and three-month visits, an oral examination and oropharyngeal rinse were collected using 10 ml Scope[®] mouthwash. DNA was obtained, quantified and analysed by PCR reactions using HPV-L1 consensus primers (GP5+/GP6+), HPV-LCR and HPV-E6 regions for specific HPV-16 and HPV-18 (LCR7450F/LCR813R, F7405/R165, F240/R419 and HZ30/E65'). The statistical analysis was performed with SPSS v.22 software.

RESULTS: Fifty-five HIV/AIDS individuals were included, 52/94.5% men, median age: 27 (Q₁-Q₃: 24-35) years, with a median time of HIV-diagnosis of 30 (Q₁-Q₃: 13-114) days.

The median CD4+ count was 234 (Q₁-Q₃: 108.5-372) cell/mm³, and a mean Log₁₀ viral load of 4.7 (Q₁-Q₃: 4.3-5.3) copies/ml. HPV and HR-HPV prevalence was 31% and 9.1% (HPV-18: 5.4%, HPV-16: 3.7%), respectively.

The three-month overall HPV-incidence was 11.8% (HR-HPV: 5.9%), HPV persistence and clearance were low (< 6%). The prevalence of HPV-oral lesions was 7.3%, none malignant.

CONCLUSIONS: Although overall HPV-prevalence was relatively high in HIV/AIDS treatment-naive individuals, the HR-HPV infection was low, similarly to the values observed at three-month evaluation, when the incidence and persistence of HR-HPV infection were still low. Additionally, it is essential to emphasize the lack of association of HPV and HR-HPV infection with the presence and development of HPV-oral lesions.

TUPEB183

Incidence rate of high-grade anal squamous Intraepithelial Neoplasia (HG-AIN) among HIV-infected and high risk men who have sex with men (MSM) in resource-limited settings

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BACKGROUND: An increasing incidence of anal cancer has been observed in MSM. No data on histologically diagnosed HG-AIN among MSM are available from resource limited settings. We investigated the risk of progression to HG-AIN among Brazilian MSM.

METHODS: A longitudinal analysis of the INI/FIOCRUZ Men's Cohort was performed. Sexually active men aged ≥18 years without history of anal cancer were evaluated for AIN through liquid-based anal cytology and high-resolution anoscopy with biopsy, when indicated. MSM who presented with HSIL and/or HG-AIN at baseline were excluded. The incidence rates and cumulative risks of cytological HSIL and/or histological HG-AIN

were assessed for all MSM and stratified by HIV-serostatus, regardless of and also according to cytology and histology at baseline, using Nelson-Aalen analysis.

RESULTS: Thirty-one incident cases of HSIL/HG-AIN were identified among 273 MSM over 660 person-years (PY) of follow-up. This corresponded to 4.7 cases/100PY [95% Confidence Interval (CI): 3.3-6.7]: 3.9/100PY (95%CI: 1.9-8.3) vs. 5.0/100PY (3.3-7.4) in HIV-negative and -positive MSM, respectively. The cumulative incidence of HSIL/HG-AIN among all MSM was 2% (95%CI: 0.8-4.8), 7% (95%CI: 4.1-12), and 12.5% (95%CI: 8.1-19.6) at 12, 24, and 36 months of follow-up, respectively. A higher cumulative incidence was observed among HIV+MSM only in the second year [HIV+MSM: 7.4% (95%CI: 4.1-13.5) vs. HIV-MSM: 5.9% (95%CI: 1.9-18.3)]. HSIL/HG-AIN incident rate of 1.4/100PY (95%CI: 0.6-3.1), 9.2/100PY (95%CI: 5-17.2) and 11.8/100PY (95%CI: 7.1-19.6) were observed, respectively, among MSM with normal ASC-US and LSIL in baseline cytology. Among those with normal cytology, a high cumulative incidence was observed in the third year of FU (5.2%; 95%CI: 2.1-12.6) compared to 1.7% (95%CI: 0.4-6.7) in the second year; no cases were identified in the first year. Among MSM with baseline ASC-US, we observed cumulative incidences of 8% (2.6-24.9), 15.2 (6.3-37.1) and 19.8 (8.7-45), respectively, at 12, 24 and 36 months. Of note, higher outcome cumulative incidences were observed in the second (18%; 95%CI: 8.7-39.5) and the third year (33.1%; 95%CI: 17-64.6) of FU.

CONCLUSIONS: The rate of progression to HSIL/HG-AIN varies according to baseline cytology and years of FU. The highest rates were observed among MSM with ASC-US and LSIL at baseline at the second and third years. Screening strategies for anal cancer should be designed according to baseline cytology findings.

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Genotypic diversity of anal HPV amongst HIV-infected women reporting for routine cervical cancer screening in Harare, Zimbabwe

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BACKGROUND: Over 80% of anal cancers are associated with human papillomavirus (HPV). HIV-infected individuals are at increased risk because of poor clearance of HPV in the immunosuppressed. Most researches have focused on men-who-have-sex-with-men, yet the anatomy of women also allows for the spread of HPV from the vaginal area to the anus even without practicing anal intercourse. There is generally paucity of data on anal HPV infection, especially among women from HIV prevalent settings. The aim of the study was to determine the type specific prevalence of HPV in the anal canal of HIV infected women reporting for routine cervical cancer screening.

METHODS: A cross sectional study performed at a tertiary hospital visual-inspection- with-acetic-acid clinic (VIA), in Harare, Zimbabwe. Women aged ≥18 years, reporting for routine cervical cancer screening, were recruited. A trained nurse collected anal swabs from the women. HIV testing was carried out using Alere Determine™ HIV-1/2. HPV detection and genotyping were performed using next generation amplicon sequencing of a 450bp region of the L1 gene. HPV results were grouped by HIV status and analysed on R-Studio.

RESULTS: A total of 300 women were recruited and 151/300 (50%) were HIV-infected, of which 47/151 (31%) were HPV positive. A total of 32 HPV genotypes were detected in this group of women. The most common genotypes were HPV 52 (17%), HPV 16 (13%) and HPV 62 (13%). Twenty-four (51%) women had multiple HPV infections.

CONCLUSIONS: The distribution of HPV genotypes in the anus of these women was diverse. Two of the most common genotypes were high-risk. A high proportion of the women had multiple infections, which puts them at risk of persistent HPV infection and development of cancer. Routine anal HPV screening is recommended in a high HIV prevalent setting, to prevent persistent infections and anal cancers.

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Syphilis and other sexually transmitted infections

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Factors associated with sexually transmitted infections among HIV-positive clients in same-day antiretroviral therapy cohort in Bangkok, Thailand

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BACKGROUND: Sexually transmitted infections (STIs) such as syphilis and hepatitis have a well-known association with HIV diagnosis. Although mostly asymptomatic or mildly symptomatic, clinical signs/symptoms of these STIs could be a main reason bringing individuals forward to HIV testing. In this study, we explored factors associated with STI co-infection among HIV-positive clients who accessed same-day antiretroviral therapy (SDART) services at the largest HIV testing clinic in Bangkok, Thailand. **METHODS:** Data were collected during July 2017-November 2018 from SDART clients at the Thai Red Cross Anonymous Clinic. Clients were asked to choose at least one of the following reasons for accessing HIV testing: (1) unprotected sex, (2) having partners with high-risk behaviors, (3) purchasing sex, (4) selling sex, (5) suspected symptoms of acute HIV infection or other STIs, including syphilis and hepatitis, (6) abnormal blood tests from elsewhere, (7) injecting drugs. Logistic regression models were carried out to determine factors relating to STI co-infections.

RESULTS: Of 2,562 HIV-positive clients (69.4% were men who have sex with men [MSM], 5.15% transgender women [TGW], and 25.4% general population) who entered into the SDART cohort, 74.6% initiated ART on the same day as HIV diagnosis and an additional 20.8% started ART within the next seven days. Syphilis was the most common STI co-infection (18.1%; 22.54% of MSM, 24.24% of TGW, and 4.61% of general population, $p < 0.001$), followed by hepatitis C (3.1%; 3.59% of MSM, 0.30% of TGW, and 1.69% of general population, $p = 0.078$). In multivariable model, being MSM (OR 5.07, 95%CI 3.41-7.55, $p < 0.001$) and being TGW (OR 5.65, 95%CI 3.24-9.86, $p < 0.001$) increased the risk of syphilis. Reporting abnormal symptoms increased risks of syphilis (OR 1.99, 95%CI 1.33-2.99, $p < 0.001$) and hepatitis C (OR 2.36, 95%CI 1.10-5.07, $p = 0.027$).

CONCLUSIONS: Almost one-fifth of clients initiating ART in the clinic were co-infected with syphilis. HIV-positive MSM and TGW were disproportionately affected by syphilis. Screening for STIs should always be integrated into ART initiation services, especially for MSM, TGW, and those who present with abnormal symptoms. Not doing so will result in a missed opportunity to test and treat other STIs.

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Clinical prediction of neurosyphilis in HIV-infected patients with early syphilis

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BACKGROUND: Worldwide, in the last decade there has been a rebound in the incidence of syphilis. In Mexico, the real number of new cases of syphilis in the general population and in HIV+ patients is unknown, as well as the frequency of complications, such as Neurosyphilis (NS). The diagnosis of NS is a challenge, since Asymptomatic NS is present in a large proportion in HIV+ patients and the criteria for deciding when to perform a lumbar puncture (LP) in HIV infected patients with syphilis, is still controversial. Due to the above we performed a retrospective study in order to identify clinical risk factors for the presence of Neurosyphilis in HIV Infected Patients with Early Syphilis.

METHODS: A demographic, clinical, and laboratory data from 128 HIV positive patients with documented early syphilis who underwent a LP in order to diagnose neurosyphilis (NS) were retrospective analyzed between January 2004 to November 2018. NS was defined by a positive cerebrospinal fluid (CSF) VDRL test, and CSF white blood cell count of >20 cells/ μ L.

RESULTS: Fifty-seven of the 128 evaluated HIV positive patients had NS; of which 66.6% (38) were asymptomatic. Presence of general symptoms related to syphilis had an OR 3.4 (1.4-8.3), $p = 0.009$, headache OR 5.06 (1.02-24.92), $p = 0.045$, blood VDRL $>1:32$ OR 3.5 (1.37-8.9), $p = 0.007$. Viral load and CD4 T cell count did not increase the risk of NS in our population.

CONCLUSIONS: Presence of symptoms, particularly headache, and VDRL $>1:32$ increased the risk of NS in HIV infected patients with early syphilis; while CD4 T cell count and viral load should not be used as the sole criterion for deciding whether to perform a LP in early syphilis.

Other bacterial, viral and parasitic infections

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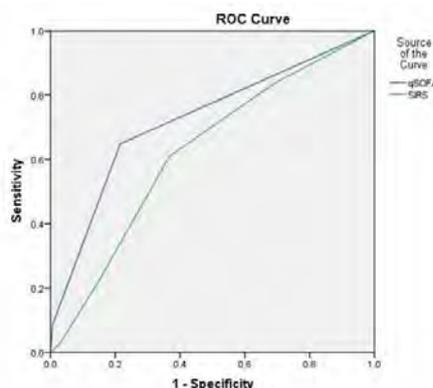
Quick Sequential Organ Failure Assessment score predicts mortality among hospitalized patients with HIV/AIDS

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BACKGROUND: The predictive value of quick Sequential (Sepsis-Related) Organ Failure Assessment (qSOFA) score has not yet been well-evaluated in patients with HIV/AIDS.

METHODS: The study was carried out in a reference HIV clinical center in China, from Jan 2014 to Dec 2017. A retrospective analysis was done in hospitalized HIV/AIDS patients. Case group was composed of all patients died in hospital and control group was selected from patients who survived during hospitalization. Control group was paired with case group in age, gender and CD4 count on admission. Etiology of co-infections was categorized into common bacteria, mycobacterium, fungus and others. The associations between qSOFA score, SIRS score, etiology of co-infections, ART experience and hospital mortality were measured.

RESULTS: Among 2328 HIV/AIDS patients with suspected co-infection, 128 (5.5%) died in hospital. In multivariate analysis, qSOFA score ≥ 1 was associated with increased risk of hospital mortality (64.8% vs 20.9%; odds ratio, 3.2 [95% CI, 2.3-4.1]); $P < 0.001$. A SIRS score ≥ 2 was associated with a smaller increase in hospital mortality (60.9% vs 36.6%; odds ratio, 1.6 [95% CI, 1.2-2.0], $P < 0.001$). Etiology of co-infections was not associated with hospital mortality. Usage of ART before admission was a protective factor against hospital mortality. qSOFA discrimination [area under the receiver operating characteristic curve [AUROC], 0.73 [95% CI, 0.69-0.77]] was superior to that of SIRS (AUROC, 0.62 [95% CI, 0.59-0.65]; $P < .01$). qSOFA score ≥ 1 yielded a sensitivity of 64.8% and a specificity of 79.1%. While qSOFA score ≥ 2 yielded a sensitivity of only 7.3% and a specificity of 94.9%.



[qSOFA vs SIRS in predicting mortality among HIV infected patients]

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CONCLUSIONS: The qSOFA score performed better in identifying HIV patients with suspected coinfection who at risk of hospital mortality, compared with SIRS score. qSOFA score ≥ 1 presents a good sensitivity and acceptable specificity. Still, further research is needed to improve the early recognition of high-risk patients among this population.

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Schistosomiasis is not a strong risk factor for HIV acquisition in four prospective cohorts: A nested case-control analysis

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BACKGROUND: Worldwide, approximately 200 million people have schistosomiasis, 90% of whom live in sub-Saharan Africa. Several cross-sectional studies, hypothesizing that inflammation and mucosal damage from schistosome ova increased HIV-1 susceptibility, found strong associations between schistosomiasis and HIV-1 infection. We evaluated this association using data from four large prospective African cohorts.

METHODS: Data were from three longitudinal cohorts of heterosexual HIV-1 serodiscordant couples (Partners in Prevention HSV/HIV Transmission Study, Couples Observational Study, Partners PrEP Study) and one female sex worker (FSW) cohort (Mombasa Cohort). Cases were individuals who acquired HIV-1 during prospective follow-up; three controls were selected for each case. The presence of circulating anodic antigen (CAA; lower-limit 10 pg/mL) in archived serum, collected prior to HIV-1 seroconversion, identified participants as having active schistosomiasis; species-specific immunoblots determined the schistosome species causing the infection. Data from the serodiscordant couples cohorts were pooled while the FSW cohort was analyzed separately to allow for appropriate confounder adjustment.

RESULTS: In the HIV serodiscordant couples cohorts, 245 HIV-1 seroconverter cases and 713 controls were assessed; in the FSW cohort, there were 330 HIV-1 seroconverters and 962 controls. The prevalence of active schistosomiasis was 20% in the serodiscordant couples cohorts (14% *S. mansoni*, 4% *S. haematobium*) and 22% in the FSW cohort (18% *S. mansoni*, 6% *S. haematobium*). In the serodiscordant couples cohorts, we found no association between schistosomiasis and HIV-1 acquisition risk among males (aOR=0.99, 95% CI 0.59-1.67) or females (aOR=1.21, 95% CI 0.64-2.30). Similarly, we found no association in the FSW cohort (aIRR=1.11, 95% CI 0.83-1.50). Exploring species-specific effects, there was no statistically significant association between *S. mansoni* infection (serodiscordant couples: aOR=0.90, 95% CI 0.56-1.44; FSW: aIRR=0.83, 95% CI 0.53-1.20) or *S. haematobium* infection (serodiscordant couples: aOR=1.06, 95% CI 0.46-2.40; FSW: aIRR=1.64, 95% CI 0.93-2.87) and HIV acquisition risk. In sensitivity analyses, high intensity infections (defined as CAA ≥ 1000 pg/mL) were also not associated with increased HIV-1 risk.

CONCLUSIONS: In the largest analysis of schistosomiasis and HIV-1 acquisition to date, schistosomiasis was not a strong risk factor for HIV-1 acquisition in four prospective studies among women and men from East Africa.

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Cross-talk between *H.pylori* and gastric microbiome among people living with HIV

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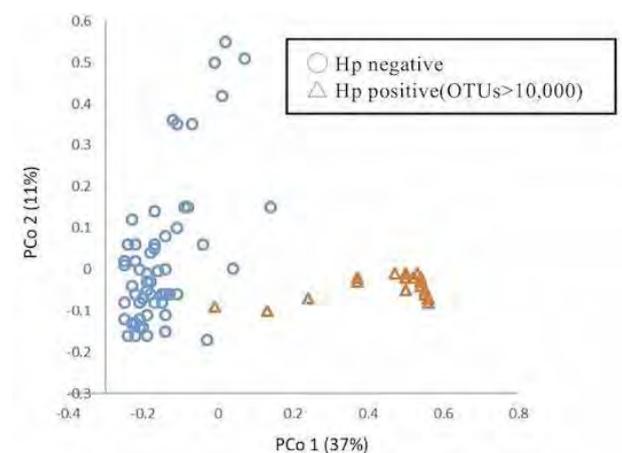
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BACKGROUND: Gut immunity of people living with HIV (PLWH) is deficient from the early stage of infection. Some reports showed that HIV coinfection inhibits *Helicobacter pylori* (*H.pylori*) infection and progress of chronic gastritis, but the role of direct (microbiome-mediated) colonization resistance (CR) or indirect (host immune-mediated) CR to regulate gastric microbiota is not clear. The aim of this study is to elucidate the cross-talk between *H.pylori* and gastric microbiome in PLWH.

METHODS: We conducted a prospective cross-sectional study of 127 PLWH who underwent upper gastrointestinal endoscopy from April 2014 to March 2017 in our institute. Obtained biopsy specimens were used for classification of histologic gastritis by the updated-Sydney system and bacterial 16S ribosomal RNA amplicon gene sequencing on the Illumina MiSeq platform. We analyzed the amount of microbial DNA (richness), the estimated number of species (α -diversity) and microbial community composition (β -diversity)

RESULTS: *H.pylori* sequences were detected from all analyzed samples and the observed Operational taxonomic unit (OTU) richness is positively correlated with histological diagnoses of *H.pylori*. The chao-1 estimates showed that the α -diversity was lower in *H.pylori* positive (>10,000 OTUs) samples than in *H.pylori* negative samples. The principal coordinates analysis using UniFrac distance revealed that the β -diversity was significantly different between *H.pylori* positive and negative samples (Fig). On the contrary, the β -diversity was not associated with present CD4 counts, nadir CD4 counts, the history of AIDS. The β -diversity of microbiome except *H.pylori* was not associated with the advance of immunodeficiency.

CONCLUSIONS: This is the first to examine the association of gastric microbiome with the advance of immunodeficiency in PLWH. *H.pylori* robustly affect diversity of gastric microbiome in PLWH, but alternations in microbial communities are not observed in PLWH with lower CD4 cell count. Our data offer a possibility that direct CR play a key role in the colonization of *H.pylori*, compared with indirect CR.



[Fig. *H. pylori* infection alters the β -diversity]

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Bloodstream infection (BSI) in HIV-infected and HIV-uninfected patients in a tertiary hospital in Barcelona, Spain: A 16-year comparative study

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BACKGROUND: Bacterial infections are frequent in HIV-infected patients. The objective of the study was to compare the etiology, source, and prognosis of BSI between HIV+ and HIV- patients.

METHODS: During the studied period, 2000-2016, all admitted patients with bacteremia were prospectively followed in a tertiary Hospital, in Barcelona, Spain. Contaminated blood cultures were excluded. Healthcare-associated was considered when BSI developed 3 days after admission or was related to previous medical procedures. The crude in-hospital mortality was considered. Chi-square was used to compare proportions. Regression logistic model was used to calculate the risk of death.

RESULTS: A total of 10274 episodes of BSI were identified, 9661(94%) in HIV- and 613 (6%) in HIV+ patients. Healthcare-associated BSI was considered in 4144 in HIV- and 169 in HIV+ patients. Community-acquired was recognized in 5,517 HIV- and 444 HIV+. Significant differences in the etiology and source of infection were found between both groups.

The most frequent sources of BSI in HIV- were: urine 3050 (31.6%), abdominal 1664 (17.2%), primary/unknown 1298 (13.4%) and catheter-related 1267 (13.1%); and in HIV+: respiratory 186 (30.3%), primary/unknown 124 (20.2%), urine (10.4%) and catheter-related 49 (8%) (P< 0.001).

The most frequent microorganisms involved in HIV- were: *E coli* (35.1%), other *gram-positive cocci* (20.9%), and all of the *gram-negative bacilli* represents 60.5% of BSI; in HIV+: *S pneumoniae* (22.3 %), *S aureus* (18%) and all the *gram-negative bacilli* were 35.4% of BSI. (P< 0.001). MRSA was identified in 11% and 30.26% of *S aureus* BSI in HIV+ and HIV- respectively. The fungemia was more frequent in HIV+ 30 (4.9%) compared to HIV- 233 (2.4%) (P< 0.001).

The overall mortality in both HIV+ and HIV- groups was 15%; adjusted for age, gender, hepatitis C and place of acquisition the OR of death in HIV+ was 1.60 (95%CI:1.2, 2.11).

CONCLUSIONS: The sources and microorganisms involved in BSI were different in HIV+ and HIV- patients and mortality was higher in the HIV+ group. In our setting gram-positive cocci were the most common microorganisms in HIV+. Due to its high prevalence should be emphasized the need for vaccination against *S pneumoniae* in all HIV-infected patients.

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Shorter CD8 T cell subset telomeres and lower proliferative: Senescent CD8 ratio in people with chronic/latent viral coinfections

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BACKGROUND: People living with cART-controlled HIV and coinfecting with other chronic/latent viruses are at higher risk for age-related diseases compared to HIV-monoinfected individuals. We investigated how chronic/latent viral infections affect immune aging markers such as shorter proliferative CD8 (pCD8) T cell telomere length (TL) and lower proliferative: senescent CD8 (pCD8:sCD8) T cell ratio.

METHODS: pCD8 and sCD8 T cells were FACS-sorted by CD28 using PBMCs from CARMA cohort participants. TL was measured in sorted subsets containing sufficient cell numbers for multiplex qPCR (~58% of all

specimens). Infection status for HIV, HBV, HCV, and CMV was determined by clinical history and/or serology. The chronic/latent viral burden was considered as 0, 1, 2, and ≥3 of any viruses.

RESULTS: Among 189 participants, 33, 108, 10, 47, and 113 were positive for none (controls), HIV, HBV, HCV, and CMV (21 missing CMV data), respectively. Most (83%) HIV+ participants were undetectable and ~45% of HCV+ participants were RNA-negative. Among participants with any viruses, 44, 66, and 25 had 1, 2, and ≥3 viruses, respectively. Higher number of viruses was univariately associated with decreasing pCD8:sCD8 ratio (P< 0.0001) and shorter pCD8 TL (P=0.004), with a noteworthy effect towards shorter sCD8 TL (P=0.077). Compared to no viruses, ≥1 virus was associated with lower pCD8:sCD8 ratio (P≤0.001) and shorter sCD8 TL (P≤0.047), while 2 viruses was associated with shorter pCD8 TL (P=0.005), independent of age and sex. Both HIV (β=-0.22, P< 0.001) and CMV (β=-0.26, P=0.036) were independently associated with a lower pCD8:sCD8 ratio, but HBV and HCV were not. Only CMV showed a significant independent association with shorter pCD8 TL (β=-0.28, P=0.036), with HCV infection ever as the second strongest signal (β=-0.18, P=0.069).

CONCLUSIONS: Living with a higher chronic/latent viral infection burden is associated with a poorer immune profile, likely related to persistent/repeated CD8 T cell stimulation. Our data highlight the potential value of treating and/or developing vaccines where feasible for chronic/latent viruses, including CMV, in people living with HIV.

Neurologic disorders

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Parkinson's disease diagnoses in a population-based cohort of people living with HIV and a comparative general population sample in British Columbia, Canada

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BACKGROUND: Accelerated aging among people living with HIV (PLHIV) may contribute to the early-onset of neurodegenerative diseases. We documented Parkinson's disease (PD) diagnoses among PLHIV and a comparative general population sample in British Columbia (BC), Canada.

METHODS: This analysis is based on the Comparative Outcomes And Service Utilization Trends (COAST) Study which contains data on all known PLHIV and a 10% random sample of the general BC population (1996-2013). Based on a case-finding definition, a PD diagnosis was defined as: having at least two of the following ICD diagnostic codes within a one-year period (ICD-9: 332.x; ICD-10: G20, G21.x, G22) or one ICD code and a Drug Identification Number for an Antiparkinsonian medication (i.e., Levodopa + Carbidopa/Benserazide, Ropinirole, Rotigotine, Selegiline, Rasagiline, Entacapone, Apomorphine, Pramipexole) within six-months of an ICD code. Continuous variables were summarized using median (Q1-Q3) and Wilcoxon rank-sum tests were used to compare medians between PLHIV and the general BC population with PD diagnoses, as well as PLHIV with and without a PD diagnosis.

RESULTS: Among 13,907 PLHIV in BC, 35 individuals were diagnosed with PD, as per our definition, between 1996-2013. In the general BC population (N=516,340), 3,011 participants were diagnosed with PD. Of note, PLHIV were younger at the time of receiving a PD diagnosis (median age: 58 years, Q1:50-Q3:68), compared to the general BC population (median age: 78 years, 71-83) (p< 0.001).

Furthermore, while not statistically significant, PLHIV with a diagnosis of PD were on antiretroviral therapy for longer (median duration: 6.12 years, 3.07-12.54) than PLHIV without a PD diagnosis (median duration: 4.33 years, 1.61-9.00) (p=0.057). Lastly, HIV related factors, including nadir CD4 cell counts, were similar between PLHIV with and without a PD diagnosis (median CD4: 110 cells/mL, 20-220 vs. median CD4: 150 cells/mL, 50-280) (p=0.117).

CONCLUSIONS: Despite a low prevalence of PD diagnoses, PLHIV met our diagnosis definition at a substantially earlier age than participants from the general BC population. Qualitatively, PLHIV with a PD diagnosis had

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been on antiretroviral therapy longer than those without a diagnosis. Future work should examine these discrepancies in age and treatment duration, in relation to PD diagnoses, in this setting.

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CSF viral escape among HIV-infected patients in Southern India

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BACKGROUND: Globally, remarkable progress has been witnessed in optimal control of HIV-associated neurocognitive disorders over the past five years. However, little is known of CSF viral escape in HIV-infected patients from resource limited settings. We report the profile of patients from Southern India with neurocognitive impairment, among those with suppressed plasma viral load (PVL).

METHODS: 35 patients with neurocognitive impairment, admitted from February 2014 to September 2018, underwent lumbar puncture under aseptic conditions during routine in-patient care. CSF HIV RNA was measured with Abbott m2000rt real-time PCR [Abbott Molecular Inc., Des Plaines, IL, USA, detection limit - 40 to 10,000,000copies/ml]. Data was explored using STATA 15.1 and descriptive analyses were undertaken to study the clinical, antiretroviral therapy profiles and examine the discordance between the CSF and PVL in these patients.

RESULTS: 33 patients presented with neurocognitive impairment were diagnosed as HIV-associated dementia and 2 as mild neurocognitive disorder. 77% are male with median age at admission of 46 years (SD 8.6). Five were evaluated for opportunistic infections (CNS TB=3, CMV=1, and toxoplasmosis=1). 21 were CSF viraemic at presentation; 15 had greater than one log₁₀ difference between CSF and PVL. Initially, 77.14% were on NRTI+PI, 20% on NRTI+NNRTI and 2.86% on INSTI+PI based regimens. 11 (32%) individuals had discordance in HIV-RNA levels between plasma and CSF; median CSF VL at admission =17445 copies/mL (IQR 1040 - 32200 copies/mL). 82% were on NRTI+ ritonavir-boosted PI based regimen (78% on atazanavir, 11% on darunavir, 11% on lopinavir).

Among them 82% were modified to INSTI+ ritonavir-boosted PI regimens (dolutegravir (n= 8), raltegravir (n=1), darunavir (n=3), lopinavir (n=4). Recovery from clinical symptoms of neurocognitive impairment for these 11 patients was as follows: 36% (n=4) after 1 month, 36% (n=4) after 3 months and 18% (n=2) recovered after 6 months. One patient did not recover.

CONCLUSIONS: Neurocognitive impairment was present among patients with suppressed PVL, most receiving atazanavir. Patients on integrase inhibitor based regimens showed better improvement of clinical symptoms, compared to other PI based regimens among patients on second-line ART.

Depression and other psychiatric manifestations

TUPEB194

Co-morbidity of HIV and psychosis among the in-patients at the national tertiary psychiatric hospital in Malawi

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BACKGROUND: The National UNAIDS Spectrum Estimates Prevalence of 15-49 years in 2018 in Malawi is at 9.3%. The study aimed at determining the prevalence of HIV in inpatients aged 15-49 years with psychotic disorders and their associated demographic and or clinical factors at Zomba Mental Hospital in Malawi.

Some studies in Sub Saharan Africa demonstrate that patients with psychosis have a higher prevalence of HIV compared to those without psychosis.

However, there is no available data to substantiate this for Malawi, such that people with mental illness may be at risk for under diagnosis of HIV, poor access to HIV care, and worse HIV outcomes, thereby threatening the fast tracking of the acquisition of the 90:90:90 by 2020 in the country.

METHODS: It was a descriptive cross-sectional systematic study. Participants were recruited from all existing inpatients at the national tertiary psychiatric hospital in Malawi with psychosis and all subsequent admissions from January to June 2018. Presence of a psychotic disorder was verified using SCID- 4 for recruitment. Demographic and HIV treatment data was also collected. Data was analyzed using SPSS with p-value set at 0.01.

RESULTS: A total of 257 were recruited. 181 had a diagnosis of Schizophrenia, while 33 had psychosis secondary to a general medical condition or medications. Forty-four patients (17.1%) tested HIV positive. Female sex on psychotic illness secondary to a general medical condition (p<0.005) was associated with being HIV positive. Seventy-two patients (28%) had no previous HIV test. Reasons for lack of previous testing included, 'not having thought of going for an HIV test in 85 (33.1%). Of those with HIV, 35/44 (79.5%) were on cotrimoxazole prophylaxis and 31/44 (70.5%) were on ARVs.

CONCLUSIONS: The Prevalence of HIV in Malawi among the 15-49 years in-patients with psychosis at Zomba Mental Hospital was higher than the general population at 17.1%. Therefore, mental illness patients are confirmed as high-risk population for HIV/AIDS.

Malignancies (AIDS and non-AIDS)

TUPEB195

Role of immune suppression as independent prognostic factor of NHL outcome in PLWHIV

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BACKGROUND: Despite the marked improvement of NHL survival in the ART era, the burden of HIV-related immune suppression on NHL outcomes is yet to be fully described.

METHODS: Multicenter observational cohort study including HIV+ pts from 6 Italian centers, receiving biopsy-proven NHL diagnosis since 2003. Data on HIV infection and Lymphoma characteristics, treatment and outcome were recorded. Overall survival (OS) estimates by Kaplan Meyer and predictors of OS by Chi-square, Fisher's exact, and Cox regression were performed.

RESULTS: Overall, 127 HIV-NHL were included (86.6% males, medians: age 48 years, CD4+ at diagnosis 186/mmc). Among them, 86 (68%) had systemic DLBCL, 18 (14%) Burkitt, 11 (9%) plasmablastic, 6 (5%) primary CNS, 6 (5%) other lymphoma histotypes. At NHL diagnosis, 61% were on ART and 30% had HIV-RNA< 50 cp/ml. All pts were treated with ART during chemotherapy (CT).

After a median follow-up of 23.5 months (IQR-8-64), 45 (35.4%) pts died. However, at 24 months from diagnosis, cumulative risk of death was significantly higher for patients with CD4 < 200/mmc at diagnosis compared to >200/mmc (45.4% versus 17.6%, HR=3.3, 95%CI 1.6-7.4, p=0.0015). Other factors significantly associated to death at univariate analysis were HCV co-infection, nadir CD4+, Ann-Arbor stage III-IV, higher ECOG performance status, IPI score>2. At multivariable analysis (including IPI and histotype), CD4+ at diagnosis were independently associated with increased risk of death. Analysis considering only disease-related deaths (30/45, 66.7%) confirmed the same associations.

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To avoid potential confounder effect of different NHL histotypes, we performed a sub-analysis on DLBCL cases only. After a median follow-up of 25 months (IQR 8-65), 29 (33.7%) DLBCL pts dies. Cumulative risk of death at 24 months was significantly higher for pts with CD4 at diagnosis < 200/mm³ versus >200/mm³ (45.2% versus 18.4%, HR 2.6, 95% CI 1.0-6.3, p=0.04).

CONCLUSIONS: While lymphoma prognostic scores were found to be reliable in our cohort of HIV-positive individuals, an independent effect of CD4 count at LNH diagnosis on LNH survival was noted. While advocating for HIV patients to receive the same treatment intensity as HIV-negative individuals, we suggest that prognostic scores for the former group might benefit from the addition of CD4 count as an item.

TUPEB196

Malignancies' standardized incidence rates among adults' Hispanic people living with HIV in the recent cART era, Puerto Rico 2010-2015

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BACKGROUND: Advances in antiretroviral therapy (ART) prolong life expectancy among people living with HIV (PLWH), with higher malignancies incidence that are leading morbidity and mortality causes in this vulnerable population. Combination of ART reduced, but did not eliminate this disparity in earlier cART eras. The present study evaluate the malignancies' incidence among a Hispanic PLWH cohort in a more recent cART era.

METHODS: Databases of 2,692 Hispanic PLWH and the Puerto Rico Central Cancer Registry (PRCCR) were match to evaluate the malignancies standardized incidence rate and 95% confidence interval (SIR [95%CI]) among this adult HIV cohort between 2010 and 2015. SIR evaluates a measure of risk related to the general population, and is defined as the ratio of observed to expected number of cancers. Expected counts were estimate by applying gender, age, and calendar years PRCCR's specific cancer incidence rates to our cohort.

RESULTS: Of the 92 malignancies diagnosed after 2009, 36.5% were women, 32.4% used injecting drugs, 74.0% smoked, 68.1% consumed alcohol, 90.4% received ART, and 84.0% cART. A total malignancies' SIR of 1.4 [1.1-1.7] reveals that disparity remains among the cohort in recent cART era. Similarly, SIRs of Kaposi's sarcoma (40[13-97]), invasive cervical carcinoma (8[4-17]), oral cavity/pharynx (2.4[1-5]), and non-Hodgkin's lymphomas (4[2-7]) remained significant higher among them, but slightly lower when compared to previous cART eras data. Conversely, SIRs of anus (46[24-82]), vaginal (125[46-277]), central nervous system (4.5[1.1-12]), and Hodgkin's lymphomas (10[3-24]) significantly increase after 2009.

CONCLUSIONS: Availability of cART has significantly decreased the malignancies risk; however, cancer remains a significant threat in this vulnerable population. As more PLWH gain access to treatment in the cART era, occurrences of incomplete viral suppression due to suboptimal clinical management could potentiate the role of additional oncogenic factors, including viruses, tobacco and alcohol. As known, not all PLWH are able to achieve virology suppression to undetectable level; consequently, further studies are recommend to evaluate the low detectable HIV RNA as a malignancies risk factor. Additionally, aggressive intervention in form of vaccines, risky practice reduction, early screening intervention and education needs to be reinforce in this vulnerable population. Supported by Grants U54MD007587, S21MD001830 and NPCR-CDC-5-NU58DPO06318

TUPEB197

First report on salivary shedding, viremia and seroprevalence of Kaposi's sarcoma associated herpes virus among a group of men who have sex with men and transgender women from Argentina

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BACKGROUND: Kaposi's sarcoma is still the most frequent cancer among HIV positive people in Latin America including Argentina. However data on Kaposi sarcoma associated herpesvirus (KSHV) is scarce in this setting. We developed a pilot study to evaluate KSHV within a cohort of people with or at high risk of HIV in Argentina.

METHODS: Men who have sex with men (MSM) and transgender women (TGW) were recruited between April and November 2018. All patients signed informed consent prior to study procedures. Samples derived from blood and saliva were collected and stored at -70°C, medical information was recorded. DNA from whole blood and saliva samples were extracted using QIAamp DNA Mini Kit (QIAGEN) and PCR reactions were performed. KSHV serology was done by indirect immunofluorescence assay.

RESULTS: Thirty-three patients were included: 26 MSM (23 HIV+) and 7 TGW (4 HIV+). Median age was 37 years old for MSM and 28 for TGW. Participants were born in Argentina (n=21), Peru (n=3), Venezuela and Colombia (n=2; each), Paraguay (n=1).

All TGW were current or past sexual workers. No patient ever received blood transfusions, one used intravenous drugs in the past, 19 used non-intravenous drugs and 9 used stimulants. Among HIV+ participants, median CD4 cell count was 772 cells/ul (interquartile range: 598- 957). One patient had previous Kaposi's sarcoma and no patient had active clinical disease.

KSHV PCR was positive in saliva of 36% of the patients (5/7 TGW and 7/26 MSM; 10/12 HIV+) and in 24% of whole blood samples (4/7 TGW and 4/26 MSM; 7/8 HIV+). Three patients had both. Twenty-five patients (76%) had positive KSHV serology (100% TGW and 69% MSM).

CONCLUSIONS: Prevalence of KSHV infection was high among the studied population. Seroprevalence was 76%, similar to 73.1% previously reported 20 years ago in HIV+ MSM from Argentina. TGW had a higher frequency than MSM. Virus detection in blood and saliva was more frequent among HIV+ patients.

This is the first study to report KSHV infection in TGW and MSM separately in Argentina. This cohort is still enrolling; full data may inform public health policies and help to build prevention strategies.

Funding: NIH 2P30AI073961-06/U54 CA221208

TUPEB198

Improving access to cervical cancer screening services at remote areas in Tanzania

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BACKGROUND: Cervical cancer is the commonest malignancy affecting women of reproductive age and the commonest cause of cancer related deaths in women in Tanzania. Women living with HIV (WLHIV) are more likely to have precancerous lesions; have higher rates and recurrences of cervical dysplasia; faster progression; shorter survival rates once diagnosed with cervical cancer.

As a partner supporting the Ministry of Health in providing comprehensive HIV prevention, care and treatment services; Tanzania Health Promotion

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Support (THPS) integrated cervical cancer screening (CCS) among women of reproductive age living with HIV thus increasing access for women in remote areas

METHODS: A total of 43 sites initiated cervical cancer screening services in Pwani, Kigoma and Mtwara regions. Health care providers received training, supportive supervision and mentorship sessions. In addition expert clients living with HIV were trained to sensitize WLHIV on having this service annually. Sites were equipped with cryotherapy machines and supplied with commodities for CCS, the three regional hospitals were in addition equipped with a loop electrosurgical excision procedure (LEEP) machine for larger lesions not treatable through cryotherapy. Program data of all women including WLHIV from supported sites was analysed from October 2011 - September 2018. Depending on the outcome of the screening by Visual Inspection with Acetic Acid (VIA) appropriate management was provided

RESULTS: A total of 84,666 women of reproductive age were screened, 380 (0.4%) were referred due to large lesion at screening. Among all screened women, 27,010 (32%) tested positive for HIV, 53,073 (63%) were HIV negative and 4,559 (5%) had unknown HIV status. WLHIV had higher rates of VIA positive results i.e. 5.4%; compared to HIV negative women (2.7%). Among women with unknown HIV status, VIA positivity was five percent (4.6%). Among all 3,131 VIA positive women 90% (3,016) received cryotherapy.

CONCLUSIONS: Using a simple screening tool, many women were reached for cervical cancer screening services. HIV positive women showed higher rates of early signs of cervical changes suggestive of cervical cancer compared to those without HIV a well-established evidence. We recommend universal availability of this life saving simple screening test among eligible women to prevent morbidity and mortality associated with it.

TUPEB199

Head and neck cancers in U.S. Veterans living with HIV

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BACKGROUND: As People Living with HIV (PLWH) age, the risk for cancers, particularly virally-mediated cancers and cancers associated with tobacco and alcohol will likely increase. In the U.S. the incidence of tobacco and alcohol associated head and neck squamous cell cancers (HNSCC) have decreased while the incidence of oropharynx cancers have increased. We sought to evaluate the incidence and outcomes of HNSCC among PLWH.

METHODS: We performed a retrospective cohort study of PLWH males receiving care in the US Department of Veterans Affairs between 10/01/1999 and 12/31/2016 using the Corporate Data Warehouse (CDW). Patients with a minimum of 90 days between HIV HNSCC diagnosis or death, their last recorded health care encounter, or study end were included in the analysis. We calculated age-standardized incidence rates (IR) for both oropharynx cancer (OPC) and non-OPC HNSCC. Demographic, lifestyle, and clinical variables were assessed. We used time-varying Cox regression models to estimate Hazard ratios (HR) and 95% CIs for associations with risk factors for OPC and non OPC HNSCC in PLWH.

RESULTS: We identified 45,515 HIV positive male veterans (53% black, 37.5% white; median age=47.1, SD=10.7), of whom 372 developed HNSCC (114 OPC, 258 non-OPC) during follow-up. The IR = 21.4 per 100,000 person years [95% CI: 15.8-27.0] for OPC and 51.7 per 100,000 person years (95% CI: 43.1-60.4) for non-OPC. When assessing OPC IR by year of HIV diagnosis, the IR was 17.2, 25.6, and 18.2 for years 2000-2005, 2006-2011, and 2012-2016, respectively; while the non-OPC IR was 72.0, 45.3, and 44.1 for the same time periods. Nadir CD4 count was significantly associated with non-OPC HNSCC (OR=1.5, 95% CI 1.1-1.9), but not OPC (OR=1.4, 95% CI: 1.0-2.1). OPC patients were more likely to be diagnosed at an advanced stage (Stage 3-4) compared to non-OPC patients (p<.0001) (80.2% versus 43.3%, respectively), and the median survival for OPC was 2.38 years compared to 4.71 years for non-OPC (p=0.0024).

CONCLUSIONS: Among HIV-positive veterans, non-OPC HNSCC are not decreasing and have a higher overall incidence than OPC HNSCCs. However, HIV-positive veterans with OPC are diagnosed at later stages and have shorter median survival than those with non-OPC HNSCC.

Cardiovascular disease

TUPEB200

Gut microbial dysbiosis in HIV-infected males with different sexual behaviour and cardiovascular risk

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BACKGROUND: HIV-related dysbiosis may fuel the pro-inflammatory/activated immune milieu which is linked to a high cardiovascular risk in this population. Differences in faecal microbial composition exist according to sexual behavior. We hypothesized that alterations of the intestinal microbiota may correlate with a different degree of cardiovascular risk in HIV-infected (+) MSM and MSW.

METHODS: 44 male, HIV+ subjects on suppressive cART were stratified according to Framingham Score (FS) using a cutoff of 10 (< 10: low [L] FS; ≥10 Intermediate/High [I/H]) and sexual behavior (MSM and MSW). Subjects underwent:

- standardized diet questionnaires;
- lipidic profile;
- faecal microbiota composition (MiSeq Illumina).

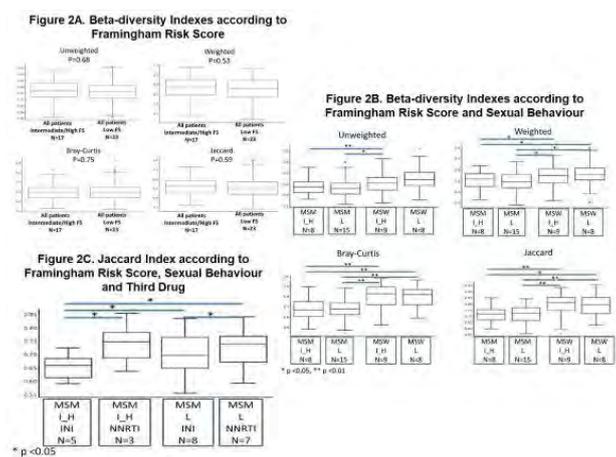
RESULTS: Subjects were comparable for demographics and HIV-related parameters (Fig1). Food consumption was also similar among study subgroups. We confirmed a diverse gut microbiota composition in HIV+ MSM compared to MSW (Unweighted-Unifrac: p=0.02; Weighted-Unifrac: p=0.02; Bray-Curtis: p=0.003; Jaccard p=0.002), yet failed to detect any differences according to FS (Fig2A). When analyzing faecal microbial composition according to both sexual behavior and FS, all differences we detected were linked to the former (Fig2B). When studying the gut microbiota according to sexual behavior, FS and third-drug regimen, a diverse microbial separation was found in MSM with I/H versus L FS treated with INI-containing regimens (Jaccard, p=.02; Fig2C).

CONCLUSIONS: We confirm differences in the fecal microbial composition according to sexual behavior. Despite failing to detect a link between microbiota and Framingham score in HIV+ MSM and MSW, our data suggest that cardiovascular risk may be modulated by the combined effect of microbes and drug exposure.

Figure 1. Demographic and HIV-related parameters

Patients Characteristics	TOT (N=44)	MSW Low FS (N=10)	MSW Intermediate/High FS (N=9)	MSM Low FS (N=15)	MSM Intermediate/High FS (N=10)	pValue
Age, years (IQR)	51 (45-55)	46 (42-53)	54 (51-55)	48 (42-55)	53 (49-55)	0.004
BMI, n (IQR)	25,55 (23,5-27,7)	25,55 (23,4-27,8)	25,8 (24,2-27,1)	24 (22,2-28,5)	28,79 (24-31,1)	0.228
Previous ABT prophylaxis, n (%)	14 (31,81)	4 (40)	5 (55,55)	3 (20)	2 (20)	0.27
AIDS diagnosis, n (%)	7 (15,9)	1 (10)	4 (44,44)	1 (6,66)	1 (10)	0.073
Previous HCV coinfection, n (%)	8 (18,18)	1 (10)	4 (44,44)	0 (0)	1 (10)	0.02
HIV infection months naïve, n (IQR)	8 (1-50,5)	21 (0,75-71,25)	8 (0,5-57,5)	3 (1-48)	14 (2-81)	0.784
CD4 nadir, n/mm ³ (IQR)	348 (98-488)	200 (61-555)	127 (25-239)	310 (235-500)	249 (150-469)	0.133
Current CD4n, n/mm ³ (IQR)	659 (549-828)	648 (498-804)	632 (423-710)	779 (565-910)	874 (567-768)	0.484
cART ongoing						
NNRTIs based, n (%)	19 (43,18)	8 (80)	1 (11,11)	6 (53,33)	4 (40)	0.138
PI based, n (%)	3 (6,81)	1 (10)	2 (22,22)	0 (0)	0 (0)	
INIs based, n (%)	22 (50)	3 (30)	6 (66,66)	7 (46,66)	6 (60)	
VL zenith, log ₁₀ cp/ml (IQR)	4,86 (4,2-5,4)	5,34 (4,1-6,2)	5,23 (4,2-5,8)	4,6 (4,1-5,1)	4,68 (4,2-5,8)	0.648
cART duration months, n (IQR)	98,5 (36,2-186,3)	79,5 (28,5-153,5)	133 (47,5-273)	81 (36-192)	103 (53-214,5)	0,514

[Figure 1]



[Figure 2]

TUPEB201

Cardiovascular disease risk among HIV-infected and uninfected adults in Kisumu, Kenya

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BACKGROUND: Despite concerns of elevated risk of cardiovascular disease (CVD) among HIV-infected adults compared to the general population, there are few studies from resource limited settings. We evaluated the prevalence and predictors of metabolic syndrome (MetS) among HIV-infected and uninfected adults in Western Kenya.

METHODS: We conducted a cross-sectional study among adults at least 30 years of age with and without HIV infection seeking care at Kisumu County Hospital. CVD screening was through the World Health Organization STEPS survey, fasting lipids and glucose, blood pressure and anthropometric measurements. MetS was defined as any three of these five criteria: abdominal obesity, elevated triglycerides, low high density lipoprotein (HDL) cholesterol, elevated blood pressure and high fasting plasma glucose. Chi-square, independent t-tests and multivariable logistic regression were used to determine associations with CVD risk factors.

RESULTS: Between September 2017 and May 2018, we enrolled 300 HIV-infected and 298 HIV-uninfected participants with similar numbers of males and females in each group. Median age was 45 and 40 years (interquartile range [IQR] [40,53 and 31,55]) for the HIV-infected and HIV-uninfected, respectively. Median duration of antiretroviral therapy for HIV-infected participants was 8 years (IQR 4,10) with a median CD4 count of 512 cells/mm³ (IQR 364,666). Majority (87%) were on a first-line regimen and 82% (191/233) were virally suppressed. HIV-infected participants compared to HIV-uninfected participants had lower rates of smoking and alcohol use and higher daily intake of fruits and vegetables and higher physical activity. Sixteen (5.6%) of 287 HIV-infected participants had MetS compared to 29 (10.5%) of 277 HIV-uninfected participants (p=0.032). The most common components of MetS were low HDL, elevated blood pressure and abdominal obesity. After adjusting for age, sex, education, smoking, alcohol use, diet and physical activity, HIV-infected participants were 50% less likely to have MetS compared to HIV-uninfected participants [Adjusted odds ratio [aOR] 0.48; 95% confidence interval 0.25, 0.93; p=0.028].

CONCLUSIONS: While MetS prevalence was high in both HIV-infected and uninfected groups (1 in 20 and 1 in 10, respectively), HIV-infected participants were less likely to have MetS than HIV-uninfected participants. This may be due to better access to preventive services and health education among HIV-infected individuals.

TUPEB202

Framingham, EURO and asCVD risk scores perform less good in HIV+ individuals from the HIVH-study compared to the general population

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BACKGROUND: The Framingham (FRS), Euro (EURO) and atherosclerotic cardiovascular disease (asCVD) scores have been developed to predict cardiovascular disease (CVD) risk in the general population. We analysed which of these scores assesses risk equally well in HIV+ individuals.

METHODS: We compared HIV+ outpatients from the HIV Heart (HIVH) study (n=500) with participants from the population-based Heinz-Nixdorf-Recall (HNR) study (n=4000) recruited in Germany since 2000. Individuals included in the different analyses depend on the respective score. The median follow-up time was ~5 years. The relationships between FRS, EURO, and asCVD and their respective outcomes were examined using logistic regression. Score performances were assessed by comparing the area under the curves (AUC).

RESULTS: Mean age in HIVH and HNR was 52.9±6.7 and 59.1±7.7 years. Baseline characteristics are shown in Table 1. Mean time since HIV+ diagnosis was 9.1±6.7 years and AIDS was already diagnosed in 36% at baseline.

Less CVD and peripheral artery disease events occurred in HNR than in HIVH (3.9% vs. 12.1%). Adjusted for age and sex the risk for future events was greater with increasing FRS in both cohorts (OR per point increase in HIVH=1.05; 95% 1.00-1.09 vs. in HNR=1.04; 95%CI 1.02-1.06), but the FRS performed better in HNR than in HIVH (AUC=0.71 vs. 0.65). Similar findings were observed for the EURO (AUC=0.70 vs. 0.62) and asCVD (AUC=0.74 vs. 0.62).

CONCLUSIONS: The CV risk scores predict incident CVD in both cohorts, however the performance was better in the general population than in the HIV+ cohort. There is a strong need for a risk score which is tailored to predict CVD risk better in HIV+ individuals.

	FRS vs. CVD_pAD events		EURO vs. CHD events		asCVD vs. CVD events	
	HIVH (n=470)	HNR (n=4308)	HIVH (n=567)	HNR (n=4440)	HIVH (n=464)	HNR (n=3485)
Male sex [n(%)]	420 (89.4%)	2036 (47.3%)	506 (89.2%)	2329 (47.6%)	416 (89.7%)	1686 (48.4%)
Age (years) [mean (SD)]	52.8 (6.7)	59.1 (7.7)	52.9 (6.9)	59.3 (7.7)	52.9 (6.7)	58.9 (7.7)
Score (points) [mean (SD)]	11.4 (7.1)	11.5 (8.4)	4.0 (1.5)	4.0 (1.7)	12.5 (13.6)	10.9 (10.7)
Incident events [n(%)] ¹	57 (12.1%)	169 (3.9%)	44 (7.8%)	97 (2.1%)	46 (9.9%)	115 (3.3%)
FU-time mean (years) [mean (SD)]	4.5 (1.0)	4.8 (0.7)	4.6 (0.9)	4.8 (0.6)	4.6 (1.0)	4.8 (0.7)
Time since HIV infection (years) [mean (SD)]	9.1 (6.7)	n.a.	9.2 (6.6)	n.a.	9.2 (6.7)	n.a.

¹ for each score based on the respective exclusion criteria participants were excluded prior to analysis and prevalent cases of the respective future event were excluded prior to analysis. Abbreviations: asCVD= atherosclerotic cardiovascular disease; CHD= coronary heart disease; CVD=Cardiovascular diseases; CVD_pAD= CVD-events and peripheral artery disease; EURO= Euro risk score; FU= follow-up; FRS= Framingham risk score; HIVH= HIV-Heart study (HIV-positive individuals); HNR= Heinz-Nixdorf Recall study (population-based).

[Table 1. Baseline characteristics and incident events in the HIVH and HNR study]

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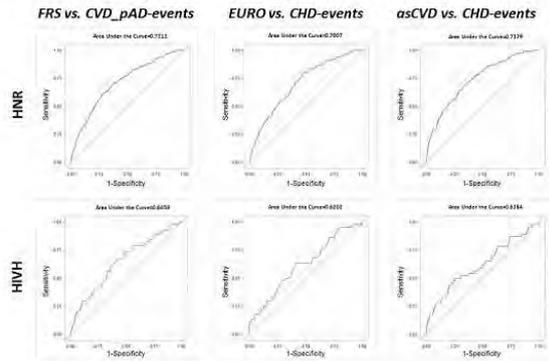
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Index**Receiver operating characteristics (ROC)¹ curves for 3 risk scores and incident CVD events**
during a mean follow-up time of 5 years in the HNR and HIVH-cohorts

¹The respective ROC-curves were obtained from age and sex logistic regression models.

Abbreviations: asCVD= atherosclerotic cardiovascular disease; CHD= coronary heart disease; CVD=Cardiovascular disease; CVD_pAD= CVD-events and peripheral artery disease; EURO= Euro risk score; FU= follow-up; FRS= Framingham risk score; HIVH= HIV-Heart study (HIV-positive individuals); HNR= Heinz-Nixdorf Recall study (population-based).

[Receiver operating characteristics curves for 3 risk scores and incident CVD events]

TUPEB203**Impact of HIV specific and traditional risk factors on the incidence of cardiovascular events in HIV-positive males over time**

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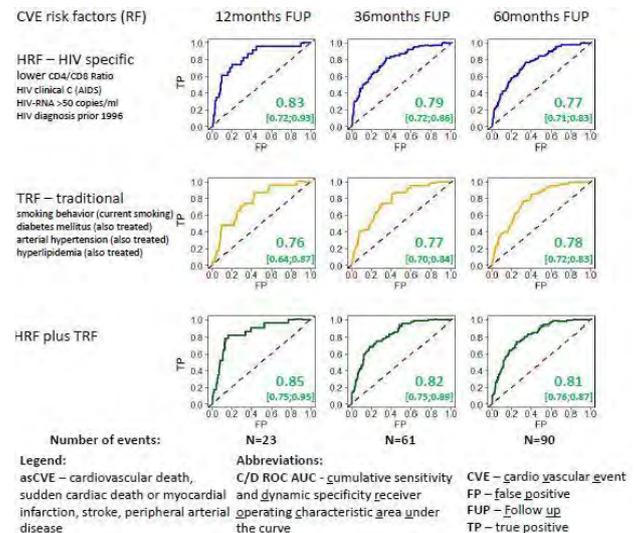
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BACKGROUND: Traditional (TRF) and HIV-specific risk factors (HRF) are associated with cardiovascular events (CVE). We investigate the impact of these RF on the incidence of CVE in HIV-positive (HIV+) males.

METHODS: The HIV HEART study (HIVH) is an ongoing prospective observational cohort study in the German Ruhr Area starting in 2004 to assess the frequency of CVE. This longitudinal analysis included HIV+ males with at least 5 years of follow-up. CVE is defined as the composite of cardiac or sudden cardiac death, myocardial infarction, stroke or peripheral arterial disease. CD4/CD8 Ratio, AIDS, HIV-RNA >50 copies/ml and HIV diagnosis prior 1996 were identified as HRF. TRF were smoking, Diabetes mellitus, arterial hypertension and hyperlipidaemia. We used the cumulative sensitivity and dynamic specificity receiver operating characteristic (C/D ROC) curve approach to illustrate the influence of these baseline parameters over time. All results were presented age adjusted.

RESULTS: 1069 HIV+ males (mean age 44.0±10.0 years) with 5662 patient-years under risk were reviewed. In their history, 29% had already AIDS and 44% had CD4-cells (c) < 200 c/μl. During 5 years of observation the proportion of antiretroviral treated HIV+ increased from 85% to 96% resulting in higher rates of HIV-RNA < 50 copies/ml (from 72% to 88%). 90 CVE occurred. In the CVE C/D ROC analysis the area under curve (AUC) for HRF decreased from 0.83 (for 12months prediction (p12m)) to 0.77 (60month prediction (p60m)), while for TRF AUC increased slightly from 0.76 (p12m) to 0.78 (p60m) (see Figure). For TRF plus HRF in one model we observed an AUC at p12m of 0.85 and at p60m of 0.81.

CONCLUSIONS: TRF plus HRF predicted incident CVE better than TRF or HRF alone in HIV+ males over time. There is a medical need for HIV+ individuals to develop a CVE risk score, which includes HRF.



[C/D ROC AUC for incidence of asCVE]

TUPEB204**Longitudinal analysis of blood pressure and estimation of the effect of HIV on BP mediated through HIV-specific pathways in a mixed cohort in Uganda**

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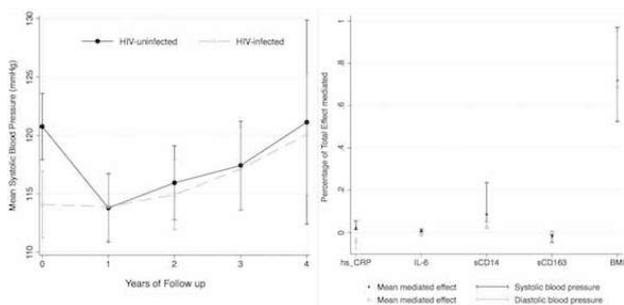
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BACKGROUND: We sought to quantify the global effect of treated HIV infection on blood pressure, and whether differences in blood pressure are mediated by traditional or HIV-specific pathways in Uganda.

METHODS: We followed 141 HIV-infected adults on ART and 142 sex- and age-quartile matched, population-based, HIV-uninfected controls for five years in a mixed cohort in rural Uganda. We collected data annually on body mass index (BMI), BP, and biomarkers of inflammation (high sensitivity C-reactive protein and Interleukin-6) and immune activation (sCD14 and sCD163). We fit mixed-effects models to describe changes in BP and tested for mediated effects of BMI and biomarkers using two-stage regression models.

RESULTS: The mean systolic BP (SBP) at enrollment was 119 mmHg (95%CI [confidence interval]) 116, 121) in HIV-uninfected and 111 mmHg (95%CI 108, 114) in HIV-infected (p < 0.0001) whereas the mean diastolic BP (DBP) at enrollment was 76 mmHg (95%CI 74, 78) in HIV-uninfected and 69 mmHg (95%CI 68, 71) in HIV-infected (p < 0.00001). SBP and DBP decreased by 1.8 mmHg/year (95%CI 0.8, 2.8) and 0.6 mmHg/year (95%CI 0.1, 1.3) in HIV-uninfected whereas among HIV-infected, SBP increased by 1.1 (95%CI 0.1, 2.0) and DBP rose by 1.4 mmHg (95%CI 0.8, 2.0). We found a significant difference in the rate of change in DBP over time between groups (p < 0.0001). BMI differences accounted for 72% (95%CI 57, 97) of the difference in SBP between people with and without HIV.

CONCLUSIONS: Over five years of observation, blood pressure is generally lower among HIV-infected taking ART than among HIV-uninfected. BMI, rather than HIV-associated biomarkers of inflammation, explained a majority of the difference in BP observed.



[Panel A: Adjusted changes in mean SBP and Panel B: mediated effects]

Renal disease

TUPEB206

Estimated glomerular filtration rate (eGFR) Slopes on Tenofovir Alafenamide (ETA)

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BACKGROUND: Tenofovir disoproxil fumarate (TDF) may cause eGFR decline through renal tubular toxicity. While switching from TDF to tenofovir alafenamide (TAF) improves tubular proteinuria, the effects of TAF on eGFR in those who experience eGFR decline on TDF have not been reported. We compared the eGFR slopes on TDF and TAF in patients with a history of TDF exposure who initiated TAF prior to October 2016.

METHODS: We conducted an observational cohort study at 5 clinics in the UK. Serial creatinine measurements on TDF and TAF were converted to eGFR (CKD-Epi), and mixed effects models with random intercept and time terms fitted to generate and compare eGFR slopes. Models were adjusted for age and eGFR at TDF/TAF initiation, gender, ethnicity, time-updated CD4 cell count and HIV RNA measurements.

RESULTS: Data were available for 94 subjects (median age 54 years, 93% male, 93% white/other ethnicity, 77% MSM, nadir CD4 200 cell/mm³). At TAF initiation, the median CD4 cell count was 549 [IQR 430, 760] cell/mm³, eGFR 80 (60, 106) mL/min/1.73m², and 95% had HIV RNA < 50 c/mL. The median exposure to TDF and TAF was 5.1 (1.7, 8.0) and 1.6 (1.3, 1.8) years, and the median number of eGFR measurements 12 (4, 19) and 4 (3, 5), respectively. The mean adjusted eGFR slope during TDF and TAF exposure was -0.92 (-1.09, -0.75) and 0.53 (-0.73, 1.79) mL/min/1.73m²/year (Table),

		mean (95%CI) eGFR slope (mL/min/1.73m ² /year)		
		TDF	TAF	P-value
All patients (n=94)	Crude	-0.97 (-1.14, -0.80)	0.44 (-0.84, 1.72)	<0.001
	Adjusted	-0.92 (-1.09, -0.75)	0.53 (-0.73, 1.79)	<0.001
TDF renal discontinuations (n=67)	Crude	-1.38 (-1.56, -1.20)	0.46 (-1.18, 2.10)	<0.001
	Adjusted	-1.32 (-1.51, -1.14)	0.40 (-1.21, 2.02)	<0.001
Switch from TDF to non-TDF regimen, with subsequent switch to TAF regimen (n=40)	Crude	-1.52 (-1.79, -1.25)	0.56 (-1.55, 2.66)	<0.001
	Adjusted	-1.47 (-1.74, -1.20)	0.84 (-1.24, 2.92)	<0.001
Direct switch from TDF to TAF regimen (n=54)	Crude	-0.63 (-0.84, -0.42)	0.32 (-1.13, 1.77)	<0.001
	Adjusted	-0.59 (-0.80, -0.38)	0.29 (-1.14, 1.71)	<0.001

[Table]

with greater eGFR decline on TDF observed in individuals who discontinued TDF for abnormal renal function or prior to the availability of TAF. Renal function remained stable on TAF-containing regimens, and there were no renal discontinuations.

CONCLUSIONS: Significant improvement in eGFR slope was observed in patients who switched from TDF- to TAF-containing regimens. These data provide further support for the renal safety of TAF including for patients who experience worsening renal function on TDF-containing regimens.

TUPEB207

Renal function with dolutegravir, elvitegravir/cobicistat, raltegravir, or darunavir

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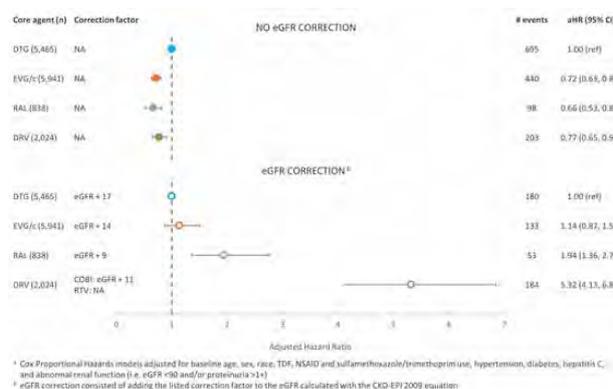
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BACKGROUND: Dolutegravir (DTG), raltegravir (RAL), and cobicistat (c) inhibit the tubular secretion of creatinine, artificially lowering estimated glomerular filtration rate (eGFR). We assessed the association between four core agents [DTG, elvitegravir (EVG), RAL and darunavir (DRV)] and renal function with and without eGFR correction.

METHODS: People living with HIV (PLWH) initiating these agents were included. A history of renal impairment (RI) was defined as either 2 consecutive eGFR < 60 ml/min per 1.73 m², ≥14 days apart; an eGFR < 30; or acute kidney injury (AKI) diagnosis ≤12 months before or at baseline. New RI was defined as eGFR < 60 or AKI, without RI history. eGFR values were corrected for DTG, EVG/c, RAL, and DRV/c based on the average decrease reported in the literature (Figure 1). The association between core agent and time to RI (with or without eGFR correction) was assessed with multivariate Cox models.

	DTG, N=5,465	EVG, N=5,941	DTG vs. EVG p-value	RAL, N=838	DTG vs. RAL p-value	DRV, N=2,024	DTG vs. DRV p-value
Age ≥50 years	1631 (29.8%)	1372 (23.1%)	<.0001	377 (45.0%)	<.0001	615 (30.4%)	0.6501
Female	762 (13.9%)	837 (14.1%)	0.8234	176 (21.0%)	<.0001	413 (20.4%)	<.0001
African American	2171 (39.7%)	2460 (41.4%)	0.0677	318 (37.9%)	0.3269	972 (48.0%)	<.0001
Hispanic	1361 (24.9%)	1425 (24.0%)	0.2543	140 (16.7%)	<.0001	410 (20.3%)	<.0001
U.S. Region: Southern states	2908 (53.2%)	3860 (65.0%)	<.0001	532 (63.5%)	<.0001	1267 (62.6%)	<.0001
Diabetes Mellitus	425 (7.8%)	309 (5.2%)	<.0001	119 (14.2%)	<.0001	156 (7.7%)	0.9207
Hypertension	1382 (25.3%)	1210 (20.4%)	<.0001	290 (34.6%)	<.0001	479 (23.7%)	0.1491
Impaired Renal Function (eGFR <90 or proteinuria > +1)	2789 (51.0%)	2739 (46.1%)	<.0001	554 (66.1%)	<.0001	1055 (52.1%)	0.4017

[Table 1. Baseline characteristics of patients prescribed regimens containing DTG, EVG, RAL, or DRV]



[Figure 1. Adjusted hazard ratios for progression to renal impairment by anchor agent]

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RESULTS: Out of 14,268 PLWH, 38% initiated DTG, 42% EVG, 6% RAL and 14% DRV. Characteristics varied at baseline by core agent (Table 1). Before eGFR correction, EVG, RAL and DRV were all associated with lower hazards of RI than DTG. After eGFR correction, the association disappeared for EVG; RAL and DRV became associated with an increased hazard of RI (Figure 1).

CONCLUSIONS: Correcting for artificial lowering of eGFR had a substantial impact on the association between core agent and RI, demonstrating the impact that inhibition of tubular secretion of creatinine can have when using eGFR cut-offs and suggesting that some events observed before correction may not be of clinical concern.

TUPEB208

Outcome of early-switching of Tenofovir Disoproxil Fumarate (TDF) in HIV-infected patients with TDF-induced nephrotoxicity: A prospective study

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BACKGROUND: TDF-induced proximal renal tubular dysfunction (PRTD) is a well-known complication. The rate of recovery after discontinuation of TDF is undetermined. There is no study regarding the outcome and recovery rate after TDF switching in the Thai population. Hereby, we investigated the outcome between early-switching and late-switching (per Thai National HIV Guidelines) of TDF in the presence of TDF-induced PRTD.

METHODS: A prospective study was performed including HIV-1 infected, virologically suppressed adults with TDF cART, whom were enrolled if the TDF-induced PRTD was presented during 2017-2018. Late-switching group was defined as $\geq 25\%$ eGFR decrement from baseline or Fanconi's syndrome. Early-switching group included any 2 or more abnormalities in the proximal renal tubular functions as follows: fractional excretion of phosphate (FEPO₄) $\geq 10\%$ or low TmP/GFR, uricosuria; fractional uric acid excretion (FEUA) $\geq 10\%$, urine protein-creatinine index (UPCI) ≥ 500 mg/g creatinine, normoglycemic glycosuria or decreasing eGFR between 15-24%. The recovery rates of the proximal tubular function at 6 months after TDF discontinuation were assessed. Complete recovery was defined by normalization of all abnormal tubular markers.

RESULTS: A total of 31 HIV-infected patients were enrolled. 70% of patients were male. Baseline characteristics were not significantly different between the two groups except for the baseline tubular markers (Table). During the follow-up period, the early-switching group had more cases with complete recovery of all tubular markers than the late-switching group (P=0.007, log rank test). The FEPO₄, TmP/GFR, and FEUA in the early-switching group improved significantly after discontinuation of TDF but not other parameters (Table).

CONCLUSIONS: Early switching of TDF in HIV patients with PRTD prompted the complete recovery of proximal renal tubular function than late switching. Closed monitoring of markers for proximal tubulopathy is warranted in patients receiving TDF-based regimens because rate of recovery may be delayed after discontinuation of TDF in late switching group.

Baseline Characteristics	Early-switching (n=17)	Late-switching (n=14)	P-value
Time of TDF exposure (months)	71.71 \pm 34.04	83.21 \pm 31.05	0.338
Urinary β -2-microglobulin (μ g/L)	1,030 (205-3,750)	19,840 (1,350-21,700)	0.006
Pre-switch eGFR (ml/min/1.73 m ²)	84.92 \pm 14.74	61.51 \pm 18.67	0.001
eGFR change from ART initiation until pre-switch as %	-15.47 (-20.35 to -8.43)	-42.99 \pm 13.01	<0.000
Tubular markers and eGFR change after 6-month switch	Early-switching (n=12)	Late-switching (n=13)	P-value
eGFR (ml/min/1.73 m ²)	+1.96 (95% CI -10.31 to 14.24)	+4.57 (95% CI -3.98 to 13.12)	0.589
TmP/GFR (mg/dL)	+0.67 (95% CI 0.3 to 1.04)	+0.22 (95% CI -0.3 to 0.75)	0.152
FEUA (%)	-4.75 (95% CI -7.32 to -2.18)	-7.41 (95% CI -15 to 0.19)	0.489
UPCI (mg/g creatinine)	-89.4 (95% CI -216.6 to 37.8)	-296.83 (95% CI -847.71 to 254.04)	0.213

[Table. Baseline characteristics, tubular markers and eGFR change after 6 months post-switch between the 2 groups]

TUPEB209

Real-world eGFR change among HIV patients who switch from F/TDF to F/TAF while maintaining the same third agent class

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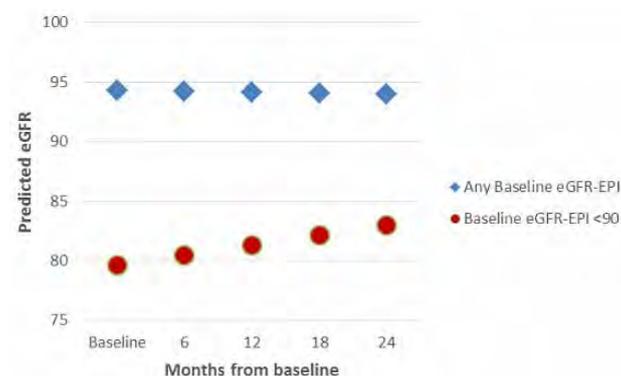
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BACKGROUND: In the clinical trial setting, switch from emtricitabine/tenofovir disoproxil fumarate (F/TDF) to emtricitabine/tenofovir alafenamide (F/TAF)-based regimens has been shown to improve renal parameters but limited evidence is available in the real-world. This analysis evaluated the effects of F/TAF-based regimens on renal function among people living with HIV (PLHIV) switching from F/TDF with no change in third agent class.

METHODS: A retrospective analysis was performed using data from a multicenter Spanish cohort of adult PLHIV, VACH. Patients with baseline estimated glomerular filtration rate (eGFR-EPI), at least one follow-up measurement, at least 30 days on F/TAF and switching from F/TDF to F/TAF with no change in third agent class up to March 2018 were included. Multivariate mixed linear models were used to evaluate change from baseline over time in eGFR-EPI with adjustment [at time of switch] for age, gender, HIV-RNA level and CD4+ count, eGFR-EPI, time on/from: previous F/TDF regimen, antiretroviral therapy (ART) and diagnosis. Predicted values were obtained by applying the regression to each patient's covariates values and averaging over the group of interest.

RESULTS: Of the 340 individuals included, 81% were male and 35% were ≥ 50 years. Baseline median eGFR-EPI was 96 and 37% had < 90 mL/min/1.73m². Median time on ART, on F/TDF and on F/TAF were 8, 1.4 and 1.0 years respectively. Gender, viral load, CD4, time on/from F/TDF, ART and diagnosis were not significant in the regression. Predicted values over time (Figure 1) indicate that 12 months after switch, patients with a baseline eGFR-EPI < 90 showed a mean 2.7% eGFR-EPI increase from 79.6 to 81.3, while overall there was a small 0.1% decrease (94.3 to 94.2).

CONCLUSIONS: In the real-world, switching from F/TDF to F/TAF-based regimen while maintaining the same third agent class, slightly reduced eGFR-EPI in the overall population while improving it in PLHIV with baseline eGFR-EPI < 90 mL/min/1.73m².



[Predicted eGFR over time]

Metabolic, lipid and endocrine complications (including obesity, hyperlipidaemia and lipodystrophy)

TUPEB210

Prevalence and associated risk factors for diabetes at HIV diagnosis in South Africa

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BACKGROUND: Diabetes is a leading cause of morbidity and mortality. In South Africa, people living with HIV (PLHIV) should be screened for diabetes. We estimated the prevalence of diabetes among newly diagnosed adult PLHIV in Durban, associated risk factors, and relationship with HIV clinical outcomes.

METHODS: We enrolled adults presenting for outpatient HIV testing at a large clinic from 2016-2018. We used a point-of-care hemoglobin A1c (HbA1c) test (A1cNow[®]) to screen participants with a positive HIV test result for diabetes (HbA1c $\geq 6.5\%$), prediabetes (HbA1c 5.7-6.4%), or dysglycemia (HbA1c $\geq 5.7\%$). Participants received antiretroviral therapy (ART) according to local guidelines and were followed for 12 months to document HIV viral load suppression ($< 1,000$ copies/mL), hospitalizations, and death. We tested for characteristics associated with diabetes using chi-square and ANOVA and used multivariable logistic regression to estimate the association of diabetes with HIV outcomes. We estimated the number needed to screen (NNS) overall and for sub-populations at higher risk of diabetes.

RESULTS: Among 1,259 participants, 59.5% were women, median age was 32 years (IQR 27-38), and median CD4 count was 364 cells/mm³ (IQR 212-551). The majority of participants were overweight (39.3%) or obese (23.6%), 46 (3.7%) screened positive for diabetes, and 260 (20.7%) for prediabetes. None who screened positive reported a prior diabetes diagnosis. Diabetes was associated with higher age, body mass index category, and blood pressure (p-values < 0.001). In unadjusted and adjusted models of diabetes with each HIV outcome, no significant differences were observed. HbA1c $\geq 5.7\%$ was associated with 0.36-fold lower adjusted odds of viral load suppression (95% CI 0.16-0.78). Overall, screening 27 adults yielded one positive result for diabetes; four needed to be screened to identify one with dysglycemia.

CONCLUSIONS: Dysglycemia is common among adults presenting for outpatient HIV testing in South Africa. The NNS for diabetes and dysglycemia are low even without accounting for risk factors, providing support for current national guidelines recommending universal diabetes testing at ART initiation.

	HbA1c Cutoff	Elevated HbA1c (N)	Elevated HbA1c (%)	Number Needed to Screen
Overall (n=1259)	$\geq 6.5\%$	46	3.7	27.0
	$\geq 5.7\%$	306	24.3	4.1
Age ≥ 45 years (n=156)	$\geq 6.5\%$	14	9.0	11.1
	$\geq 5.7\%$	60	38.5	2.6
BMI ≥ 25 and ≥ 1 risk factor (n=202)	$\geq 6.5\%$	14	6.9	14.5
	$\geq 5.7\%$	62	30.7	3.3

[Prevalence of elevated hemoglobin A1c and the number needed to screen at the time of HIV testing]

TUPEB211

Switch from tenofovir to raltegravir is not associated with weight gain over 96 weeks

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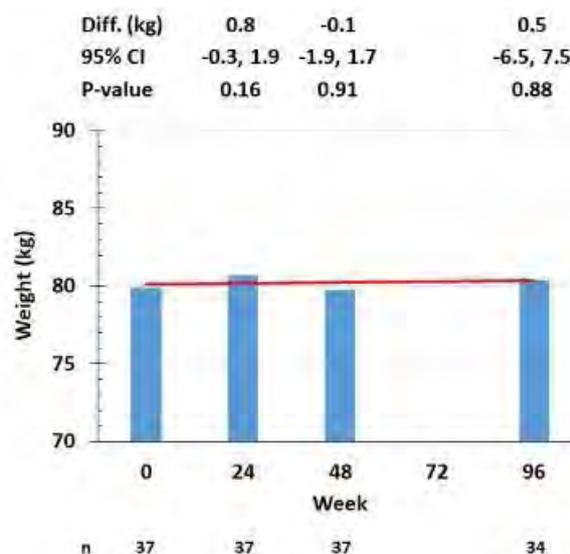
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BACKGROUND: Integrase inhibitor-based antiretroviral therapy (INSTI-ART) has been associated with unexplained weight gain. The reported data are partially confounded by the expected recovery to health seen with ART initiation. Minimal data have been presented regarding a switch to raltegravir-based ART in patients with an undetectable viral load.

METHODS: We retrospectively evaluated serial weight data from a non-randomised study that evaluated changes in bone mineral density (BMD) over 96 weeks after switching from tenofovir disoproxil fumarate (TDF) 300mg daily to raltegravir 400mg twice daily. Comparisons were made using t-tests.

RESULTS: The study population comprised 37 HIV-infected adults (36 men, mean age 49 years, mean weight 79.6kg, mean body mass index 26.1kg/m²) with viral load < 50 copies/mL plasma on TDF-based ART, no prior INSTI exposure, and low BMD (t-score < -1) at the hip or spine. Despite an increase in BMD, mean weight changes at Weeks 24, 48 and 96 were not significant: Week 24 (mean change +0.8kg [95% confidence interval -0.3, 1.9], p=0.16); Week 48 [-0.1kg [-1.9, 1.7], p=0.91]; Week 96 (+0.5kg [-6.5, 7.5], p=0.88). Change in weight at Week 48 was inversely correlated with baseline weight (rho=-0.401; p=0.01), but not with baseline age, alcohol consumption, smoking status, TDF duration, creatine kinase, albumin or BMD, suggesting that weight change after baseline mainly reflected regression to the mean. Weight change did not correlate significantly with change in creatine kinase or BMD (p ≥ 0.3).

CONCLUSIONS: In this virologically-suppressed population, switching from TDF to raltegravir 400mg twice daily resulted in an increase in BMD without a change in weight. Weight change after baseline mainly reflected regression to the mean. Weight gain may not occur with all INSTIs.



[Change in weight over 96 weeks]

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TUPEB212

HIV+ women with diabetes mellitus exhibit CD4+ T lymphocyte immunometabolic dysfunction

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BACKGROUND: Antiretroviral therapy (cART)-treated people living with HIV (PLWH) exhibit residual CD4+ T lymphocyte activation that could contribute to age-related disease. Activated CD4+ T lymphocytes have increased expression of glucose transporter-1 (GLUT1) and reliance on glycolytic metabolism in order to achieve efficient function. Diabetes mellitus (DM) is emerging as an age-related disease in PLWH but immune activation has not been described. We hypothesized that CD4+ T lymphocytes from PLWH with DM would display elevated metabolic activity.

METHODS: Peripheral blood mononuclear cells (PBMC) from treated mostly virally suppressed HIV+ women in the Women's Interagency HIV Study (WIHS) with untreated DM (HIV+DM+, n=18) or without DM (HIV+DM-, n=18) were identified and matched for age, race/ethnicity, smoking status and CD4 count. DM was defined by either self-report use of DM medications, HbA1c $\geq 6.5\%$, or fasting glucose ≥ 126 mg/dL confirmed by another clinical or laboratory parameter. CD4+ T lymphocyte GLUT1 surface expression was examined from PBMC by flow cytometry. To assess the extracellular acidification rate (glycolysis) and the oxygen consumption rate (oxidative phosphorylation), CD4+ T lymphocytes were purified from PBMC, stimulated with CD3CD28 Dynabeads and then analyzed using a Seahorse XF96 analyzer. CD4+ T lymphocyte gene expression analysis was conducted by Fluidigm HD Biomark RT-PCR for all gene isoforms of the glycolysis pathway, pentose phosphate pathway and the tricarboxylic acid (TCA) cycle. Comparisons of groups were calculated using the Wilcoxon signed-rank test.

RESULTS: Flow cytometric analysis showed an increased proportion of CD4+ T lymphocytes expressing GLUT1 in HIV+DM+ compared to HIV+DM- (median 0.72% vs. 0.40%, $p=0.0016$). The proportion of GLUT1 expressing cells correlated with CD38+HLA-DR+CD4+ T lymphocytes ($r=0.67, p<0.0001$), indicating that these cells were activated. Assessment of stimulated CD4+ T lymphocytes by Seahorse XF96 showed a 1.9-fold increase in glycolytic metabolism and a 2.1-fold increase in oxidative phosphorylation for HIV+DM+ compared to HIV+DM-. Gene expression analysis of CD4+ T lymphocytes from HIV+DM+ showed increased expression of genes for rate-limiting enzymes in the glycolysis and pentose phosphate pathway and intermediary enzymes in the TCA cycle.

CONCLUSIONS: CD4+ T lymphocytes from HIV+ women with DM display immunometabolic dysfunction that may contribute to DM development and associated complications.

Hepatic complications (including NASH)

TUPEB213

Abnormal liver function tests are common during acute HIV infection, correlate with HIV viral load, and do not persist in individuals initiating antiretroviral therapy

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BACKGROUND: Liver disease is a common cause of non-AIDS mortality in individuals living with HIV, but the prevalence and significance of liver function test (LFT) abnormalities in early HIV infection is unknown.

METHODS: We measured LFTs (alanine aminotransferase [ALT], gamma-glutamyl transferase [GGT], bilirubin) at the time of HIV diagnosis and at 4, 12, 24, and 48 weeks after ART initiation in 426 Thai individuals with acute HIV infection without viral hepatitis from 2009-2018. Values greater than 1.25 times the upper limit of normal were considered elevated. Analysis utilized descriptive statistics, non-parametric tests, and multivariate logistic regression.

RESULTS: Sixty-six of 426 individuals (15.5%) had abnormal baseline ALT. Of these, 8 (12.1%) were Fiebig stage I-II and 58 (87.9%) were stage III-V, while among those with normal ALT, 159 (44.2%) were stage I-II and 201 (55.8%) stage III-V ($p<0.001$). In a multivariate model, baseline HIV RNA >6 log copies/mL was associated with elevated baseline ALT ($p=0.008$). Syphilis seropositivity, alcohol use, and drug use did not differ between groups. While individuals in Fiebig stages III-V had higher baseline median ALT and GGT than those in stages I-II ($p<0.001$), differences were no longer detected after 4 weeks on ART. Individuals with elevated ALT were more likely to experience acute retroviral syndrome (ARS; 93.9% vs 74.2%, $p<0.001$). Those with ARS had higher median baseline ALT (31 vs 22 IU, $p<0.001$), but this difference resolved after ART initiation. Individuals with elevated baseline ALT were more likely to have elevated ALT at Week 12 on ART (risk ratio 1.9 [1.2-3.0], $p=0.02$), but not afterwards. At Week 48 on ART, 36/421 individuals (8.6%) had elevated ALT, but only 7 of these (19.4%) had elevated baseline ALT. In a random effects model, individuals initiated on dolutegravir-based ART were less likely to have elevated ALT over 48 weeks compared with individuals on efavirenz-based regimens.

CONCLUSIONS: One in six people with acute HIV infection have elevated LFTs that are associated with Fiebig stages III-V, ARS, and high viral load. Abnormal baseline ALT resolves after 12 weeks of ART; therefore, its presence should not delay ART initiation.

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Ageing with HIV (including polypharmacy and frailty)

TUPEB214

The physical and mental health implications of vision impairment in aging HIV-infected men

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BACKGROUND: There are few studies of ocular disease and visual impairment among aging HIV-infected adults in the modern therapy era. This study used data from the Multicenter AIDS Cohort Study (MACS), an aging cohort of HIV-infected and -uninfected men who have sex with men (MSM) to describe the burden of vision impairment and its physical and mental health correlates.

METHODS: A modified version of the National Eye Institute vision function questionnaire was administered to assess the level of difficulty performing vision-dependent tasks (no difficulty, some difficulty, moderate difficulty, and extreme difficulty).

Among participants who answered at least one question on visual function from September 2017 to March 2018, we matched HIV-infected to -uninfected on exact year of age and imputed missing covariate data using 20 imputation data sets.

Prevalences of vision problems were estimated by HIV-serostatus, and the relationships of self-reported visual functioning difficulties with physical and comorbidity outcomes were examined using logistic regression, regressing each outcome separately on visual function as indicator variables with no difficulty used as the reference.

RESULTS: There were 634 age-matched pairs for a total sample size of 1268 out of 1700 with available data. The median age was 60 years (IQR: 54.3, 65.9) and 24% were African American. Among HIV-infected men (93%) were virally suppressed. Overall, there were 51 reported eye conditions with the most prevalent being cataract (25% of the reported diagnoses). HIV-infected men reported more difficulty than HIV-uninfected men across all vision-related tasks.

Those reporting modest or extreme visual difficulties had 3.7 times the odds of depression, 10.1 times the odds of frailty (consistent with the Fried definition), 2.7 times the odds of a slow gait speed (present if time to walk 4 m is more than 80th percentile of HIV- men and 3.7 times the odds of minor or major IADL difficulty (using the Lawton-Brody Instrumental Activities of Daily Living Questionnaire) compared to those reporting no visual difficulties.

CONCLUSIONS: There was a higher prevalence of difficulty with vision-related tasks with a larger burden of mental health and physical function consequences among older HIV-infected MSM compared to HIV-uninfected men.

TUPEB215

Low muscle mass is the body composition parameter most predictive of pre-frailty and frailty in Asians living with HIV

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BACKGROUND: In Caucasian people living with HIV (PLWH), central obesity, low muscle mass and osteoporosis were associated with frailty. Body composition differs between Asians and other ethnic groups. There is paucity of data evaluating correlation between various body composition parameters and pre-frailty/frailty in Asian PLWH.

METHODS: A prospective observational cohort study was performed. Adult HIV-infected patients aged ≥ 18 years, followed in an HIV metabolic clinic in Hong Kong were recruited. Anthropometric measurements and dual-energy X-ray absorptiometry (DXA) scan were performed to measure various components of body composition. Measurements included body weight and body mass index, measures of adiposity (waist circumference, percentage total body and trunk fat, fat mass index [fat mass/height²], and fat mass ratio [percent trunk fat/percent leg fat]), muscle mass (appendicular skeletal muscle index/ASMI [lean mass of extremities/height²]), and bone mineral density (BMD) at femoral neck and lumbar spine.

Frailty and pre-frailty were determined using Fried phenotype (characterized by unintentional weight loss, exhaustion, low physical activity, and diminished gait speed and grip strength). Presence of 1-2 and ≥ 3 criteria indicated pre-frailty and frailty respectively. Multivariable binary logistic regression model was performed to determine association between body composition parameters and pre-frailty/frailty.

RESULTS: A total of 137 participants were recruited: mean age 59 \pm 11 years, 14% female, 95% Chinese, 40% ever-smoker, and 43% diabetes. Duration of HIV diagnosis was 13 (IQR 8-19) years, current CD4 527 \pm 272 cells/mm³, and 97% had viral load <20 copies/mL. All were taking anti-retroviral therapy (25% NNRTI, 37% protease inhibitors, and 38% integrase inhibitors). Among this cohort, 72 (52.6%) had pre-frailty, and 10 (7.3%) had frailty.

On univariate analysis, older age (61 \pm 9 vs. 55 \pm 11 years, $p < 0.001$), ever-smoker (48% vs. 27%, $p = 0.015$), lower body weight (64 \pm 13 vs. 69 \pm 13 kg, $p = 0.022$), lower femoral neck BMD (0.691 [IQR 0.609-0.766] vs. 0.763 [IQR 0.683-0.822] g/cm², $p = 0.001$), and lower ASMI (6.7 \pm 1.2 vs. 7.4 \pm 1.2 kg/m², $p = 0.002$) were associated with pre-frailty/frailty. None of the HIV-related variables nor measures of adiposity had association with pre-frailty/frailty. On multivariable analysis, age, ever-smoker, and lower ASMI (adjusted odds ratio 0.70, 95% CI 0.51-0.97) were associated with pre-frailty/frailty.

CONCLUSIONS: In a cohort of Asian PLWH, low muscle mass was the predominant body composition parameter associated with pre-frailty/frailty.

TUPEB216

Characterizing Canadians living with HIV to improve management of comorbidities

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BACKGROUND: Management of non-HIV related comorbidities in persons living with HIV (PLHIV) is an important concern since PLHIV experience disproportionately high comorbidity rates.

METHODS: This retrospective analysis characterized 200 most recently seen PLHIV in each of 10 Canadian HIV clinics via chart review. Data on demographics, comorbidities and lab results were collected, and risk categories of developing chronic kidney disease (CKD), cardiovascular disease (CVD) and fractures were calculated by D:A:D, Framingham, and FRAX equations. Sub-analyses compared younger (< 50 years) vs older individuals (≥ 50 years) using Cochran-Mantel-Haenszel testing.

RESULTS: Most persons were Caucasian (68%), male (87%) with a median age of 52 (57% ≥ 50 years). The median CD4 count was 583 cells/uL and nearly all (97%) had HIV-RNA < 400 copies/mL. Comorbidities were common (mean of 2.8/person; 31% had ≥ 4); only 8% of patients had no documented comorbidity. Frequent comorbidities included central nervous system (61%), overweight/obesity (43%), hepatic (37%), dyslipidemia (37%), hypertension (27%), bone (23%), CVD (18%), and renal (17%). Although younger patients ($n = 865$) were less likely to have comorbid conditions than older patients ($n = 1135$; 16% vs 3%; $p < 0.001$), 54% had ≥ 2 comorbidities. Of note, older individuals were 4.8-times more likely to have ≥ 4 co-morbidities compared to younger patients (48% vs 10%).

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Risk stratification revealed that 48% had high-risk CKD scores (n=554/1150), while 47% had medium/high CVD risk score (n=782/1672). Older patients were 5.2 and 13.5-fold more likely to score high for CKD (72% vs 14%) and CVD (18% vs 1.3%) than younger patients, respectively. Bone mineral density was measured in some patients (n=417); 54% were osteopenic and 13% were osteoporotic. Using FRAX (n=96), 15% of patients were at high risk of hip fractures and 2.1% for major osteoporotic fractures.

CONCLUSIONS: Routine clinical practice should be optimized to prevent and manage the high rates of comorbidities and risks Canadian PLHIV are experiencing, especially in aging patients.

TUPEB217

Smoking and High HIV viremia damage mitochondrial DNA and may accelerate mtDNA aging

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BACKGROUND: People living with HIV experience accelerated aging. The accumulation of somatic mitochondrial DNA (mtDNA) point mutations is believed to be a marker of biological aging, and has been implicated in several age-associated diseases that manifest prematurely in HIV+ individuals. Current theories of aging describe both *de novo* mutations, and the clonal expansion of pre-existing mutations, as potential mechanisms for the accumulation of mtDNA mutations. In this study, we hypothesized that somatic mtDNA substitutions (frequency $\leq 2\%$), which may represent *de novo* mutations, and heteroplasmic mtDNA substitutions (frequency $> 2\%$), that may result from clonal expansion, would increase with older age, tobacco smoking and HIV infection.

METHODS: Participants in this cross-sectional study were HIV+ (n=92) and HIV-negative (n=72) girls and women aged 1-62 years, enrolled in the CARMA cohort, not infected with hepatitis C or B, and either current or never smokers. Whole blood mtDNA substitution mutation rates/10Kb were quantified via next generation sequencing with primer IDs. Univariate associations between our mtDNA measures (occurrence of heteroplasmy and somatic mtDNA mutation rates) and age, smoking, or HIV were examined, along with possible confounders. Variables important univariately ($p < 0.1$) were considered for inclusion in multivariable models. Age, smoking status and HIV status were included in all models, as per our *a priori* study design.

RESULTS: In a model of adult participants (n=139) that included age, smoking status, and HIV status, being older ($p=0.003$) and having a peak HIV viremia $\geq 100\ 000$ copies/ml (vs. HIV-) ($p=0.045$) were independently associated with higher somatic mtDNA mutation frequency. MtDNA heteroplasmy among all participants (n=164), was associated with older age ($p=0.006$) and being a current smoker ($p < 0.001$) but not with living with HIV. An interaction was observed between age and smoking whereby heteroplasmy increased in non-smokers ($p=0.004$) but decreased in current smokers ($p=0.025$) with age.

CONCLUSIONS: Exposure to high HIV viremia may contribute to increased mtDNA mutations and accelerated aging in some people living with HIV. In contrast, smoking seemed to promote the clonal expansion of mutations rather than increase *de novo* mutations. This too may be consistent with the knowledge that smoking promotes age-related diseases.

TUPEB218

Depression is associated with greater telomere attrition over time in HIV-infected women- implications to aging in long living women with HIV infection

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BACKGROUND: Life expectancy has increased in HIV+ individuals due to improved highly active antiretroviral therapy (HAART) although physiological and psychological co-morbidities including depression occur similar to normal aging that are known to be associated with cellular senescence. Reduction in telomere length is a biological marker of cellular senescence. We hypothesize that higher level of depression will be associated with greater telomere attrition and will differ by HIV serostatus.

METHODS: We measured relative telomere length (RTL) of 119 women from Chicago Women's Interagency HIV Studies (WIHS) participants (89 HIV+ and 30 HIV-) using Flow-Fluorescence In-Situ Hybridization (Flow-FISH) in PBMCs samples. We evaluated relationship of change in RTL with Depression (defined as having a CES-D Score ≥ 16 at baseline) in 4 groups of HIV+ and HIV- individuals with and without Depression at 2 time points over a 7 years period. HIV+ groups with and without depression had mean (SD) CD4 count 556.4 (286) and 581.5 (280) cells/mm³ and HIV RNA copies/mL 25,165 and 8382 respectively. Difference between groups were tested using Kruskal-Wallis ANOVA, with Bonferroni corrected pairwise comparisons. Wilcoxon Signed-Rank tests were used to compare RTL at T1 and T2 by group.

RESULTS: Mean age of HIV+ and HIV- was 42.8 and 38.4 years respectively. Higher number of HIV+ had depression vs. HIV- (44.9% vs 33.3%). In all 4 study groups RTL decreased significantly over time from T1 to T2 (HIV+Depression, HIV+No Depression and HIV-No Depression, $p < 0.001$; and HIV-Depression, $p=0.008$). RTL was lowest in HIV+ Depression group compared to other three groups. Although groups were not significant different at baseline (T1), groups differed significantly at T2 ($p=0.01$), with significant difference between HIV+ Depression and HIV- No Depression. Highest telomere attrition from T1 to T2 was observed in HIV+ Depression group % mean (sd) 13.6 (10.9) compared to 11.8 (8.1) in HIV-Depression, 9.9 (10.5) in HIV+ No depression and 10.9 (8.6) HIV-No depression.

CONCLUSIONS: Depression is associated with greater telomere attrition over time in HIV-infected women with implications to aging in long living women with HIV infection.

Immune reconstitution disorders and immune reconstitution inflammatory syndrome

TUPEB219

Dolutegravir is associated with Kaposi Sarcoma's Immune Reconstitution Inflammatory syndrome in a cohort of AIDS patients in Rio de Janeiro, Brazil

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BACKGROUND: Immune reconstitution inflammatory syndrome (IRIS) is a major concern when starting highly active antiretroviral therapy (HAART). Recently, Brazil started recommending Dolutegravir (DTG), a potent Integrase strand inhibitor (INSTI), as first-line ART. The rapid decline of HIV viral load (VL) associated with DTG-based ART, might potentiate the risk

of IRIS in severely immunocompromised patients. INI-FIOCRUZ is a major referral center for diagnosis and treatment of AIDS-associated Kaposi Sarcoma(KS). We conducted a retrospective study, to determine if there was an association of DTG and KS-IRIS.

METHODS: We enrolled all patients diagnosed and treated with AIDS-KS in INI-FIOCRUZ, from January 01, 2000, through December 31, 2017. KS-IRIS was defined as unexpected progression of preexisting KS lesions, development of new lesions or involvement of new sites within three months after ART initiation.

Associations with time to KS-IRIS were assessed with hazards ratios (HR), calculated from Cox proportional hazards models. Observations were censored at the date of death, 3 months after ART or at the date of last observation, whichever occurred first.

RESULTS: From 2000 to 2017, 200 KS patients were enrolled, and 44(22%) had a diagnosis of IRIS; 145(72.5%) were stage T1, 135(67.5%) received chemotherapy; overall median CD4 count was 107cells/mm³, and 96cells/mm³ for KS-IRIS patients. From the 44 KS-IRIS patients, 7(15.9%) were on DTG treatment. In a univariate analysis, T1 stage, HR=2.67(95%CI, 1.13-6.32, $p=0.025$) and DTG, HR=9.54(95%CI, 4.17-21.81, $p<0.001$) were associated with an increased risk for KS-IRIS.

In a multivariate model, T1 stage, HR=2.57(95%CI, 1.09-6.09, $p=0.032$) and DTG, HR=9.15(95%CI, 3.99-20.98, $p<0.001$) were also associated with KS-IRIS

CONCLUSIONS: Patients with KS who started DTG were at greater risk to develop KS-IRIS, even after controlling for disease stage. These patients warrant close monitoring when starting DTG-based ART. There should be an effort to increase awareness of KS-IRIS in research limited settings, where DTG is being introduced as first-line ART, so that providers can promptly recognize and treat this potentially serious condition, and check for evidence of emerging KS-IRIS.

TUPEB220

Elevated anti-CMV IgG titer is associated with microbial translocation in elite controllers and ART-treated people living with HIV

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BACKGROUND: Persistence of systemic inflammation despite long-term antiretroviral therapy (ART) has been associated with the development of non-AIDS events. Microbial dysbiosis, epithelial gut damage, and subsequent microbial translocation remain major contributors to inflammation in ART-treated people living with HIV (PLWH). While invasive CMV-infection has become rare in the ART-era, asymptomatic CMV co-infection is highly prevalent amongst PLWH and has been associated with inflammaging in the general population.

METHODS: Study samples were collected from 195 PLWH without CMV-related diseases or any other acute conditions (126 anti-CMV IgG high vs. 32 low), including 37 elite controllers (EC) (25 anti-CMV IgG high vs. 12 low) and 29 HIV-uninfected controls (15 anti-CMV IgG high vs. 14 low). Anti-CMV IgG titer over 250 was considered high and the rest low.

CD4 and CD8 T cell counts, plasma HIV viral load (VL), markers of epithelial gut damage (I-FABP) and microbial translocation [LPS, sCD14, and (1 \rightarrow 3)- β -D-Glucan (β DG)], B cell activation (total IgG, IgM, and IgA), and inflammatory markers (kynurenine, tryptophan, CXCL13, IL-6, and IL-8) were measured.

RESULTS: Median CD4 T cell count was similar between participants with high and low anti-CMV IgG titer amongst untreated, ART-treated, and EC PLWH. ART-treated PLWH with high anti-CMV IgG titers had elevated CD8 T cell counts ($p=0.004$), I-FABP ($p=0.03$), LPS ($p=0.007$), β DG ($p=0.005$), IDO-1 metabolism ($p=0.03$), CXCL13 ($p=0.004$), IL-6 ($p=0.05$), and IL-8 ($p=0.04$) compared to those with low anti-CMV IgG titers.

ECs with high anti-CMV IgG titer did not have increased plasma levels of I-FABP, however they had elevated plasma levels of LPS ($p<0.001$) and β DG ($p=0.008$) compared to those with low titer. Unlike ART-treated PLWH, EC with high and low anti-CMV IgG titer had similar plasma levels of CXCL13, IL-6 and IL-8.

CONCLUSIONS: CMV co-infection was associated with increased epithelial gut damage, microbial translocation, and inflammation in ART-treated PLWH. In contrast, CMV-coinfection was associated with increased microbial translocation without increased epithelial gut damage in EC. Persistent inflammation despite long-term ART may be explained, in part, by CMV-co-infection.

Other ART complications and adverse reactions

TUPEB221

Gastrointestinal disorders following initiation of dolutegravir, elvitegravir, raltegravir or darunavir

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BACKGROUND: We assessed the risk of incident gastrointestinal (GI) disorders associated with initiation of antiretroviral therapy (ART) with dolutegravir (DTG), elvitegravir (EVG), raltegravir (RAL) or darunavir (DRV).

METHODS: GI disorders consisting of GI-related symptoms, diagnoses or medication use (details in Figure 1) were assessed in persons initiating DTG, EVG, RAL or DRV in the OPERA[®] cohort. Multivariable analyses over the first 6 months of follow-up and over the entire follow-up were conducted with Cox proportional hazards regression and stratified by ART experience. Results are presented for the first 6 months of follow-up only.

RESULTS: The study population consisted of 4,700 ART-naïve (DTG: 35%, EVG: 49%, RAL: 2%, DRV: 14%) and 11,047 ART-experienced persons (DTG: 36%, EVG: 45%, RAL: 5%, DRV: 15%), Table 1. Among ART-naïve persons, incident GI disorders were rare, and no statistically significant association was observed between DTG, EVG, RAL or DRV based regimen users (Figure 1). Among ART-experienced persons, GI disorders were more likely with both DRV (HR: 1.46; 95% CI: 1.09, 1.96) and RAL (1.61; 1.05, 2.47), compared to DTG use (Figure 1).

CONCLUSIONS: In ART-naïve persons, no statistically significant increase in the risk of GI disorders over the first 6 months of ART was detected with EVG, RAL or DRV compared to DTG. However, sparse data limited the statistical power to detect differences with RAL. ART-experienced persons on DRV or RAL were more likely to experience GI disorders than those on DTG in their first 6 months on the regimen.

	ART-naïve (N=4,700)				ART-experienced (N=11,047)			
	DTG (n=1,653)	EVG (n=2,288)	RAL (n=109)	DRV (n=650)	DTG (n=3,958)	EVG (n=4,916)	RAL (n=549)	DRV (n=1,624)
Age, median (IQR)	30 (25, 40)	30 (25, 41)	39 (29, 50)	36 (28, 46)	43 (32, 52)	38 (29, 49)	48 (37, 54)	44 (34, 52)
Female, n (%)	199 (12.0)	267 (11.7)	28 (25.7)	113 (17.4)	591 (14.9)	692 (14.1)	107 (19.5)	379 (23.3)
African American, n (%)	750 (45.4)	1053 (46.0)	54 (49.5)	346 (53.2)	1606 (40.6)	1968 (40.0)	192 (35.0)	771 (47.5)
Hispanic, n (%)	460 (27.8)	623 (27.2)	23 (21.1)	151 (23.2)	1016 (25.7)	1272 (25.9)	98 (17.9)	343 (21.1)
U.S. region: Southern States, n (%)	937 (56.7)	1491 (65.2)	65 (59.6)	380 (58.5)	1967 (49.7)	3023 (61.5)	331 (60.3)	992 (61.1)
Nadir CD4 cell count (cells/ μ L), median (IQR)	376 (224, 524)	364 (214, 523)	319 (140, 456)	220 (78, 381)	416 (251, 609)	446 (277, 635)	510 (299, 716)	365 (178, 584)
Opioid use, n (%)	42 (2.5)	45 (2.0)	6 (5.5)	28 (4.3)	295 (7.5)	245 (5.0)	46 (8.4)	114 (7.0)
NSAID use, n (%)	53 (3.2)	63 (2.8)	2 (1.8)	33 (5.1)	306 (7.7)	298 (6.1)	40 (7.3)	125 (7.7)

[Table 1. Baseline demographic and clinical characteristics]

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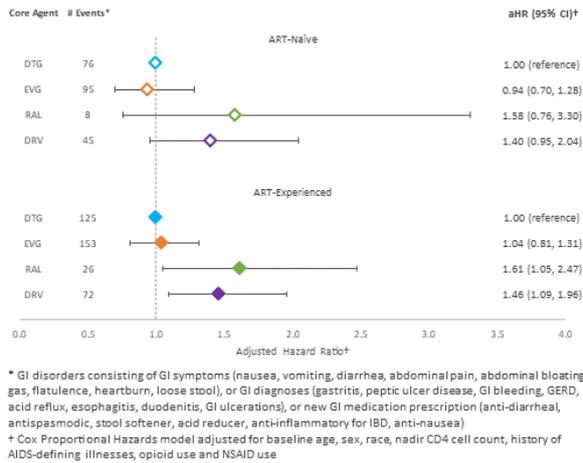
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[Figure 1. Association between core agents and GI disorders]

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Prevalence and outcomes for heavily treatment-experienced (HTE) individuals living with HIV in a European Cohort

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BACKGROUND: The extent of limited treatment options due to extensive treatment history, drug resistance or intolerance to specific antiretrovirals (ARVs) is largely unknown, as are the clinical consequences. We estimated the prevalence, variation over time and potential clinical consequence of HTE individuals in the EuroSIDA cohort.

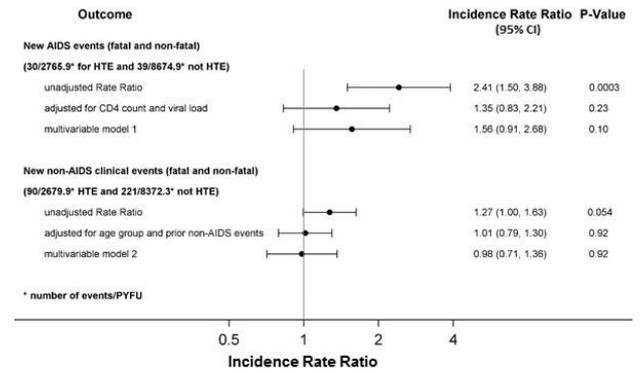
METHODS: A composite definition for HTE, based on observed/predicted cumulated drug resistance (≤ 2 ARV classes available), ARV treatment history and use of sentinel regimens indicating limited treatment options remaining, was used to estimate the prevalence and incidence of HTE between 2010 and 2016. Outcomes following HTE were assessed by Poisson regression, comparing each person who became HTE after 01.01.2010 with three controls who were never HTE, with follow-up accrued from the date the person became HTE.

RESULTS: Of 15570 individuals under follow-up in 2010-2016, 1617 were ever HTE (10.4%, 95% CI 9.9-10.9%). HTE prevalence increased by 0.5%/year [95% CI 0.34-0.66%/year]. In 2016, the prevalence of HTE was similar in South, West/Central and North Europe (11.5%, 11.3% and 11.4%, respectively) and lower in East Europe (3.1%).

HTE individuals experienced 2.4 and 1.3-fold higher incidence rates of AIDS and non-AIDS clinical events [10.9 [95% CI 7.6-15.5] and 33.6 [27.3-41.3] events/1000 person-years of follow-up (PYFU), respectively] than

those who were not HTE [4.5 [3.3-6.2] and 26.4 [23.1-30.1] AIDS and non-AIDS events/1000 PYFU]. After adjustment for CD4 count and viral load, HTE status was no longer associated with AIDS, while the higher incidence of non-AIDS events was largely explained by older age and pre-existing comorbidities (Figure).

CONCLUSIONS: Around 10% of HIV-positive individuals in Europe are HTE with limited treatment options. HTE prevalence increased over time and HTE individuals experienced higher incidence of AIDS and non-AIDS events, largely explained by immuno-virological parameters or by aging/comorbidities, respectively. Effective management of HIV and co-morbidities remain important to reduce clinical complications in the HTE population.



For each HTE individual three controls were selected at random from those under follow-up but never HTE, and assessed from the date the HTE individual became HTE.

Model 1 adjusted for age (<50 vs. ≥ 50 years), region of Europe, CD4 cell counts and viral load at the HTE index date, and prior AIDS and non-AIDS clinical conditions.

Model 2 adjusted for age group, gender, ethnic group, HIV risk group, region of Europe, CD4 counts and viral load, prior AIDS and prior non-AIDS clinical conditions and the total number of different ARV drugs previously exposed to.

[Figure. Univariable and multivariable incidence rate ratios for new AIDS or non-AIDS clinical events]

HIV complications and co-morbidities in paediatric and adolescent populations

TUPEB303

Long-term growth among children stunted at ART initiation in Malawi

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BACKGROUND: Stunting is common among HIV-infected children. However, little is known regarding long-term growth of stunted children following ART initiation. We used routinely collected data from a Médecins Sans Frontières supported project in rural Malawi to report long-term growth of stunted children at 5 and 10 years after ART initiation.

METHODS: We conducted a retrospective cohort analysis on all patients initiated on ART less than 10 years old between 2001-2018. Height-for-age (HAZ) and weight-for-age (WAZ) Z-scores were calculated using WHO Child Growth Charts and WHO Reference 2007 Charts. Cutoffs for moderate/severe stunting and underweight followed WHO guidelines.

RESULTS: Among 3,398 children who initiated ART, 64.1% were stunted (26.7% moderately and 37.4% severely); median HAZ -2.5 [IQR: -3.5,-1.5]. Of them, 48.9% were male, median age 2.9 years [IQR: 1.4,6.2]. 22.7% were moderately underweight and 19.4% were severely underweight; median WAZ -1.7 [IQR: -2.7,-0.7]. Of the children stunted at ART initiation, 1,037 have completed 5 years on ART with a median change in HAZ of 1.2 [IQR: 0.5,1.8]; 41.5% were no longer stunted (HAZ > -2). Of the children stunted

at ART initiation, 338 have completed 10 years on ART with a median change in HAZ of 1.2 [IQR: 0.5;1.7]; 37.3% were no longer stunted. A multivariate model found patients 5-9 years old at ART initiation were 4.01 (95%CI: 2.86,5.61) times more likely to remain stunted after 5 years on ART compared to patients < 5 years old at ART initiation.

		No. of patients (n=1,037)	No. stunted after 5 years on ART	Adjusted Odds Ratio	95% CI
Age at ART initiation	Less than 5 years	737	374 (50.8%)	ref.	
	5-9 years	300	233 (77.7%)	4.01**	[2.86,5.61]
Stunting Status at ART initiation	Moderate	404	177 (43.8%)	ref.	
	Severe	633	430 (67.9%)	2.75**	[2.04,3.70]
	Not underweight	448	199 (44.4%)	ref.	
Underweight at ART initiation	Moderate	318	207 (65.1%)	1.72**	[1.25,2.36]
	Severe	271	201 (74.2%)	2.35**	[1.64,3.37]
	Female	492	289 (58.7%)	ref.	
Patient Sex	Male	545	318 (58.4%)	0.95	[0.72,1.24]
	ART Regimen Line 5 years after ART initiation	1 st Line	887	515 (58.1%)	ref.
	2 nd Line	150	92 (61.3%)	1.12	[0.76,1.65]

*p<0.05 **p<0.01

[Association between stunting after 5 years on ART and key risk factors among children stunted at ART]

CONCLUSIONS: 41.5% of stunted HIV-infected children were no longer stunted after 5 years on ART. The height catch up appears to remain stable between 5 and 10 years on ART. Early ART initiation for HIV-infected children reduces the likelihood of remaining stunted. In addition, nutritional support should be provided to stunted patients on ART.

Clinical issues in men who have sex with men

TUPEB309

High prevalence of anal and oral high risk-human papillomavirus in HIV-negative French men who have sex with men taking pre-exposure prophylaxis

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BACKGROUND: Men who have sex with men (MSM) are at risk for HIV acquisition, and may benefit of pre-exposure prophylaxis (PrEP). Descriptive, quantitative, cross-sectional survey was conducted in 2018 estimating the prevalence of anal and oral high risk Human papillomavirus (HR-HPV) infection and associated risk factors among young adult MSM taking PrEP in healthcare facilities in Orléans, France.

METHODS: Anal and oral samples were collected from prospectively included MSM seeking PrEP at consultation services in a French hospital to be screened by multiplex real-time PCR (Anyplex™ II HPV 28, Seegene, South Korea) for HPV DNA. Face-to-face standardized interview was used to collect socio-demographic and behavioral characteristics.

RESULTS: A total of 61 MSM (mean age, 36.1 years) taking PrEP were enrolled. The anal HPV and HR-HPV prevalence were 93.4% (95% CI: 87.2-99.6) and 81.9% (95% CI: 72.3-91.6), respectively. Oral HPV and HR-HPV prevalence were 33.9% (95% CI: 21.5-46.3) and 19.6% (95% CI: 9.2-30.1), respectively. HR-HPV-33 targeted by prophylactic Gardasil-9[®] vaccine was the most detected genotype, both in anal and oral specimens.

More than two-thirds (68.8%) of the study MSM carried at least one HPV genotype targeted by Gardasil-9[®] vaccine in their anal specimens; all oral HPV-positive specimens carried at least one HPV genotype covered by this vaccine. Condomless receptive anal intercourse and past history of anal gonorrhoea were the main factors strongly associated with increased risk for anal HPV infection (aOR: 10.4, 95% CI: 1.2-90.5%) and multiple anal HR-HPV (aOR: 5.77, 95% CI: 1.7-19.3%), respectively.

Conversely, having had < 10 different male partners in the last 12 months was associated with decreased risk for anal infection with both multiple

HPV (aOR: 0.19, 95% CI: 0.05-0.83%) and HR-HPV (aOR: 0.17, 95% CI: 0.04-0.8%). No associated risk factor could be evidenced for carrying oral HPV.

CONCLUSIONS: French MSM using PrEP are at high risk for both anal and oral carriage of HR-HPV infections and therefore for HPV-related cancers. There is an urgent need to strengthen existing HIV and other sexually transmitted infections prevention strategies and interventions towards HIV-negative French MSM taking PrEP.

Male and female condoms and other physical barriers

TUPEC381

Development of a scale to assess male partner involvement in the prevention of mother-to-child transmission of HIV

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BACKGROUND: Male partner participation in the prevention of mother to child transmission (PMTCT) of the Human Immuno-Deficiency virus (HIV) is recognized as being critical for the success of a PMTCT program. Limited attempts have been made to measure it and a validated tool is lacking. Our aim is to develop a tool to measure male partner involvement in PMTCT of HIV, and determine its internal consistency and validity.

METHODS: Our study was designed in two phases. The first phase was a systematic review to identify items used to describe male partner involvement in PMTCT. The items were used to develop a questionnaire. The second phase, was a cross sectional study to test the different items of the questionnaire on 266 participants. Principal component analysis was used to group items that measured the same construct. Cronbach's alpha was used to test internal consistency. Multiple linear regression analysis was used to test construct validity.

RESULTS: The final scale with 20 items consisted of two subscales: supportive and non-supportive domains of male partner involvement in PMTCT. Estimates of Cronbach's alpha for internal consistencies of the subscales were 0.91 [95% confidence interval (CI): 0.89, 0.92] and 0.89 [95% CI: 0.87, 0.91], respectively. Scores on the scale varied from 20 to 100. Based on the 50th and 90th percentile scores of the study participants, a male partner can be considered as being „uninvolved“ (score ≤67), „partially involved“ (score 68 to 88) or „involved“ (score ≥ 89) in the PMTCT cascade. The results of the regression indicated that older age of the woman (estimated $\beta=0.29$ [95% CI: 0.06, 0.53], $p=0.016$), and living together with the male partner (estimated $\beta=4.35$, [95% CI: 1.60, 7.11], $p=0.002$), were found to be positive predictors of male partner PMTCT involvement, and associated with higher scores. The fear of the male partner to know his HIV status was associated with significantly lower scores (estimated $\beta=-16.36$, [95% CI: -20.40, -12.32], $p<0.001$).

CONCLUSIONS: We have developed a tool to measure an attribute we call „Male partner involvement in PMTCT“, and have assessed its internal consistency and validity. More research still remains to validate the tool.

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22 July**Male circumcision****TUPEC382****Reasons for exclusion from voluntary medical male circumcision: Project IQ Malawi experience**

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BACKGROUND: Voluntary medical male circumcision (VMMC) provides males with lifelong, partial protection against HIV and other sexually transmitted infections (STIs). The WHO minimum package of VMMC services stresses screening men for VMMC eligibility and recommends referral to a higher level of care for clients with contraindications or management of conditions that pose increased risk. Men who initially screen ineligible frequently undergo treatment and are later circumcised when they meet eligibility criteria. Jhpiego, with funding from the US Centers for Disease Control and Prevention, has been implementing VMMC in Lilongwe District, Malawi since April 2016, and routinely reviews reasons for VMMC ineligibility among men seeking services in Lilongwe to better anticipate and address clients' health needs while ensuring the safety of the procedure.

METHODS: Project data from April 2016 to October 2018 were retrospectively analyzed for reasons for VMMC ineligibility. Information on the types of contraindications identified was captured from the clinical record.

RESULTS: Out of 90,012 clients seeking VMMC services between April 2016 and September 2018, 89,356 (99%) were eligible and received VMMC services. A total of 656 males (1%) were ineligible for VMMC at the time of initial screening. Of all the ineligible clients, 486 (74.1%) were syndromically diagnosed with STIs, 35 (5.3%) had phimosis that required referral to specialist, 22 (3.4%) had high blood pressure, 18 (2.7%) had epispadias/hypospadias, 18 (2.7%) reported allergic reactions, not specified, 8 (1.2%), had diabetes, 8 (1.2) had high fever and were referred for a malaria test, and 60 (9.1%) had other contraindications (Paraphimosis, painful urination, bleeding disorders, psychiatry, Bacterial skin infection, HIV with immunosuppression (Low CD4 count and a WHO stage 2 or 3 condition observed), hydrocele).

CONCLUSIONS: Comprehensive screening procedures are essential to ensuring the safety of VMMC for HIV prevention. We found that less than 1% of clients presenting for VMMC screened ineligible, which is lower than expected and suggests there may be room to improve screening. Additionally, the majority of clients presented with conditions that are easily managed, highlighting the need for proper management with follow up mechanisms for all ineligible clients to ensure they receive VMMC services after treatment.

TUPEC383**Maximizing voluntary medical male circumcision for HIV prevention in Lilongwe, Malawi, by targeting men in priority age group (15-29 years)**

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BACKGROUND: Targeting voluntary medical male circumcision (VMMC) to men aged 15-29 years helps reduce HIV incidence. In 2016, the US President's Emergency Plan for AIDS Relief (PEPFAR) technical guidance recommended that VMMC programs in all countries prioritize men in this age group. A review of 2016 performance data indicated that most circumcision clients in Lilongwe, Malawi, were boys younger than 15 years. We evaluated the program's efforts to target men aged 15-29 years.

METHODS: VMMC aggregate program data are collected monthly through partner monitoring and evaluation system and reported quarterly to PEPFAR. We analyzed program data from 2016 to 2018 to examine trends in clientele age and total number of VMMCs performed. Data were grouped by US government fiscal year (October 1-September 30) and disaggregated by quarter and age. Descriptive analyses were performed to evaluate VMMC program performance.

RESULTS: Of all clients who underwent circumcision in Lilongwe in 2016, 44% were aged 15-29 years. In 2017 and 2018, 71% and 82% of circumcisions, respectively, were among men aged 15-29 years, with an overall increase of 86% from 2016. Performance improvements in 2017 and 2018 are attributed to implementation of the following demand creation strategies: training satisfied VMMC clients within the priority age group to be community mobilizers; community mapping of male congregate areas (e.g., markets or bawo games); extending service hours to accommodate work hours and clients with privacy concerns; partnering with community leaders and key influencers to act as VMMC champions; and enhancing referrals from other health service delivery points.

CONCLUSIONS: Implementing age-targeted demand creation activities effectively improves VMMC service uptake among this priority age group. Further refinements include scaling provider referrals to all district sites and expanding community mobilization activities all year to minimize seasonal demand.

TUPEC384**Modeling the impact of Voluntary Medical Male Circumcision (VMMC) on cervical cancer in Uganda**

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BACKGROUND: VMMC is a large-scale HIV prevention intervention implemented primarily in 14 southern and eastern African countries, with over 22 million circumcisions performed following WHO and UNAIDS recommendations in 2007. VMMC has provided millions of men with lifelong 60% lower risk of HIV infection, and also provides their female partners with health benefits including decreased risk for human papillomavirus (HPV) and resultant cervical cancer (CC). We modeled the potential impact of VMMC on CC incidence and mortality as an additional benefit beyond HIV prevention.

METHODS: We used a simulation-based Spectrum cervical cancer and HPV optimization model calibrated for Uganda to estimate HPV infection incidence over 50 years (2018-2067), based on the gradual nature of malignant transformation. 2016 Demographic Health Survey data provided baseline VMMC coverage. Assumptions included VMMC scale-up to 90% coverage in all age groups 15-49 by 2023; 2018 Uganda-specific HPV epidemiologic estimates from the WHO-affiliated HPV Information Centre including CC crude rate 28.8 per 100,000 and HPV 16/18 prevalence 3.6%; and circumcision effects from published literature - 53% reduction in acquisition rate of high-risk HPV types and 56% increase in clearance rates among HIV-negative men, and no impact among HIV-positive men. The baseline (no VMMC scale-up beyond current levels) was compared to multiple scenarios to assess the impact of VMMC scale-up in the absence of HPV vaccination and CC screening programs.

RESULTS: In a scenario where coverage of all interventions remain at current levels, the crude CC incidence and mortality rates are 32.8 and 17.3 per 100,000 women per year, respectively, in 2067. VMMC scale-up decreases CC incidence to 26.6 by 2067 and averts 14,000 deaths between 2018-2067. In the presence of 90% HPV vaccination coverage for adolescent girls and young women, incidence drops below 10 per 100,000 with or without a VMMC program.

CONCLUSIONS: Planned VMMC scale-up to 90% coverage from current levels can prevent a substantial number of CC cases without dedicated HPV and CC interventions, though it adds little in settings where these are in place. Further modeling is needed to determine potential region-wide CC and CC-related mortality prevention benefits of VMMC and those experienced from circumcisions already done.

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Post-exposure prophylaxis in victims of sexual violence. 10 years' experience at the Condesa Specialized Clinic (CSC)

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BACKGROUND: Since its implementation in 2008, the CSC's program for treating victims of sexual violence has used post-exposure prophylaxis (PEP) as an effective preventive mechanism. The majority of patients are referred for treatment by the Sex Crimes Department of the Mexico City Attorney General's Office. All patients undergo a rapid HIV test, Agp24, HBsAg, Ab VHC and T. Pallidum. Clinical risk assessment and, in the case of sexual violence having occurred within 72 hours with vaginal and/or anal violence, PEP is begun for HIV, along with prophylaxes for other STIs including azithromycin, metronidazole and ceftriaxone; emergency anti-contraceptives are also offered. If the patient has not been vaccinated for the human papilloma virus (HPV) then the vaccine is administered. Weekly follow-ups are scheduled in order to monitor for adverse effects from the antiretroviral medications. Detection of Agp24, HBsAg, AbVHC and T. Pallidum is performed at the start and weeks 4,16,32. The objective of the study is to demonstrate the effectiveness of PEP.

METHODS: Transversal study, including victims of sexual violence referred to the CSC's PEP program. Period: December 1, 2008 to December 31, 2018. Description of continuous and categorical variables was undertaken.

RESULTS: 9,958 victims of sexual violence. 92.7% (n=9,236) women, 7.2% (n=722) men. Median age of 20.1 and 17.5 years, respectively. 56.9% (n=5,676) were younger than 19 years old, of which 16.2% (n=1,623) were younger than 12 years old, 22.2% (n=2,231) were between 12 and 15 years old and 18.2% (n=1,822) were between 16 and 19 years old. PEP for HIV and STIs: 35% (n=3,489) of patients (3,238 women, 251 men) who showed up within the first 72 hours of sexual violence. Pregnancy resulting from sexual violence occurred in less than 1% (n=106). Of the patients who were victims of sexual violence, 34.7% (n=3,456) had not initiated their sex life at the time of the event. No case of HIV resulting from sexual violence has been detected among the patients in treatment. 92% (n=9,161) of the patients were sent from the Sex Crimes Department of the Mexico City.

CONCLUSIONS: PEP is effective for preventing HIV and other STIs in victims of sexual violence, as well as for early diagnosis of unwanted pregnancies. The period following the event is critical for beginning PEP and is the cause of lost opportunities.

TUPEC386

Eighteen years experience of prophylaxis after sexual exposure to HIV (PEP): Comparison between two decades

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BACKGROUND: PEP has been offered at Clinique médicale l'Actuel since 2000. Development and improvements in antiretroviral treatments have changed post-exposure prophylaxis (PEP) guidelines. We aim to describe and compare characteristics and adherence to treatment of our PEP cohort from 2000 to 2018.

METHODS: This observational retrospective study of the PEP cohort of Clinique médicale l'Actuel (Montréal, Canada) includes men who have sex with men, ages ≥18, who consulted for PEP from January 2000 to No-

vember 2018. We defined two groups: group 1 (January 2000 to December 2009) and group 2 (January 2010 to November 2018). Socio-demographics, behavioural risks and treatment characteristics were compared between groups. Completed follow-up (FU) was considered if the patient came back for consulting at week 4. Analyses were performed by using Stata 11.

RESULTS: Among 2882 consultations for PEP, 516 (18%) were in group 1 and 2366 (82%) in group 2. PEP is used much more often since 2010. For the majority it was a first episode (63%) and the delay between exposure and consultation was within 72 hours (99%). Patients in group 2 had sex with casual partner (96% vs. 37%, $p < 0.01$) and a risk assessment classified by the physician as high (81% vs. 75%, $p < 0.01$) superior than those in group 1. The table 1 provides more information about our cohort.

CONCLUSIONS: We observed a high adherence to ARV-PEP in our cohort, but more recent ARV-PEP regimens had less adverse reaction and increased the adherence to treatment. Patients in the group 2 had risk behaviours higher than those in the group 1; as such, continued risk reduction counseling is essential to minimize potential harms associated with risk behaviors. The support of combined prevention measures remains key to ending the epidemic.

	Group 1 n (%) 516 (18)	Group 2 n (%) 2366 (82)	Total n (%) 2882	p-value
Age (mean + standard deviation)	34.8 + 9.3	35.7 + 10.6	35.6 + 10.4	0.06
University degree	300 (58)	1511 (64)	1811 (63)	0.02
Casual partner	189 (37)	2265 (96)	2454 (85)	<0.01
Condomless anal sex	467 (91)	2211 (94)	2678 (93)	0.06
Patient treated	515 (99.8)	2294 (97)	2809 (97.5)	1.00
TDV/LPV regimen	352 (68)	898 (39)	1250 (44)	<0.01
TDV/RAL regimen	0	1143 (50)	1143 (41)	<0.01
Adverse reaction to ARV	306 (89)	1290 (58)	1596 (62)	<0.01
Adherence to 4 weeks treatment	475 (92)	2252 (95)	2727 (95)	<0.05

[Table 1- Characteristics of Study Population]

TUPEC387

Zero: The seroconversion rate of Mozambican health workers occupationally exposed to HIV

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BACKGROUND: Mozambique faces the double challenge of an AIDS epidemic and scarce health workforce. To protect health workers (HW), the Ministry of Health is implementing workplace safety (WPS), HW training on safe practices, and post-exposure prophylaxis (PEP) in the largest 180 health facilities, since 2009, with support from Jhpiego, a non-governmental organization. Exposed workers must receive immediate assistance to define their eligibility for PEP and risk of HIV infection. The proportion of seroconversions is a proxy of failed PEP. Globally, 0.3% of HW percutaneously exposed to blood, the commonest risk, will acquire HIV infection.

METHODS: Data was abstracted from facility PEP registers. HWs with HIV negative result and exposure time less than 72 hours were eligible for PEP. Exposure source was classified as percutaneous (puncturing, slicing or penetrating) or superficial (mucous membranes), and extent of exposure as light (superficial needle prick) or massive (deep prick with large caliber needle or bistoury). The time to initiate PEP was recorded. All exposed HWs were monitored for six months minimum for seroconversion.

RESULTS: From 2009 to 2018, 6,283 HW were occupationally exposed to HIV in the 180 facilities, with 3,101 males (49.4%) and 3,182 females (50.6%). Causes of exposure were percutaneous [blood, 4,084 (65%); superficial [non-bleeding lacerations, 983 (15.6%); sprays of blood, 794 (12.6%) and amniotic fluid, 314 (5%); contact of fluids with damaged skin, 108 (1.8%)].

Exposure occurred in general wards for 2,325 (37%); maternity ward, 1,005 (16%); emergency services, 880 (14%); operating rooms, 440 (7%); labs, 371 (6%); outpatient consultation, 239 (4%) and 1,023 (16%) in intensive care, trauma and surgery care. 5,704 (90%) exposed were eligible for, and initiated PEP, all within 72 hours of the exposure; 3,896 (62%) source

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patients were HIV positive. No exposed HW seroconverted, regardless of source patient serostatus. All HWs received regular refreshments to reinforce biosafety skills.

CONCLUSIONS: Mozambique WPS/PEP program has the lowest possible seroconversion rate among HWs. The WPS/PEP efforts (including refresher trainings) have proved successful to protect HWs against HIV infection. However, the likelihood of poor transmission of HIV in the modes of occupational exposure seen in Mozambique cannot be entirely discarded.

TUPEC388

Use of HIV postexposure prophylaxis after sexual assault among female sex workers in Brazil

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BACKGROUND: Access to post-exposure HIV prophylaxis (PEP) is critical for women and especially for sex workers (FSW) as a method of preventing HIV transmission. However, FSW still faces barriers to PEP access in many places, including Brazil. Our objective was to analyze factors associated with PEP use among FSW after sexual assault in Brazil.

METHODS: A cross-sectional study of 4,245 FSW recruited in 12 Brazilian cities by respondent driven sample (RDS) in 2016. Participants were interviewed and the associations of behavioral, sociodemographic, health service related variables, social support and history of violence and discrimination with PEP use after sexual assault were analyzed. For each city, individuals were weighted using RDSII estimator. Combined data was analyzed by STATA 14 complex survey procedure using each city as a stratum and each group of women recruited by the same FSW as a cluster. Odds ratios and 95% CI were estimated using logistic regression.

RESULTS: Half of FSW was below 30 years of age and 48% did not complete high school. 73.9% black; with lower socioeconomic level (56.2%), 31% were aware of PEP, 26.3% reported an episode of sexual assault during a lifetime. After sexual assault, 7.5% used PEP, 18.7% went to a health clinic but did not have access to PEP and 73.8% did not search for health assistance. Factors associated with PEP use after sexual assault were: PEP awareness (OR: 3.71); participation in HIV educational activities (OR: 1.53); disclosure of FSW status to a health care provider (OR: 1.80) and number of clients per day (1-9 vs 10 or more) (OR: 6.67).

CONCLUSIONS: Despite the existing policy for victims of sexual assault in Brazil with PEP included, PEP use after sexual assault was extremely low among FSW even for those who sought health assistance indicating inequity in access. Screening, documentation and care for victims of sexual assault, such as counselling and engagement in proper care are essential to promote access to HIV preventive services. Health services should be better qualified to care for FSW victims of sexual assault.

TUPEC389

Awareness of HIV Postexposure Prophylaxis among female sex workers in Brazil

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BACKGROUND: Post-exposure prophylaxis (PEP) is a prevention tool that has proven effectiveness in reducing the risk of HIV infection and it is offered at no cost in Brazil since 2009. Female sex workers (FSW) continue to bear a high burden of HIV infection in many countries including Brazil and are an important target population for a public health response to HIV. We aimed to investigate PEP awareness among FSW in Brazil.

METHODS: A cross-sectional study of 4,245 FSW recruited in 12 Brazilian cities by respondent-driving sampling (RDS) in 2016. Participants were interviewed and associations of behavioral, socio-demographic variables related to health services, social support and history of violence and discrimination with PEP awareness were analyzed. For each city, individuals were weighted using RDSII estimator. Combined data was analyzed by STATA 14 complex survey procedure using each city as a stratum and each group of women recruited by the same FSW as a cluster. Odds ratios and 95% CI were estimated using logistic regression.

RESULTS: Half of FSW was below 30 years of age and 48% did not complete high school. 73.9% black; with lower socioeconomic level (56.2%) and treated worse than other people in the health services for an FSW (47.3%). 31.0% were aware of PEP before the survey. Factors associated with PEP awareness were: age 40 or older (OR: 1.25), whites (OR: 1.13), higher income (OR: 1.44), higher education levels (OR: 1.58), access to HIV knowledge and information (OR: 1.74), disclosure of FSW status to a health care provider (OR: 1.43), searched for health care after sexual assault (OR: 1.64), protective sex with clients (OR: 1.40).

CONCLUSIONS: Despite availability of PEP since 2009 and universal access to HIV care in the Brazilian public health system, our results show that PEP awareness is still low among FSW which represents an important barrier to PEP access. These results indicate that strategies to increase information, knowledge and access to PEP among FSW are urgently needed.

PrEP

TUPEC390

Projected impact of concurrent availability of long-acting injectable and daily-oral PrEP among men who have sex with men

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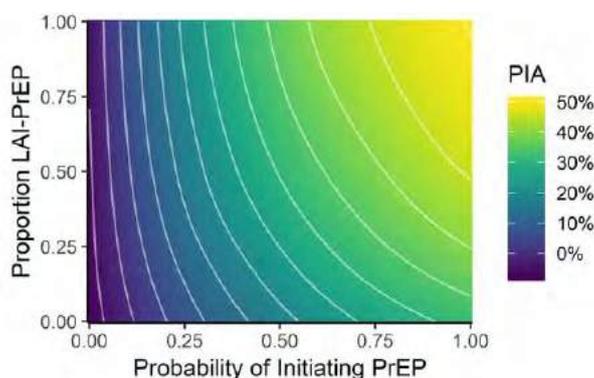
BACKGROUND: Daily oral pre-exposure prophylaxis (DO-PrEP) to prevent HIV is highly effective, but uptake and adherence challenges have limited its benefits. Long-acting injectable PrEP (LAI-PrEP) with bimonthly injections could overcome these limitations, but its prevention benefits among high-risk populations accessing either formulation are unknown.

METHODS: We used an agent-based model of HIV transmission dynamics among men who have sex with men (MSM) over a 10 year period. Model parameters for LAI-PrEP pharmacokinetics and efficacy were estimated based on Phase IIa trial data. We evaluated counterfactual scenarios, simultaneously varying the probability of PrEP initiation and the proportion

choosing LAI-PrEP versus DO-PrEP, compared to a current empirical reference scenario with no LAI-PrEP and 10% of indicated men initiating DO-PrEP. Sensitivity analyses compared alternative parameters for LAI-PrEP pharmacokinetics and efficacy given the absence of Phase III trial data.

RESULTS: Overall HIV incidence decreased from 3.03 per 100 person-years in the reference scenario to 2.60 and 2.21 when the proportion of MSM choosing LAI-PrEP increased to 50% and 100%, respectively, but initiation probability remained at 10%. Cumulatively across 10 years, these reductions corresponded to 5% and 10% of infections averted compared to the reference. The benefit of choosing LAI-PrEP was maximized when overall initiation of PrEP also increased (see Figure). When the probabilities of initiating PrEP and choosing LAI-PrEP both increased to 50%, incidence decreased to 1.35 (30% of infections averted). These results were robust to alternative specifications of LAI-PrEP parameters.

CONCLUSIONS: This is the first modeling study that estimates the population-impact of oral and injectable PrEP formulations when available concurrently, as is expected in clinical practice. LAI-PrEP could provide significant population-level HIV prevention benefits in settings where MSM struggle with DO-PrEP adherence. However, the impact of LAI-PrEP will depend both on its more durable pharmacokinetic efficacy and its potential to improve PrEP initiation to all indicated MSM.



[Percent of infections averted (PIA) across levels of PrEP uptake and proportion choosing LAI-PrEP]

TUPEC391

PrEP users perceive high community-level PrEP stigma in Kenya

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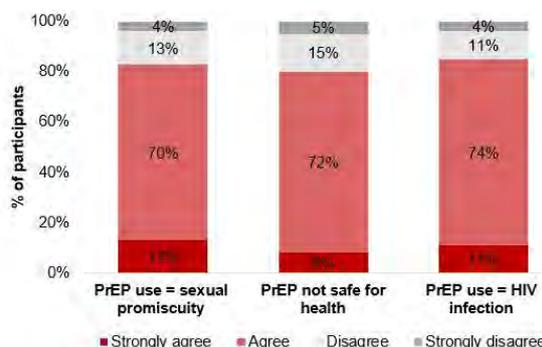
BACKGROUND: Pre-exposure prophylaxis (PrEP) is highly effective at preventing HIV infection, but uptake, retention and adherence remains low among at-risk individuals in high HIV prevalence settings. We measured PrEP users' perceptions of community-level PrEP stigma in Kenya.

METHODS: From May 2018 and January 2019, 233 PrEP users (83 men and 41 women in an HIV serodiscordant relationship, 109 women at HIV risk) were enrolled in a randomized trial testing if HIV self-testing might support PrEP delivery. Eligible participants were ≥18 years, HIV uninfected, and had used PrEP for 1 month. At enrollment, participants completed an in-person survey that measured their perceptions of community-level PrEP stigma. Specifically, participants were asked whether people in their community think: (i) people who take PrEP are promiscuous, (ii) PrEP use might not be safe for your health, and (iii) PrEP use means you have HIV (response options: strongly disagree, disagree, agree, strongly agree). We reported descriptive statistics.

RESULTS: The median age of participants was 34 years (IQR: 28-40) and number of school years was 8 (IQR: 8-12). The vast majority of participants strongly agreed or agreed that people in their community think PrEP use is associated with sexual promiscuity (83%, n=170), is unsafe your health (80%, n=164), and means you have HIV (85%, n=176), Figure 1. These findings remained consistent across sub-populations, with the exception of females at HIV risk, who reported higher community-level perceptions

of associated PrEP use and sexual promiscuity (87% strongly agreed/agreed, n=86) compared to males (79%, n=56) and females (75%, n=56) in serodiscordant couples.

CONCLUSIONS: Community-level PrEP stigma is perceived as high among PrEP users in Kenya and could thus be a barrier to PrEP uptake and continuation among HIV at-risk individuals. To optimize PrEP delivery, PrEP programing should include innovative interventions to address community-level PrEP stigma in high HIV prevalence settings.



[Figure 1. PrEP users' perceptions of community-level PrEP stigma in Kenya]

TUPEC392

Level of polysubstance use is associated with increased sexually transmitted infections but not with decreased PrEP adherence in MSM

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BACKGROUND: Little is known about the impact of polysubstance use on PrEP adherence and sexually transmitted infections (STIs) in men who have sex with men (MSM). The objectives were:

1) to use modeling to parse participants into polysubstance use 'states' (PUS) based on substance use type and frequency, and
 2) to determine how different PUS longitudinally impact PrEP adherence and STI acquisition.

METHODS: We used data from PATH-PrEP, a 48-week open label study that evaluated tenofovir diphosphate/emtricitabine as PrEP for MSM at two sites in Los Angeles, California between April 2014 and July 2016. Substance use was assessed through computer assisted self-interviews with a 30-day horizon at week 0, 4, 8, 12, and 90-days at week 24, 36, and 48. Participants were tested for syphilis, gonorrhea and chlamydia at baseline and 12-week intervals. Prevention-effective PrEP adherence was defined by intracellular tenofovir diphosphate concentrations from dried blood spots ≥700 fmol/punch. Hidden Markov Models (HMM) were used to identify PUS determined by type and frequency of substances used. Multivariate models were used to evaluate the association of PUS with prevention-effective adherence and aggregate STIs over time.

RESULTS: PATH-PrEP enrolled 301 participants and offered PrEP to 296 MSM; the study population was previously described. HMM identified 5 PUS among study participants (Figure 1a). Most participants remained in the same HMM-defined state over the study period (Figure 1b). STIs were more common in the meth/GHB state compared to the minimal use state (incidence rate ratio 2.08, 95% confidence interval 1.20-3.60, p < 0.01). There was no difference in prevention-effective PrEP adherence by PUS.

CONCLUSIONS: We identified discrete PUS associated with different levels of sexual risk behavior in MSM prescribed PrEP. Even at high levels

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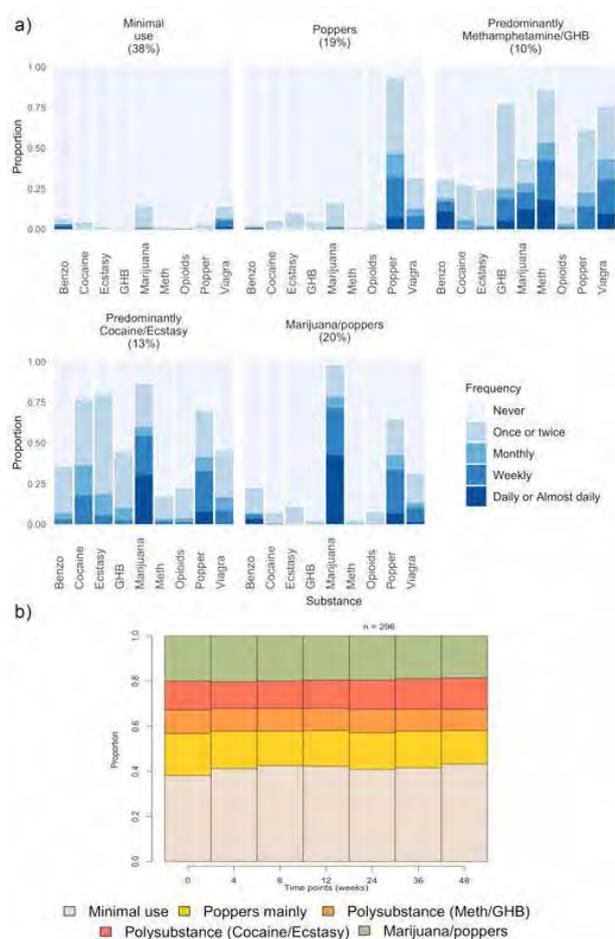
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of substance use, participants successfully adhered to PrEP. Providers should not avoid PrEP use among substance users out of concern for non-adherence.



[Figure 1]

TUPEC393

A pooled analysis of the effect of adherence on the renal safety of FTC/TDF (Truvada) for PrEP: 7 international demonstration projects

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BACKGROUND: Daily FTC/TDF for HIV pre-exposure prophylaxis (PrEP) reduces HIV-1 acquisition for high-risk individuals, however, adverse events (AEs) may impact PrEP use. Renal AEs or elevations of serum creatinine were reported in 1-4% participants taking PrEP in clinical trials. In this study, we assess the association between PrEP adherence and occurrence of renal AEs and lab abnormalities in a large, globally diverse pool of PrEP demonstration projects.

METHODS: In 7 open-label studies of FTC/TDF for PrEP, dried blood spot (DBS) analyses of tenofovir-diphosphate (TFV-DP) were collected to objectively evaluate adherence. Baseline demographics, history of renal disease and up to 1-year on-treatment renal AE and lab data were collected. Incidence rates of renal AEs based on DBS adherence were calculated by Poisson regression.

RESULTS: Of 2,823 participants received FTC/TDF PrEP, 99% were men who have sex with men (MSM), with 50% in USA, 47% in South America, 2% in Asia, and 1% in Africa. The median age at PrEP initiation was 29 years (interquartile range, IQR, 24-38), and median PrEP exposure was 8.4 months (IQR, 2.9-11.0). A total of 157 (5.6%) participants reported renal AEs within 1 year of PrEP initiation, and 6%, 7%, and 87% of them had TFV-DP consistent with taking < 2 (< 349 fmol/punch of TFV-DP), 2-3 (350-699 fmol/punch), and ≥4 (≥700 fmol/punch) tablets of FTC/TDF

PrEP per week on average, respectively. The incidence rate/100 person-years for renal AE (IR, 95% confidence interval, CI) was 1.90 (1.15-3.15) overall, and 0.60 (0.26-1.40), 1.58 (0.75-3.30), and 3.90 (2.24-6.76), respectively, for participants taking < 2, 2-3, or ≥4 tablets/week. Of 2,157 participants with ≥1 creatinine test during follow-up, 72 (3.3%) had at least one test over 1.3 mg/dl, of whom 81% were taking ≥4 [IR (95% CI), 1.24 (0.52-2.93)], 13% were taking 2-3 [1.05 (0.41-2.69)], and 7% were taking < 2 tablets/week [0.29 (0.09-0.92)] of PrEP.

CONCLUSIONS: In this multi-national pooled analysis of FTC/TDF for PrEP in MSM, participants adhere at ≥4 tablets/week were more likely to have a renal AE and/or elevated creatinine. These findings from a diverse global population underline the importance of assessing renal function for individuals using FTC/TDF for PrEP.

TUPEC394

Temporal dynamics of sexual behaviour among MSM on sequential daily and event-driven PrEP: Results from a crossover study

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BACKGROUND: Risk compensation is of concern when delivering pre-exposure prophylaxis (PrEP) for HIV prevention. The differential impacts of daily versus on-demand PrEP on the dynamics of sexual behavior among men who have sex with men (MSM) may affect the pattern of risk compensation.

METHODS: MSM enrolling in a 32-week crossover trial were randomized into 2 groups. Participants either took PrEP daily for 16 weeks switching to event-driven for another 16 weeks, or the other way around. Participants attended follow-up assessment every 8 weeks, when self-administered questionnaires were collected. Paired tests were used to differentiate risk behaviors between baseline and at week 8. Univariate analyses were conducted to identify factors associated with such change. The study was approved by the Joint CUHK-NTEC Clinical Research Ethics Committee (Ref:2016.719) and registered in Centre for Clinical Research and Biostatistics Clinical Trials Registry (Ref:CUHK_CCRB00606).

RESULTS: Of 76 participants recruited as of Jan 2019, 59 (78%) had been followed up for at least 8 weeks. Risk profile did not differ between arms. Compared to baseline, subjects reported less sex networking at week 8, particularly in physical venues ($p=0.046$). Number of total and new male sex partners were reduced ($p=0.01$; 0.004) while types/HIV status of sex partners, condom use and chemsex were similar at both time points. The reduction was associated with baseline diagnosis of STI ($p=0.02$). Chemsex was not associated with inconsistent condom use with newly met sex partners at week 0 but at week 8 it was ($p=0.37$; 0.002). It was associated with condomless sex with new sex partners at both time points ($p=0.02$; 0.03). MSM having their PrEP status disclosed in online profiles at week 8 were more active in seeking sex partners both online and offline ($p<0.001$). They had a higher number of new sex partners ($p<0.001$), especially non-regular ones ($p<0.001$).

CONCLUSIONS: PrEP per se did not modify MSM's sexual behaviors. Reduction of sex networking occurred as a result of one's knowledge of the baseline STI diagnosis; its monitoring appears to be important in affecting the dynamics of sexual behaviors. The implications of chemsex and PrEP status disclosure require further investigation.

TUPEC395

Factors associated with increased condomless sex in a PrEP adherence trial: Possible clues into who is most at riskS. Elsesser¹, S. Taylor^{2,3}, C. Psaros⁴, S. Safren⁵, K. Mayer^{2,6,7}¹University of Pennsylvania, Family Medicine and Community Health, Philadelphia, United States, ²Fenway Institute, Boston, United States, ³Wheelock College, Boston, United States, ⁴Massachusetts General Hospital and Harvard Medical School, USA, Boston, United States, ⁵University of Miami, Miami, United States, ⁶Harvard Medical School, Boston, United States, ⁷Beth Israel Deaconess Medical Center, Boston, United States

BACKGROUND: While antiretroviral pre-exposure prophylaxis (PrEP) has been shown to decrease HIV incidence in MSM, evidence regarding its association with condomless sex has been mixed. High levels of PrEP adherence may mitigate the impact of risk compensation on HIV transmission though PrEP adherence has been variable. Identifying factors associated with risk compensation may help clinicians focus their attention on those who need the most counseling or other support. We compared sexual behavior data pre- and post-initiation of PrEP among MSM enrolled in a study designed to enhance PrEP adherence.

METHODS: 50 Boston-area MSM were randomized into either a PrEP-specific adherence intervention, with four weekly sessions addressing barriers and facilitators of PrEP use, or to a time-matched control: sessions emphasizing general health information and providing PrEP information. Sexual behavior was self-reported at baseline and six-month visits. Using SPSS, differences in sexual behavior were examined using ANOVA.

RESULTS: Participants were primarily White (94%) and college-educated (64%). Overall, rates of condomless sex were similar between the three months prior to initiation of PrEP (baseline) and the final three months of the six month trial (post-initiation of PrEP) [$F(1, 38) = 1.90, p = 0.17$], despite 51% reporting increased condomless sex acts between time points. Over the same time period, participants reporting being single at screening reported increased condomless sex ($M=14.12, SD=26.57$) while those who reported a primary partner reported a decrease in condomless sex ($M=2.09, SD=16.25$) [$F(1,37) = 5.52, p = .024$]. Participants reporting no lifetime STIs reported decreased condomless sex ($M=-1.72, SD=13.57$) while reporting any lifetime STIs was associated with an increase in condomless sex, with each additional STI reported associated with a greater increase [$F(3,35) = 4.73, p=0.007$].

CONCLUSIONS: Among a group of MSM initiating PrEP, those without a primary partner and those with a prior STI history tended to increase their condomless sex acts. Small sample size limits these findings and the levels of PrEP adherence seen in the sample likely mitigated any potential increased HIV risk. Continuing to identify factors associated with risk compensation may help clinicians focus medication adherence resources where they would have the greatest impact.

TUPEC396

Pre-exposure prophylaxis and STIs screenings in the Dominican Republic: Is an integrated approach necessary to scale-up?R. Paulino-Ramirez¹, L. Tapia¹, A. Mariño², D. Reyes², M. Rodríguez-Lauzurique², M. Muñoz², J. Ledesma³, R. Rodríguez⁴, S. Rosario²¹Universidad Iberoamericana, Instituto de Medicina Tropical & Salud Global, Santo Domingo, Dominican Republic, ²Centro de Orientación e Investigación Integral, Santo Domingo, Dominican Republic, ³Ministry of Health, DIGECITSS, Santo Domingo, Dominican Republic, ⁴Panamerican Health Organization/WHO, Santo Domingo, Dominican Republic

BACKGROUND: Among the HIV preventing measures in most-at-risk populations, PrEP has demonstrated to be effective in reducing the risk of contracting HIV among Men who have sex with men and Transgender populations. In the Dominican Republic no previous PrEP implementation has been documented. The main objective of this pilot is to demonstrate feasibility, adherence, and effectiveness of PrEP in a cohort of MSM and Transwomen in the Dominican Republic.

METHODS: Self identified as MSM and Transwomen attending an outpatient clinic in the capital city were invited to receive PrEP during a period of nine months. All participants were screened for substantial risk of HIV infection by the psychology department and those qualifying were screened for HIV and other STIs including HPV by anal smear. Those with a recent sexual contact without condom were deferred for a 30 days visit or PEP. All participants were counselled about condom use with PrEP, and vaccination against Hepatitis A and B.

RESULTS: A total of 360 MSM and Trans attended the clinic during the screening period. Of those, 50% ($n=180$) were invited to initiate PrEP, and 90% ($n=162$) received PrEP. Mean adherence to PrEP was 93.1% to 30 days after initiation, and 93.1% after 120 days of initiation. Reactivity to VDRL at the baseline was 30.5% among 30-34 years old (Table 1), and among those without previous syphilis infection after 120 days on PrEP was only 2%.

CONCLUSIONS: PrEP implementation in the DR demonstrated to be well tolerated and adherence was very high. Rates of syphilis infection between MSM and Trans are substantially high, however the rate of new infections after PrEP use was very low (2%). The integrated approach of PrEP implementation seems to be key for scaling-up PrEP use among other populations. Psychological support and behavioural interventions are necessary to reinforce the HIV prevention toolbox before, during, and after PrEP.

Age	Reactive VDRL (n=36)		HPV-related infections (n=5)	
	N	%	N	%
18-19	1	2.8	1	20
20-24	8	22.2	0	0
25-29	8	22.2	2	40
30-34	11	30.6	2	40
35-39	5	13.9	0	0
40-49	3	8.3	0	0

[Table 1. VDRL Reactive results and Human Papilloma Virus related infections among PrEP users in the Dominican Republic]

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Indications for PrEP and engagement along the PrEP continuum among emerging adult men who have sex with men in the Mid-Atlantic United StatesS. Meanley¹, M. Magnuss², D. Connochie¹, J.A. Bauermeister¹¹University of Pennsylvania, Family and Community Health, Philadelphia, United States, ²George Washington University School of Public Health, Epidemiology and Biostatistics, Washington, D.C., United States

BACKGROUND: Emerging adult men who have sex with men (EAMSM; ages 18-25) could benefit greatly from PrEP given their disproportionate burden of HIV in the U.S, yet their PrEP adoption remains far lower than their older counterparts. Prior research has been limited in identifying factors that distinguish EAMSM who have adopted PrEP and those who have not. The objectives of this study were to describe EAMSM's engagement along the PrEP continuum; calculate the proportion of PrEP-indicated (high HIV risk) participants currently not taking PrEP; and identify social/behavioral correlates of PrEP use.

METHODS: Participants ($N=236$), recruited via Facebook and Grindr (2018-2019), completed a web-survey assessing PrEP use and risk behaviors. Eligibility included self-reported HIV-negative, cis-gender MSM aged 18-25, who reported sex with men in the past 6 months, and resided in Mid-Atlantic urban metro areas. Descriptive statistics were generated for participants' PrEP-related outcomes. Prior STI diagnoses, condomless anal intercourse, and drug use before/during anal intercourse were dichotomized, respectively, and summed to reflect participants' PrEP indications. Multivariable logistic regressions assessed differences in PrEP use by indications, psychosocial factors (e.g., perceived susceptibility), and sociodemographic characteristics (e.g., age, race).

RESULTS: Most EAMSM ($n=222, 94.1%$) were aware of PrEP. Among PrEP-aware participants, 62.6% never used PrEP, 9.0% discontinued PrEP, and 28.4% were currently on PrEP. Among EAMSM who had never used PrEP, 78.4% had ≥ 1 PrEP indication, 41% indicated high PrEP willing-

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ness, and 27.3% intended to seek PrEP within 3 months. In multivariable models, PrEP use was associated with older age ($AOR=1.36$, 95% CI : 1.06, 1.74), number of PrEP indications ($AOR=1.98$; 95% CI : 1.26-3.09), and recent drug use ($AOR=2.26$; 95% CI : 1.02-5.02). EAMSM were less likely to use PrEP if they were in a relationship ($AOR=0.39$, 95% CI : 0.18, 0.85), or reported higher perceived susceptibility to HIV ($AOR=0.52$; 95% CI : 0.35, 0.78).

CONCLUSIONS: Consistent with national trends, PrEP use among EAMSM in our sample was low despite meeting PrEP indication/eligibility. Our findings advocate for scaled-up PrEP campaigns that focus on EAMSM, especially those in non-monogamous relationships, highlighting how PrEP can reduce their HIV susceptibility. These efforts must be paired with multi-level strategies that minimize barriers to PrEP access/adoption.

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Awareness and willingness to use PrEP among female sex workers in Dar-es-Salaam

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BACKGROUND: Tanzania is implementing a demonstration project on pre-exposure prophylaxis (PrEP) to female sex workers (FSW) whose HIV prevalence is five times higher than the general population. While PrEP has demonstrated to be an effective biomedical intervention in reducing HIV incidence, no data is available on the extent of PrEP awareness and willingness to use among FSW in Tanzania. Understanding the level of awareness, the extent of willingness to use PrEP and identifying factors associated with PrEP awareness could inform the ongoing country efforts to roll-out PrEP.

METHODS: Data was obtained from the integrated bio-behavioral surveillance conducted in 2017 in Dar es Salaam. FSWs were recruited using respondent-driven sampling. Face-to-face interviews were conducted to collect information on awareness and willingness to use PrEP as well as factors associated with PrEP awareness. Weighted bivariate and multivariable logistic regression models were used to estimate factors associated with PrEP awareness.

RESULTS: We recruited 958 FSW, their median age was 26 (IQR 22-32) years. Among self-reported HIV negatives ($n=751$), 228 (31%) reported having heard of PrEP. PrEP awareness was higher among those aged 25 years or more compared to 18-24 years (33% vs 26%, $P=0.02$), but did not differ by education levels [none/primary vs secondary/tertiary (24% vs 30%, $P=0.26$)]. Contact with peer educator in the past 12 months (aOR 1.48, 95% CI 1.06-2.06), HIV testing at a health facility (aOR 1.65, 95% CI 1.03-2.66) or research project (aOR 3.41, 95% CI 1.74-6.68) compared to testing in the community were strongly associated with higher PrEP awareness.

Women with experiences of sex work related stigma at health facilities had higher PrEP awareness than their counterparts (aOR 2.09, 95% CI 1.38-3.16). Conversely, substance use (aOR 0.64, 95% CI 0.41-1.00) and having >10 partners in the past month (aOR 0.65, 95% CI 0.43-0.96) were associated with lower PrEP awareness. Nearly all of the self-reported HIV negative women 96% ($n=710/751$) were willing to use PrEP.

CONCLUSIONS: Despite the low PrEP awareness, there is a great willingness to use PrEP among FSW in Dar es Salaam. PrEP implementation programs should focus on increasing PrEP knowledge among younger FSW. Peer educators and HIV testing opportunities could be seized to raise PrEP awareness.

TUPEC400

Latent class analysis of current use and willingness of adopting pre-exposure prophylaxis in men who have sex with men in Taiwan: Subgroup analysis from 2017 Hornet/HEART Survey

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BACKGROUND: A recent online survey found 25% of MSM in Taiwan were willing to use PrEP, with only 3% currently using PrEP. This study is to examine patterns of sexual behavior among MSM and their association with both actual use and the intention of adopting PrEP in the future.

METHODS: Direct messages were sent to users of a large MSM social networking application in Taiwan between November 22nd and December 22nd 2017. These messages invited men to participate in a survey, which included 15 questions regarding age, residence, HIV serostatus, risk behaviors, PrEP awareness, willingness and current use. We used latent class analysis to group individuals with similar patterns of HIV risk behavior, current and likely future PrEP use.

RESULTS: There were 1,335 HIV negative or untested men eligible for this analysis. The best-fitting latent class analysis model described three distinct classes:

- (1) Old Schoolers (OS, 53%), who use condoms most of the time and have the lowest HIV risk;
- (2) Freshmen (FM, 20%), who are much younger, more likely to be untested for HIV, and unaware of PEP or PrEP; and
- (3) Adventurers (AV, 27%), who are less likely to use condoms regularly, more likely to have recently engaged in Chemsex, use PEP, and are more likely to be aware of PrEP.

Individuals in the OS ($OR = 0.13$, 95% $CI = 0.06-0.28$, $p < 0.001$) and FM ($OR = 0.05$, 95% $CI = 0.01-0.36$, $p < 0.001$) classes were less likely to use PrEP currently compared to the AV, as well as showing less willingness to adopt PrEP in the next 6 months ($OR = 0.38$, 95% $CI = 0.28-0.50$, $p < 0.001$ for OS; $OR = 0.48$, 95% $CI = 0.33-0.71$, $p < 0.001$ for FM). There were no significant differences in the current use and willingness to use PrEP between OS and FM classes.

CONCLUSIONS: MSM in Taiwan have varied sexual behaviors and differing levels of awareness regarding HIV serostatus, PEP and PrEP. Our research has identified three distinct groupings, which may help health care providers, community organisations and policy makers to develop tailored strategies to facilitate the PrEP roll-out by this key population.

TUPEC401

Homelessness at diagnosis is the strongest predictor of death among persons with HIV in a population-based study of a U.S. city

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BACKGROUND: San Francisco, California, has experienced approximately a 50% reduction in new HIV diagnoses supported by its "Getting to Zero" initiative. However, progress in reducing deaths among people with HIV (PWH) has been slower. To identify factors associated with death among PWH we performed a case-control study.

METHODS: Among PWH in the San Francisco HIV surveillance registry, a random sample of 48 decedents from July 2016 to June 2017 were matched to 2-3 controls alive at the matched participant's death date using incidence-density sampling (matched on age +/- 3 years and time since diagnosis +/- 6 months). Surveillance staff performed chart review to collect medical/psychiatric conditions, care indicators, and housing status in the prior year. Housing status at diagnosis was downloaded from surveillance databases. We used conditional logistic regression to identify factors associated with death.

RESULTS: Of the 156 PWH in the sample (48 decedents/108 matched controls), 14% were African-American, 14% Latino, and 8% female sex, with a median time from HIV diagnosis of 214 months (interquartile range (IQR): 136-292) a median CD4 of 398 (IQR: 180-617), and a median CD4 at diagnosis of 417 (IQR: 224-612).

Overall, 25% of the decedents compared to 4% of the controls were homeless at diagnosis. Of the decedents, 27% died from an HIV-related condition, 15% non-AIDS cancer, 13% overdose/substance use, 8% heart disease, 4% suicide, and 33% other. In adjusted analysis, factors associated with death included: being homeless at diagnosis [adjusted odds ratio (AOR)=27.4 95% confidence interval (CI)=3.0-552.1], active injection drug use (AOR=10.2 95% CI=1.7-128.5), active tobacco use (AOR=7.2 95% CI=1.7-46.9), not using ART in the year prior to death/index date (AOR=6.8; 95% CI=1.1-71.4), and being housed but living alone vs. living with others in the year prior (AOR=4.7; 95% CI=1.3-22.0). Current homelessness was associated with death only in unadjusted analyses (OR=6.7; 95% CI=1.4-32.4).

CONCLUSIONS: Homelessness at diagnosis was the strongest predictor of death in a population-based study of PWH in San Francisco. Continued investment in wrap-around services at the time of HIV diagnosis, including rapid ART initiation, supportive housing, and substance use treatment, will likely be needed to reduce mortality.

TUPEC402

PrEP knowledge and attitudes among adults attending public health clinics in Southern Arizona

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BACKGROUND: Pre-Exposure Prophylaxis (PrEP) is underutilized among women and Hispanic populations. The purpose of this study was to determine knowledge, attitudes, and barriers that limit PrEP usage among patients from a US southwest border community.

METHODS: A survey study was conducted from January 2018 to July 2018 in Pima County, Arizona public health department clinics which provide family planning and sexually transmitted infection testing and treatment. The data were summarized using frequency tables and summary statistics. Multiple logistic regression models were used to examine associations between survey responses and ethnicity, HIV risk, perceived HIV risk, insurance status, and sex.

RESULTS: Five hundred individuals were surveyed. The majority were less than 30 years old (59%), women (65%), Hispanic (69%), uninsured or unsure of their insurance status (57%), and heterosexual (84%). The majority of participants (63%) believed that they had no risk of HIV infection. Only 20% of participants had prior knowledge of PrEP. Individuals with ≥ 2 risk factors (men who have sex with men (MSM), people who use injection drugs (PWID), sex partners of PWID, sex partners of people living with HIV, or women whose sex partners are also MSM) had a higher probability of prior knowledge of PrEP (OR 2.61, 95% CI 1.6-4.2). Females had a lower probability of prior knowledge (OR 0.32, 95% CI 0.19-0.52). If at risk for HIV, 87% were willing to take a pill daily for HIV prevention, 91% were willing to visit a health-care provider every three months, 92% were willing to have blood and urine samples taken every three months, 54% would not be afraid or embarrassed if a friend or family knew they were taking an HIV prevention pill, and 72% would take an HIV prevention pill despite possible nausea. Sixty-two percent were willing to pay \geq \$40 every three months for PrEP and 22% reported that price did not matter.

CONCLUSIONS: Lack of knowledge, rather than patient attitudes, is the more important barrier to wider utilization of PrEP among individuals attending public health clinics in southern Arizona. Future efforts need to focus on education and access to PrEP in underserved populations.

TUPEC403

Differences in adherence to TDF/FTC for PrEP in community health centers in the US: Medication Adherence Sub-study (MAS) of the Sustainable Health Center Implementation PrEP Pilot (SHIPP)

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BACKGROUND: A strong correlation exists between medication adherence by drug levels and PrEP efficacy. Factors such as age, race/ethnicity, and gender may impact rates of PrEP medication adherence over time. The SHIPP-MAS assessed the association between patient characteristics and medication adherence, as measured by self-report and blood drug levels in 5 community health centers in the US.

METHODS: Dried blood spots were collected at quarterly visits. Patients were asked both a single question about dose(s) missed and 7-day medication recall questions. Spearman's rank correlation coefficients were calculated between blood TFV-DP level and self-reported adherence at each visit. Sub-therapeutic adherence was defined as TFV-DP levels associated with missing 6-7 doses in the prior 7 days. Associations between patient characteristics and sub-therapeutic adherence over all study visits were assessed using multivariable GEE with repeated measurements.

RESULTS: Of the 1420 MAS enrollees, 86.5% were male. Median age was 29 years. At 3, 6, 9 and 12 months interviews, TFV-DP levels associated with taking ≥ 4 doses/week was reported at 83.0%, 84.2%, 82.2%, and 78.0. Black persons and transgender women (TGW) had higher risk of sub-therapeutic adherence (RR 1.60, CI 1.09-2.34) and (RR 2.31, 1.33-4.02) compared with white persons and MSM respectively. Enrollment at sites with less experience providing PrEP was associated with sub-therapeutic adherence.

Association of Patient Characteristics with Sub-therapeutic Adherence (Estimated 6-7 Doses Missed in prior 7 days; TFV-DP < 350 fmol per punch)^{*}

Characteristic	Adjusted** RR (95% CI)
Study Site	1.0
Whitman Walker Health, Washington, DC	1.0
Access Community Health, Chicago	5.21 (2.81 - 9.69)
Department of Public Health, Philadelphia	3.18 (1.70 - 6.95)
Howard Brown, Chicago	1.86 (1.10 - 3.16)
University of Mississippi Medical Center, Jackson	6.08 (3.69 - 10.3)
Study Visit	1.0
3 Months	1.0
6 Months	1.38 (1.03 - 1.85)
9 Months	1.28 (0.94 - 1.75)
12 Months	2.17 (1.63 - 2.88)
Race	1.0
White	1.0
Black/African American	1.60 (1.09 - 2.34)
Other	1.62 (0.99 - 2.65)
Highest Education Level	1.0
No High School Diploma	1.0
High School Diploma	0.69 (0.47 - 1.03)
Bachelor's Degree or Higher	0.51 (0.32 - 0.82)
Sexual Identity	1.0
MSM	1.0
TGW	2.31 (1.33 - 4.02)
Other (HET-M, TGM, HET-F)	1.31 (0.95 - 1.81)
Number of Sex Partners in the Past 3 Months (per increase of 1)	0.96 (0.92 - 1.00)

^{*} N = 1026 patients with at least one dried blood spot specimen taken within 7 days of interview date.
^{**} Multivariable model including all variables remaining significant at p < 0.05

[Table]

CONCLUSIONS: Self-reported adherence was lower than found by blood assay results at all time points. Across diverse populations, higher adherence was seen at two clinics having more experience with PrEP provision. Black persons, TGW, and persons with fewer partners had a higher likelihood of sub-therapeutic adherence; age, gender, insurance type, sexual behavior, alcohol use or perceived PrEP protection didn't predict sub-therapeutic adherence. This study suggests factors to identify PrEP users who should be assessed for intensive counseling to achieve sufficient PrEP medication adherence over time to provide sustained prevention of HIV acquisition.

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**Can we believe the patient's estimates?
A comparison between measured treatment adherence and patient-estimated treatment adherence by patients enrolled in a PrEP pilot study in the Dominican Republic**

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BACKGROUND: Protection by PrEP follows a dose-dependent relationship, optimizing adherence equals optimizing protection towards HIV. Counseling interventions aimed to optimize adherence to treatment are crucial for PrEP programs. In the Dominican Republic a very limited experience on PrEP exists among most-at-risk populations, however, a pilot project has been implemented to evaluate effectiveness and acceptability among MSM and transwomen populations. We aim to describe a quantifiable method to measure patient's adherence perception.

METHODS: A comparison between measured adherence to PrEP and estimated adherence was made in MSM and TG patients actively enrolled in a PrEP Pilot Study in the Dominican Republic throughout 2018. Measured adherence was calculated by counting the number of pills taken by the patients in the elapsed days between appointments. Estimated adherence was estimated by asking the patient to estimate the number of pills they assumed they missed in the elapsed days between appointments.

RESULTS: A total of 139 MSM and Trans currently in follow-up for PrEP medications were evaluated. After 30 days of PrEP mean measured adherence was 91.5% (n=139) and estimated adherence was 95% (n=139), patients overestimated their adherence by 1.66% (p=0.49). After 120 days mean measured adherence was 92.7% (n=81) and estimated adherence was 97.8% (n=81), overestimation of adherence was 3.8% (p= 0.0001).

CONCLUSIONS: Significant overestimation of adherence to treatment by patients has been established. Strategies to ensure optimal adherence are essential for treatment requiring daily doses, but efforts should be made to obtain a quantifiable measurement of adherence. Strategies have to be developed to understand patients' perception of ongoing progress.

TUPEC405

Utilization of Emtricitabine/Tenofovir Disoproxil Fumarate (FTC/TDF) for HIV pre-exposure prophylaxis (PrEP) in the United States by age, gender and ethnicity (2014 - 2017)

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BACKGROUND: In the U.S., FTC/TDF is approved for HIV PrEP in adults and adolescents, and PrEP uptake has been significantly associated with declines in HIV diagnoses independent of community virologic suppression. Previous studies have shown disparities in utilization based on gender, age, ethnicity, and geography. We aim to assess whether there were recent changes in PrEP utilization trends between 2014-2017.

METHODS: We used a nationally representative sample of de-identified data provided by Symphony Health (2014-2017) to quantify the number of unique individuals who received FTC/TDF PrEP prescriptions, representing >80% of retail pharmacies in the U.S. Data included refills, medical claims and procedures, and individual demographics limited to gender, ethnicity, and age. A validated algorithm was used to exclude FTC/TDF for non-PrEP use (e.g. HIV treatment, PEP, and off-label HBV treatment).

RESULTS: Between 2014-2017, the number of unique individuals who began FTC/TDF for PrEP increased from 24,515 in 2014 to 47,253 in 2017 (total N=158,183). The proportion of PrEP users ≤ 24 years old increased 2.5 fold from 6.7% in 2014 to 16.9% in 2017 (11.7% overall). Of the 87,738 individuals with gender and ethnicity data, 90.7% were men and 9.3% were women, 66% Caucasians, 14% Hispanics, 14.2% Black/African Americans, 3.5% Asians, and 1.0% other. Among female PrEP users, 33.4% were Black

and 45.2% were Caucasian. Among male PrEP users, 12.7% were Black and 67.0% were Caucasian. Between 2014-2017, the proportions of Black and Hispanic PrEP users increased from 12.6% and 13.5% in 2014 to 14.9% and 15.3% in 2017, respectively. Among Black PrEP users, the number of new starts increased 3.9 fold among men and 2.4 fold among women.

CONCLUSIONS: There was an overall increase in the utilization of FTC/TDF for PrEP in the U.S. from 2014-2017. While the data represents a modest increase in PrEP uptake among Blacks, Hispanics and women, and a more robust improvement in the ≤ 24 age group, PrEP utilization is still disproportionately low among these populations in the highest risk categories. Efforts in HIV prevention education and PrEP services should continue to focus on these populations.

TUPEC406

Factors affecting adherence to HIV pre-exposure prophylaxis (PrEP) among female sex workers taking PrEP in Kampala, Uganda

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BACKGROUND: In Kampala Uganda, female sex workers (FSWs) have alarmingly high HIV prevalence (33%) much higher than among the general female population of reproductive age (7.5%). Oral PrEP is a novel biomedical HIV prevention intervention that was rolled out in public health facilities in Uganda for key populations including FSWs. Efficacy of PrEP is dependent on good adherence to PrEP. We sought to 1) determine the level of adherence to PrEP among FSWs using PrEP, 2) to determine factors associated with PrEP adherence among FSWs using PrEP and 3) to explore factors influencing PrEP adherence and retention in care among FSWs using PrEP

METHODS: A mixed methods cross-sectional study was conducted from August- December 2018 at a PrEP clinic in Kampala; 126 FSWs taking PrEP were interviewed using a questionnaire. Univariate analysis was done for objective 1. Bivariate and multivariate logistic regression was done for objective 2 using STATA version 14.0; results were considered significant for P value < 0.05 at 95% confidence interval. Thematic data analysis was done for objective 3.

RESULTS: Reported adherence to PrEP was 73%. The prevalence of adherence to PrEP was associated with 'PrEP packaging' (OR 0.07, CI: 0.01- 0.93), 'deliberately taking a break from taking PrEP' (OR 58.6, CI: 2.33-1477) and condom use with clients (OR 0.38, CI: 0.36-0.42). Barriers of PrEP adherence include experiencing challenging side effects, no transport to go for refills, food insecurity, and travel. Reasons for stopping to take PrEP completely include doubts about PrEP efficacy, side effects of PrEP, and not being contacted by the outreach team for more PrEP refills.

CONCLUSIONS: Adherence to PrEP among FSWs was high because the FSWs feel more protected when taking PrEP. The adherence to PrEP can be further improved by providing continued counseling, adherence sms reminders and suitable packaging of PrEP, different from that for ARVs. Reinforcement of positive behaviors, such as not taking a break from taking PrEP, by counselors will improve adherence among FSW PrEP users. It is important to emphasize the need to use other HIV prevention measures devotedly when FSWs take a break from taking PrEP to avoid sero-conversion.

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Use of HIV pre-exposure prophylaxis reduces HIV anxiety among high risk gay and bisexual men

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BACKGROUND: Gay and bisexual men (GBM) have higher rates of anxiety and depression than men in the general population. Many GBM experience sex-related HIV anxiety, particularly around condomless anal intercourse (CLAI). HIV Pre-exposure prophylaxis (PrEP) is an HIV prevention strategy that may affect levels of HIV-related anxiety among GBM.

METHODS: In the Flux study, an Australian online prospective study among GBM between 2014 and 2018, we measured anxiety using the generalized anxiety disorder assessment (GAD7) scale and a newly developed HIV anxiety scale. We used reported behaviour to assess eligibility for PrEP based on Australian PrEP clinical prescribing guidelines. Multivariate logistic regression was used to identify factors associated with use of PrEP, and results are reported as adjusted odds ratios (aOR) and corresponding 95% confidence intervals (95%CI).

RESULTS: Among 1574 men who completed the HIV anxiety scale, mean age was 37.2 years (SD 13.13). Men aged 25 years or younger had higher HIV anxiety scores than older men (p -trend < 0.001). Men who reported CLAI with casual partners (CLAIC) scored higher on HIV anxiety than men who reported no CLAIC (p -trend=0.033). A total of 406 men (26.2%) were PrEP-eligible according to Australian guidelines. Among PrEP-eligible men, 84% of PrEP users had >10 sexual partners vs 16% of non-PrEP users. PrEP users also scored lower on HIV anxiety (aOR=0.91; 95%CI: 0.85-0.97).

CONCLUSIONS: Among men who were eligible for PrEP, its use was independently associated with lower levels of anxiety in general, and of HIV anxiety specifically, despite having higher numbers of sexual partners. In addition to avoiding HIV infection, PrEP use may help reduce anxiety among men who are at risk of HIV. This feature of PrEP could be promoted as part of demand creation initiatives to increase PrEP uptake.

TUPEC408

Baseline and early follow up in the My PrEP study: A pilot PrEP demonstration project in high risk men who have sex with men (MSM) in Kuala Lumpur, Malaysia

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BACKGROUND: The HIV epidemic among MSM in Malaysia is increasing. Outside Thailand, few countries in South East Asia have embarked on demonstration projects evaluating the feasibility of PrEP implementation. The My PrEP study aims to evaluate the acceptability and feasibility of PrEP among Malaysian MSM across three sites: a private clinic, a community based organization (CBO), and academic HIV treatment centre.

METHODS: Prospective participants were recruited through internet, social media and gay dating apps. Men were eligible if they were ≥18 years old, tested negative for HIV by PCR and Antigen/antibody tests, had normal renal function, and reported high-risk behaviours (condomless anal intercourse, history of STI, commercial sex, or ,chemsex) in the past 6 months. Generic oral TDF/FTC is provided for 12 months. Socio-behavioral data were collected during baseline and presented below.

RESULTS: From March to October 2018, 381 individuals were screened. Of these, 157(41%) fulfilled eligibility criteria and 150 (39%) enrolled. The CBO was the first site to complete full enrolment. Reasons for ineligibility include: low HIV infection risk (N=109, 29%), unwilling to comply to study procedures (N=27, 7%), medical co-morbidities (N=8, 2%) and established/acute HIV infection (N=14/195, 7%). The majority of participants (57%) were of Chinese ethnicity, had a university degree or higher (90%) and earned > RM 2,000 (US\$500) per month (75%). In the past 3 months prior to baseline, the median number of male anal sexual partners was 3. 43.3% did not use condom during last anal sex, 39% engaged in group sex and 14.7% were involved in commercial sex. 36% reported having chemsex in past 3 months. Baseline STI testing revealed high prevalence of asymptomatic rectal chlamydia (18.7%) and syphilis (11.3%). Adherence during the first 3 months of the study was 98% with the retention rate at month 3 was at 96%. None of the participants sero-converted.

CONCLUSIONS: A PrEP demonstration project was successfully initiated among MSM in Kuala Lumpur. Project population consists of mostly well-educated men with high risk for HIV infection. There were high rates of asymptomatic STIs at baseline. Early project retention and self-reported daily pill adherence were high.

TUPEC409

Key population-delivered oral pre-exposure prophylaxis: Initial enrollment, adherence and retention results among men who have sex with men in Vietnam

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BACKGROUND: HIV prevalence among men who have sex with men (MSM) in Vietnam has increased in the past five years, from 3.9% to 12.2%. A 2016 pre-exposure prophylaxis (PrEP) acceptability study found that 96% of MSM in Ho Chi Minh City (HCMC) and Hanoi self-reported being at high risk of HIV and 84% said they intended to use PrEP when available.

METHODS: From March 2017, PrEP services were offered to MSM and other key populations (KP) through a partnership between twelve KP-led organizations and four KP-owned or -friendly private clinics in HCMC and Hanoi. To inform national PrEP scale-up, we integrated an observational rolling-enrollment cohort study and collected routine client data from PrEP clinics to assess PrEP enrollment, retention and adherence trends over time. Univariable and multivariable analyses were conducted to identify factors associated with PrEP retention. Retention was defined as having returned for all scheduled re-fills at month 1, month 3 and quarterly thereafter. We measured adherence using as self-report of pills taken in the past 7-days.

RESULTS: By December 2018, 1,925 MSM had ever initiated on PrEP, with 1,070 enrolling in the cohort study. Among cohort study participants, median age ever on PrEP was 26, 78.6% had partially or fully completed a university degree, and 81.7% had health insurance coverage. PrEP enrollment increased over time from an average of 39 MSM per month in the first 6-months (March-August 2017) to 154 per month in the last 6-months (July-December 2018). PrEP retention and self-reported adherence (4 doses or more/week) at month 3 was 88.7% and 91.4%, respectively. Multivariable analyses identified the following factors associated with greater odds of persisting on PrEP: being >30 years old (aOR 1.46; p =0.01), having a lower income (aOR 1.43; P =0.001), attaining an education beyond secondary school (aOR 1.42; p =0.005), and reporting a higher number of condomless receptive anal sex events (aOR 1.04; p =0.001).

CONCLUSIONS: KP providers are successfully offering PrEP to MSM that tend to have lower income and are at higher risk of HIV. Better systems and tools are needed to support younger MSM and/or those with less formal education to remain on PrEP.

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TUPEC410

Precedent factors in association with using PrEP event-driven over daily dosing regimen among men who have sex with men in Taiwan: A mixed-effect model analysis

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BACKGROUND: Both daily and event-driven dosing regimen were recommended for men who have sex with men (MSM) based on the national PrEP guidelines published by Taiwan AIDS Society. When provided with both choices of PrEP in MSM, men may choose to use either method based on their sexual practice. However, little is known what factors are associated with choosing either daily or event-driven dosing schedule in real-life practice. The objective is to identify the precedent factors associated with their choice of dosing schedule.

METHODS: The present study used data from MSM clients who initiated PrEP from three sources in Taiwan, including a medical center and two sexual health clinics between December 2017 and December 2018. Participants recruited from medical center were required follow-up visits every three month, and those from clinics were not required but encouraged to come back at least every three month. Mixed effects logistic regression was used to determine whether using PrEP with event-driven dosing instead of daily use can be predicted by precedent time-varying factors.

RESULTS: Only samples with baseline data and at least one follow-up during the study period were kept in the analysis (n=111). Of 111 PrEP users with 175 visits in total, in 61.7% visits, MSM reported using event-driven PrEP. In univariable mixed effects logistic regression, having condomless anal intercourse in the past month, in a stable relationship and length of time since they initiated PrEP were not significantly associated with using event-based PrEP. In the multivariable model, substance use in the past month (aOR: 3.01; 95% CI: 1.18 to 7.72) and source of recruitment (aOR: 3.53; 95% CI: 1.27 to 9.80) were associated with using event-based PrEP.

CONCLUSIONS: MSM chose to use event-driven dosing more often than daily use of PrEP. Although people who use substance may benefit from using PrEP daily to maintain high PrEP adherence, in our real world experience, substance use in the previous month is strongly related to using event-driven dosing schedule.

Characteristics	Univariable		Multivariable	
	OR (95%CI)	p-value	AOR (95%CI)	p-value
In stable relationship	1.77 (0.74-4.23)	0.197	1.85 (0.70-4.85)	0.212
Substance use in the past month	3.74 (1.61-8.70)	0.002	3.01 (1.18-7.72)	0.022
Had condomless anal sex in the past month	1.02 (0.41-2.54)	0.967	-	-
Source of recruitment (sexual health clinics vs medical center)	3.88 (1.64-9.17)	<0.001	3.53 (1.27-9.80)	0.016

[Mixed effects logistic regression analysis of factors associated with using event-driven PrEP among men who have sex with men]

TUPEC411

Condomless anal intercourse and adequacy of protection from HIV pre-exposure prophylaxis (PrEP) in the EPIC-NSW trial

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BACKGROUND: Pre-exposure prophylaxis (PrEP) is highly effective at preventing HIV provided it is taken around the time of sexual exposure. We investigated the association between PrEP adherence and condomless anal intercourse (CLAI) in the previous week among gay men enrolled in the implementation trial of daily PrEP, EPIC-NSW.

METHODS: Between March 2016 and April 2018, 9,708 individuals were enrolled. At baseline, then quarterly, participants were invited to complete an optional online behavioural survey about PrEP use and CLAI during the previous week. We examined the association between "adequate" PrEP adherence (defined as taking at least four PrEP pills during that week) and reporting CLAI during that week. We used chi-square tests for comparisons between groups.

RESULTS: By 30 November 2018, 4,605 gay male-identified participants had completed at least one follow-up survey (51.5% of 8,934 gay male participants, total=12,373 surveys). No CLAI was reported in 4,923 weeks (39.8%) and some CLAI in 7,450 weeks (60.2%, "CLAI-weeks"). During CLAI-weeks, adherence was adequate in 93.3% of weeks (7 PrEP pills taken in 6,336 weeks (85.1%) and 4-6 pills taken in 612 weeks (8.2%)), and inadequate in 502 weeks (6.7%, with 1-3 pills taken in 38 weeks (0.5%) and 0 pills taken in 464 weeks (6.2%)). During inadequate adherence weeks, CLAI with a partner of unknown HIV status, or an HIV-positive partner with a detectable viral load was significantly less likely than in adequate adherence weeks (3.9% versus 10.3%, p<0.001). Overall, there were only 97 weeks (0.8% of weeks examined) in which PrEP coverage was inadequate and HIV risk was high, in 92 individuals.

CONCLUSIONS: Over 90% of CLAI-weeks were adequately protected by PrEP. Men who had inadequate PrEP adherence were less likely to report high-risk CLAI, suggesting that gay men align high adherence to PrEP with periods of higher HIV risk, and use fewer pills in periods of low risk, suggesting awareness that PrEP's protective effect relies on dosing.

TUPEC412

Preliminary findings on pre-exposure prophylaxis uptake and continuation among female sex workers and men who have sex with men in Thika, Kenya

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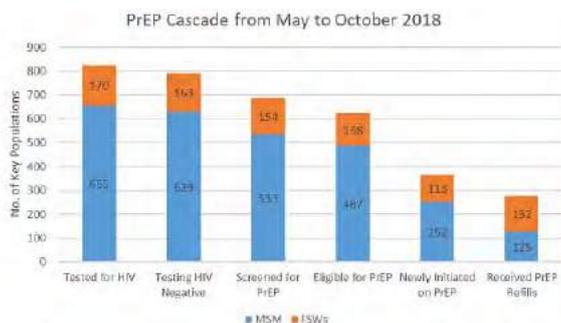
BACKGROUND: Studies have demonstrated high efficacy of pre-exposure prophylaxis (PrEP) among female sex workers (FSWs) and men who have sex with men (MSM). However, PrEP works only when taken, so there is a need for sustained use during periods of risk. LINKAGES Kenya, working with the Jilinde project, aimed to determine uptake and continuity of PrEP among high-risk FSWs and MSM in Thika, Kenya.

METHODS: The Mambaleo Peer Empowerment Group drop-in center (DIC) in Thika, Kenya, was assessed and approved to distribute PrEP to FSWs and MSM. PrEP was obtained from the County Health Department, and demand creation activities targeting new PrEP clients and those returning for refills were implemented by 20 peer educators at the DIC. Persons in-

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tiating PrEP were asked to return for refills at one month and three months post-initiation and were linked to PrEP support groups to encourage continuity. Descriptive statistics were used to summarize outcomes.

RESULTS: From May to October 2018, 154 FSWs and 533 MSM were screened for PrEP, and 138 (90 percent) of the FSWs and 487 (91 percent) of the MSM were found eligible to initiate PrEP (Figure 1). Of those, 82 percent of FSWs and 52 percent of MSM accepted PrEP. MSM had continuation rates of 45 percent at month one and 15 percent at month three, while FSWs had continuation rates of 50 percent at month one and 45 percent at month three. The main reason cited for higher PrEP continuity among FSWs was high HIV risk perception attributed to sexual and gender-based violence encountered during sex work, which compromised their ability to use condoms consistently.



[Figure 1. Mamboleo Peer Empowerment Group PrEP cascade from May to October 2018]

CONCLUSIONS: There is higher PrEP uptake and continuity among FSWs than among MSM. Strategies for understanding barriers to PrEP utilization and enabling MSM to identify their HIV risks are required for effective PrEP use.

TUPEC413

Modeling parallel reductions in anxiety and HIV worry among PrEP users: Evidence for mental health benefits of PrEP implementation

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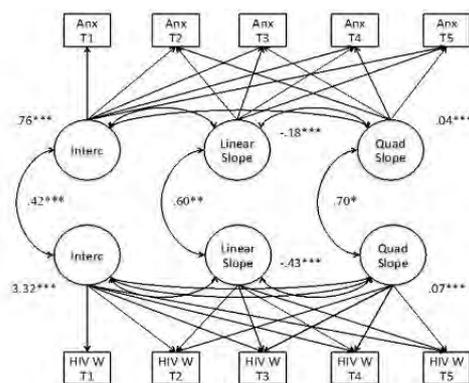
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BACKGROUND: Anecdotal reports suggest that PrEP reduces anxiety among its users, and many have touted PrEP's psychological benefits. However, little empirical data have evaluated this claim. Evaluating the impact of PrEP on mental health is critical for both messaging and implementation efforts.

METHODS: Participants (N = 300; ages 18-76; 96% cismale, 46% people of color) were prescribed PrEP at a community health center as part of the SPARK demonstration project. Data were collected at baseline (before starting PrEP) and then quarterly for 12 months. Participants completed a measure of HIV Worry and the Brief Symptoms Inventory (BSI) Anxiety subscale at each timepoint. Unconditional latent growth curve models were estimated for both measures using MPLUS 8.2, followed by estimation of a parallel process model that adjusted for demographic variables. A similar model was run on a comparison cohort of health center patients who met PrEP criteria, but had refused PrEP prescription (N = 131).

RESULTS: Among PrEP users, the parallel process model demonstrated good fit, $\chi^2(40)=72.53, p < .01$; CFI = .97, TLI = .95, RMSEA = .05. As depicted in Figure 1, both HIV worry and anxiety significantly decreased over time, with quadratic slopes indicating steeper declines in HIV worry and anxiety immediately following PrEP initiation than at later timepoints. There were strong correlations between both the linear and quadratic slopes, indicating parallel reductions in HIV worry and anxiety. Among patients who refused PrEP, there were no linear reductions in HIV worry or anxiety (Linear Slope Worry = $-.04$; Linear Slope Anxiety = $-.02$, ns), and no correlation between the slopes ($r = .003$).

CONCLUSIONS: Data provide some of the first empirical evidence for mental health impacts of PrEP, suggesting a direct association between reduction in HIV worry and reduction in anxiety symptoms following PrEP initiation.



[Figure 1. Parallel Process Model Depicting Change in HIV Worry and Anxiety among PrEP users (N = 300)]

TUPEC414

PrEP awareness and potential/actual use among MSM at risk for HIV infection in the Latin American MSM Internet Survey (LAMIS)

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BACKGROUND: Oral HIV Pre-exposure Prophylaxis (PrEP) has been recommended for HIV prevention among people at substantial risk, such as many Latin-American MSM. While HIV incidence among them is still high, and current PrEP access is still limited, following Brazil, other countries seem to be moving towards PrEP roll-out. As regional data on PrEP awareness and actual/potential use among MSM are scarce, here we describe PrEP-relevant variables among MSM participating in the Latin American MSM Internet Survey (LAMIS).

METHODS: From January to May 2018, 64,655 adult MSM from 18 Latin-American countries responded to an on-line questionnaire exploring psychosocial, behavioral, knowledge-related, and health-related variables (including PrEP-relevant variables, e.g. PrEP awareness, access to information, willingness to use, actual use, source of pills). Proportions of PrEP-relevant variables are reported for LAMIS' participants with no prior HIV diagnosis.

RESULTS: Among all respondents, 53,964 (84.0%) reported no prior HIV diagnosis; among the latter, 26,525 (53.3%) had heard about PrEP; 20,785 (38.7%) knew that PrEP can prevent HIV infection; 4,239 (7.9%) had ever tried to get PrEP, and 570 (1.1%) were using PrEP daily or on demand. PrEP pills were obtained "as part of a research study" (n=211, 39.7%); at a hospital, clinic or private physician (n=141, 26.5%); from a physical or online pharmacy (n=64, 12.0%); and from other men who had received pills for treatment or PEP (n=44, 8.3%). As expected, PrEP use was much more prominent in Brazil. Among 53,238 participants not currently taking PrEP, 29,066 (54.6%) reported they would use it if affordable PrEP became available in their city.

CONCLUSIONS: Among MSM participating in LAMIS, PrEP awareness/knowledge is still limited, and current use is marginal beyond Brazil, mostly linked to ongoing research. As PrEP is highly effective and MSM's intention to use PrEP seems moderately high, if affordable/available, countries should strategically move towards increasing PrEP awareness/knowledge and offering it to those MSM most in need.

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Geographical regions	Number of participants who have ever heard about PrEP (%)	Number of participants who knew that PrEP prevents HIV (%)	Number of participants who use PrEP daily or on (%)	Number of participants who would possibly use PrEP if available (%)
Brazil	10,065 71.6	7901 52.5	301 2.0	8136 55.1
Andean Countries* & Suriname	4346 37.5	3480 27.9	85 0.7	6983 56.1
Mexico	6019 52.4	4597 36.8	94 0.8	6659 53.6
Southern Cone**	4417 50.1	3405 35.6	64 0.7	4970 52.2
Central American Countries***	1678 43.9	1402 34.1	26 0.6	2318 56.7
TOTAL	26,525 53.3	20,785 38.7	570 1.1	29,066 54.6

* Bolivia, Colombia, Ecuador, Perú y Venezuela. ** Argentina, Chile, Paraguay y Uruguay. *** Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panamá. † Among 53,238 participants not currently taking PrEP

[PrEP knowledge, daily or on demand use and possible use among MSM at risk of HIV infection]

TUPEC415

Factors associated with PrEP Use and willingness to use PrEP among MSM at risk for HIV infection in the Latin American MSM Internet Survey (LAMIS)

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BACKGROUND: WHO has recommended Oral HIV Pre-exposure Prophylaxis (PrEP) for HIV prevention among people at substantial risk. While HIV incidence among Latin American MSM is high, current PrEP access is still very limited. As, following Brazil, other countries seem to be moving towards PrEP roll-out, we describe, among supposedly HIV-negative MSM participating in the Latin American Men Internet Survey (LAMIS), prevalence and correlates of current and intended PrEP use.

METHODS: From January to May 2018, 64,655 adult MSM from 18 Latin American countries responded to an on-line questionnaire exploring psychosocial, behavioral, knowledge-, and health-related variables (including current and potential PrEP use). Adjusted logistic regression was used to determine factors associated with current PrEP use and willingness to use it among non-users.

RESULTS: Among 53,964 (84.0%) respondents not reporting prior HIV diagnosis, 570 (1.1%) reported ongoing PrEP use. Among 53,238 non-users, 29,066 (54.6%) reported they would use it if affordable PrEP became available to them. Current PrEP use was positively associated with being older than 25, living in a city of 100,000+ people, and satisfaction with personal income (see Table for Prevalence Ratios). Among PrEP non-users, willingness to use PrEP was positively associated with higher education, and negatively associated with satisfaction with personal income. Past syphilis infection and condomless intercourse with non-steady partners of unknown HIV status were positively associated with both current and potential PrEP use.

CONCLUSIONS: Current PrEP use is very low among Latin American MSM, while intention to use PrEP among current non-users is moderate (50+); both were associated with recent syphilis and condomless sex with non-steady partners. Current PrEP use was also associated with older age (25+), satisfactory income, and residence in large cities, while intention to use PrEP was associated with slightly higher education and less satisfactory incomes. Conditions exist for the strategic introduction of PrEP for Latin American MSM that should address awareness, perceived need, age and economic barriers.

Variable		Prevalence ratio of current PrEP use *	p-value	95% CI	Prevalence ratio of willingness to use PrEP among PrEP non-users *	p-value	95% CI
Age (reference: less than 25 years old)	25 y.o. or older	2.15	<0.001	1.75-2.66	1.00	0.696	0.98-1.01
Educational level (reference: Less than college)	College or graduate	1.11	0.266	0.92-1.37	1.02	0.001	1.01-1.05
City size (reference: < 100 000 people)	100,000+ People	1.86	<0.001	1.36-2.55	1.01	0.499	0.99-1.03
Current income satisfaction (reference: Struggling/really struggling)	Living Comfortably/Very Comfortably	1.33	0.001	1.12-1.57	0.95	<0.001	0.93-0.96
Active syphilis in the last 12 months (Reference: No)	Yes	1.33	0.001	1.13-1.58	1.06	0.001	1.02-1.09
Condomless intercourse with a non-steady partner of unknown HIV status in the last 12 months (Reference: No)	Yes	1.58	<0.001	1.45-2.43	1.19	<0.001	1.17-1.21

*Adjusted models by age, city of residence size, educational level, current income satisfaction, history of syphilis infection in the last 12 months and unprotected anal sex with a non-steady partner in the last 12 months

[Factors associated with current PrEP use and willingness to use PrEP]

TUPEC416

Challenges and barriers to PrEP implementation in public health facilities in Latin America: Initial lessons from the ImPrEP demonstration project in Peru

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BACKGROUND: Since 2015 oral Pre-Exposure Prophylaxis (PrEP) is recommended for people at substantial HIV risk. Due to its slow roll-out, however, access remains insufficient globally, especially within national HIV prevention programs. Ongoing demonstration projects are helping document and resolve difficulties. Among them, ImPrEP is currently enrolling eligible MSM and transgender women (TW) aged 18 or older in Brazil, Mexico and Peru, while collecting clinical, behavioral, laboratory-, and systems-related data. We conducted an interim analysis of ImPrEP implementation at 9 public facilities in 6 Peruvian cities, aimed at: (1) characterizing/resolving current problems; (2) identifying potential issues in the event the Ministry of Health (MoH) decides to continue/expand this program after mid-2020.

METHODS: We conducted 8 semi-structured interviews with health providers in three cities (Lima/Callao, Pisco, Pucallpa), to identify key concerns in program implementation. We also analyzed the monitoring data of PrEP implementation at all sites, to describe: gaps in infrastructure; time of implementation; and emerging issues affecting enrollment and quality of care.

RESULTS: While the MoH co-sponsored the study, each facility was free to participate or not. The program generated interest among both providers and potential users (including MSM/TW new to the public clinics, e.g. students, people of higher income/education). Providers expressed concerns about work overload, post-study PrEP availability and drug resistance. For implementation, basic infrastructure gaps in each site were addressed (e.g. lab equipment, furniture, space renovation); this took from 3 to 9 months across sites due to varying fluidity of administrative procedures. Once enrollment began, new bottlenecks became visible: limited hours for blood sample collection (most sites); limited or unpredictable availability of physicians (5 sites), and long waiting times (most sites).

Morning clinic hours, highly inconvenient for transwomen and sex workers, are common. Frequent lab supply shortages did not affect the study but may affect future PrEP roll-out.

CONCLUSIONS: Providers and users of public facilities are interested in PrEP. However, well-planned and sustainable PrEP roll-out in these facilities implies some kind of upgrade in their general conditions, hence offering the opportunity to ideally invest in strengthening the health infrastructure to offer appropriate combination HIV prevention services in Peru and similar countries.

TUPEC417

The awareness of and willingness to use pre-exposure prophylaxis among men who have sex with men in China

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BACKGROUND: This study aimed to understand the awareness of and willingness to use pre-exposure prophylaxis (PrEP) and their potential factors among men who have sex with men (MSM) in China, so as to provide evidence for the future research on the evaluation of the effectiveness of PrEP implementation in China and the obstacles it may encounter.

METHODS: By using non-random sampling, 402 eligible MSM were recruited from service users of a public welfare organization for MSM in Chengdu, China. Information including social demographic characteristics, sexual behaviors, intimate partner violence (IPV), HIV/STD risk perception, AIDS related knowledge, lifestyle factors and PrEP related information were collected using an online anonymous questionnaire. Univariate and multivariate analysis were conducted to estimate the association between various variables and willingness to use PrEP.

RESULTS: The awareness rate of PrEP (any type) was 50.50% (i.e., 34.33%, 29.85% and 7.46% had heard of daily oral PrEP, on-demand PrEP and long-acting injectable PrEP (LAI-PrEP), respectively). Younger, highly educated and unmarried MSM had a higher awareness rate of PrEP. The willingness to use any type of PrEP in the next 6 months was 85.82% if PrEP is free (i.e., daily oral PrEP 60.20%, on-demand PrEP 79.60% and LAI-PrEP 61.94%). Those who had more non-regular sexual partners in the past six months (adjusted odds ratio [AOR]:2.36, 95%CI: 1.11, 5.03) and higher self-evaluation on PrEP adherence (AOR: 4.18, 95%CI: 2.26, 7.71) were more likely to use PrEP. More than half of the respondents (55.22%) thought that they would more likely to have condomless sex if they start to take PrEP. If PrEP is self-paid, 50.50% of the respondents were willing to pay RMB 100-600 per month for PrEP.

CONCLUSIONS: Our study found that there is a high willingness to use PrEP among MSM in China if it is free, but the awareness of PrEP was still low which requires more effort to promote PrEP. It is necessary to pay attention to the risk compensation in the further research as well as the implementation of PrEP.

TUPEC418

TDF/FTC pre-exposure prophylaxis (PrEP) from 2012 to 2018 in the OPERA cohort

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BACKGROUND: Tenofovir disoproxil fumarate with emtricitabine (TDF/FTC) has been approved as PrEP for HIV-negative adults at high risk for HIV since 2012. We describe those prescribed PrEP as well as those newly diagnosed with HIV without PrEP.

METHODS: HIV-negative individuals ≥ 13 years of age without hepatitis B at first TDF/FTC PrEP or HIV diagnosis without PrEP were identified between 17 August 2012 and 31 May 2018 in the OPERA cohort. Individuals were followed through 30 Nov 2018 for HIV seroconversion and new sexually transmitted infections (STI). Incidence rates (IR) were estimated with Poisson regression.

RESULTS: Baseline characteristics varied between the 8,307 PrEP users and 1,798 persons newly diagnosed with HIV without PrEP in OPERA [Table 1]. Most (88.6%) PrEP users returned for ≥ 1 follow-up visit; 59.3% at 90 days, 29.1% at a year (± 30 days). There were 58 HIV-1 seroconversions in the PrEP group (IR: 0.54/100 person-years, 95% CI: 0.42, 0.70). African American 13-25 year-olds had the highest rate (IR: 2.05; 1.17, 3.62), followed by Non-African American 13-25 year-olds (IR: 0.90; 0.50, 1.63). PrEP users and new HIV+ individuals were observed to have similar new STI rates [Table 2].

CONCLUSIONS: PrEP use was associated with a low rate of seroconversion in a real-world population. Those prescribed PrEP tended to be older, have commercial insurance, and less likely to be African American or Hispanic than persons newly diagnosed with HIV without PrEP during the same time period. The highest incidence for seroconversion among PrEP users was among the 13-25 year-olds, suggesting extra support is needed in this vulnerable age group.

	PrEP users, n = 8,307	New HIV+ without PrEP, n = 1,798	p-value
Age, median (IQR)	33 (27, 43)	30 (25, 40)	<.0001
Female, n (%)	538 (6.5)	157 (8.7)	0.0012
African American, n (%)	1488 (17.9)	586 (32.6)	<.0001
Hispanic, n (%)	1774 (21.4)	619 (34.4)	<.0001
Commercial insurance, n (%)	4001 (48.2)	581 (32.3)	<.0001
Hx of Syphilis, n (%)	975 (11.7)	508 (28.3)	<.0001
Hx of Gonorrhea, n (%)	724 (8.7)	243 (13.5)	<.0001
Hx of Chlamydia, n (%)	603 (7.3)	182 (10.1)	<.0001
Hx of Hepatitis C, n (%)	106 (1.3)	26 (1.4)	0.5648

[Table 1. Baseline demographic and clinical characteristics at initiation of PrEP or HIV diagnosis]

		Number of events	Person-years	IR (95% CI), per 100 person-years
PrEP users, n = 8,307	HIV: Overall	58	10711.1	0.54 (0.42, 0.70)
	HIV: African American, 13-25 years old	12	584.0	2.05 (1.17, 3.62)
	HIV: African American, 26-49 years old	4	846.1	0.47 (0.18, 1.26)
	HIV: African American, 50+ years old	1	134.8	0.74 (0.10, 5.26)
	HIV: Non-African American, 13-25 years old	11	1215.9	0.90 (0.50, 1.63)
New HIV+ without PrEP, n = 1,798	HIV: Non-African American, 26-49 years old	27	6637.9	0.41 (0.28, 0.59)
	HIV: Non-African American, 50+ years old	3	1292.3	0.23 (0.07, 0.72)
	New STI (syphilis, gonorrhea, chlamydia, trichomoniasis, chancroid, lymphogranuloma venereum, mycoplasma genitalium, HCV, HBV)	1759	10703.9	16.43 (15.68, 17.22)
	New STI (syphilis, gonorrhea, chlamydia, trichomoniasis, chancroid, lymphogranuloma venereum, mycoplasma genitalium, HCV, HBV)	680	4337.5	15.68 (14.54, 16.90)

[Table 2. HIV and new STI incidence rates among PrEP users and persons with a new HIV+ diagnosis]

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TUPEC419

Pre-exposure prophylaxis (PrEP) in Spain: 24-week results after of the feasibility study for PrEP implementation

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BACKGROUND: Countries must tailor PrEP implementation strategies to the needs of their health systems. Three implementation models are being evaluated in Spain: hospital-based STI clinic, non-hospital-based STI clinic and community-based center. Our objective is to analyze the overall clinical and behavioral outcomes at week 24 of the study.

METHODS: Post-authorization observational study conducted in 4 sites (BCN Checkpoint, Drassanes STI center, San Sebastian STI unit, General Hospital of Valencia). We included men who have sex with men (MSM) and transgender women, from 18 to 65 years old, meeting PrEP criterion. Study period: November 2017 to October 2018. Social-demographical and clinical information was collected and analyzed for all the participants. For those having completed a 24-week follow-up, we analyzed adherence to PrEP, condom use, STI diagnosis and drug use. Differences with baseline information were analyzed using Bowker's symmetry test.

RESULTS: In total, 318 participants were included. Median age was 36, 99% were MSM, 22% were latin-american and 68% had university education.

We observed no sero-conversions. Only 7% discontinued the study, and 221 had completed a 24-week follow-up at the time of this analysis. Proportion of participants who had not missed taking any pill within last week stayed over 94% along the observation period.

Comparing baseline and week 24, regular condom used dropped from 59 to 32% ($p < 0.001$) and STI incidences raised from 8 to 10% ($p = 0.052$). We observed a raise in the number of gonorrhoea (12 to 23, $p = 0.048$) and syphilis cases (4 to 11, $p = 0.052$). Drug use ranged from 73% to 68% ($p = 0.166$). The most used drugs were alcohol, popper, and GHB initially and GHB, MDMA and cocaine at week 24. The use of cannabis, cocaine, popper and speed significantly lowered at week 24.

CONCLUSIONS: At 24 weeks, PrEP implementation seems to be feasible. No sero-conversions occurred. Overall, the number people not missing taking pills within last week remained stable, condom used lowered and the number of cases of syphilis and gonorrhoea increased. Overall drug use remained stable. It is necessary to complete the observation period to assess the convenience of the different implementation models being evaluated.

TUPEC420

Service provider insights: Implications for national training and support for PrEP provision in South Africa

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BACKGROUND: South Africa began delivering oral pre-exposure prophylaxis (PrEP) to sex workers (SW) in 2016, to men who have sex with men (MSM) in 2017, then to adolescent girls (AG) aged 15-19 and young women (YW) aged 20-24 in 2018. We conducted implementation research on service providers' insights on oral PrEP provision to inform service delivery.

METHODS: We conducted cross-sectional surveys (192) and follow-up in-depth interviews (IDs) (13) with service providers with (PrEP-experienced) and without (PrEP-naïve) experience providing PrEP at 17 facilities in 2017-2018. Participants included nurses, lay counselors, clinicians, community educators and pharmacists. Data were analysed in Stata 13 and NVivo 11.

RESULTS: Of the 192 participants surveyed, 20% were males and 80% females, ages 18-71 with mean age of 35. Providers had service delivery experience with YW (90%), AG (58%), MSM (40%), and SW (22%). About half (54%) of participants were familiar with PrEP; among these, 47% had

been trained in PrEP delivery and 34% had provided PrEP services. Nearly all PrEP-naïve providers felt that they need additional skills/experience to provide PrEP (96%), compared to 58% of experienced providers. Providers thought that barriers to PrEP use included side effects (60%: 70% naïve/41% experienced), lack of access (58%: 63% naïve/47% experienced), drug availability (43%: 48% naïve/33% experienced), and being judged (39%: 40% naïve/35% experienced). Some providers were concerned that offering PrEP to adolescent girls (43%) and young women (32%) will result in a backlash in the community. Based on preliminary analysis, challenges discussed in qualitative interviews included stigma experienced by people taking oral PrEP, skepticism from potential oral PrEP users due to lack of information, and partner resistance to oral PrEP use.

CONCLUSIONS: Our findings suggest creating dialogical spaces with both PrEP naïve and experienced service providers to address concerns such as PrEP provision to SW/ MSM/AG and YW. There is need to strengthen service provider training particularly on non-stigmatizing and non-judgmental attitudes toward populations at substantial risk of HIV, including SW, MSM and AGYW.

TUPEC421

PrEP use among MSM in Brazil: First results from Latin America MSM Internet Survey (LAMIS)

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BACKGROUND: HIV prevalence is high among MSM in Brazil. Pre-Exposure Prophylaxis (PrEP) is available free of charge since Dec 2017, as a part of combined prevention for HIV key populations at high risk of acquiring HIV. Based on the respondents to the Latin America MSM Internet Survey (LAMIS) we seek to describe characteristics of PrEP users during the first months of its distribution in Brazil.

METHODS: LAMIS was a cross-sectional online survey conducted between January and April 2018. The survey was advertised in dating apps, websites and social network groups with gay content, and distributed by NGOs. In Brazil, a total of 18,139 MSM completed the questionnaire. For this analysis, we considered participants ($n = 15,200$) without HIV diagnosis / without known HIV infection. A multiple logistic regression model was used to estimate factors associated with PrEP use, adopting 95% confidence intervals.

RESULTS: From this subsample 2% reported using PrEP (1.5% with daily use and 0.5% using PrEP on demand). Living comfortably with their income (OR=1.85; 95%CI:1.24-2.77) and in cities larger than 500.000 inhabitants (OR=2.73; 95%CI:1.88-3.95) were the main sociodemographic characteristics associated with PrEP use. Higher odds of using PrEP were observed on those who reported a steady partner with diagnosed HIV (OR=3.46; 95%CI:1.92-6.22), used PEP more than once (OR=6.56; 95%CI:4.42-9.76), combined drugs with sex in the last month (OR=2.59; 95%CI:1.81-3.69), and reported condomless anal sex with a non-steady partner in the last 12 months (OR=2.74; 95%CI:2.17-3.45). MSM who reported had being vaccinated for hepatitis A (OR=1.41; CI95%:1.04-1.93), a full STI screen (OR=6.78; 95%CI: 4.33-10.62) also had higher odds of being on PrEP.

CONCLUSIONS: Preliminary data supports that PrEP users are presenting higher rates of STI screening and hepatitis A vaccination, suggesting concerns with their sexual health. In spite of the need to reach the most vulnerable population, this strategy seems to be effectively used by those who are engaged in high-risk sexual behavior, achieving its purposes. More data from PrEP users from the public health system is needed to make these initial findings more robust.

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TUPEC422

Awareness and willingness to use PrEP among men who have sex with men in Mexico, Encuesta de Sexo Entre Hombres, 2017

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BACKGROUND: HIV pre-exposure prophylaxis (PrEP) is a key component to HIV prevention strategies. Although Mexico provides universal coverage of HIV antiretroviral therapy, PrEP remains unavailable. Little is known about awareness and willingness to use PrEP among Mexican men who have sex with men (MSM).

METHODS: MSM in Mexico were recruited to participate in an online behavioral survey via advertisements on social venues (e.g. Facebook). Participants eligible for this analysis were men, ≥18 years old, who were MSM or gay/bisexual-identified, and self-reported being HIV-negative. Men were asked if they (1) ever heard of PrEP (awareness) and (2) were willing to take PrEP if it were available for free. We calculated frequencies and bivariate associations (unadjusted prevalence ratios and 95% confidence intervals) with key covariates using Poisson regression with robust standard errors.

RESULTS: Overall, 55% of participants were aware of PrEP. Awareness was more prevalent among MSM who had college education or higher, lived in Mexico City, had a healthcare visit (past year), tested for HIV (past year), used non-injection drugs (past year), had ≥5 male sex partners (past year), and had an HIV-positive or HIV-status-unknown last sex partner (Figure). Among those aware of PrEP, 86% reported willingness to use PrEP if it were free. Willingness to use PrEP was more prevalent among MSM who were ≤29 years, did not test for HIV (past year), had ≥2 male sex partners (past year), had condomless anal sex (past year), and had an HIV-status-unknown last sex partner.

CONCLUSIONS: Though only half of Mexican MSM were aware of PrEP, the vast majority of those aware were willing to use PrEP if it were available and free. Both awareness and willingness to use PrEP varied by demographics, recent healthcare use, and behavioral risk factors which could all be useful in designing future education campaigns and PrEP programs for Mexican MSM.

Awareness and willingness to use PrEP¹ among men who have sex with men in Mexico, 2017

Characteristics	Aware of PrEP ¹		Willing to use PrEP ²	
	n (%)	PR (95% CI)	n (%)	PR (95% CI)
Age				
18-24	1375 (48.9)	0.91 (0.80, 1.04)	1094 (88.9)	1.10 (1.06, 1.15)*
25-29	1421 (59.2)	1.09 (0.95, 1.26)	1113 (87.0)	1.08 (1.02, 1.13)*
30-39	1348 (58.6)	1.11 (1.00, 1.23)	1012 (84.2)	1.04 (1.00, 1.08)
≥40	448 (51.3)	Referent	1094 (88.9)	Referent
Education				
High school or less	1054 (44.6)	Referent	824 (87.6)	Referent
College or higher	3476 (59.0)	1.30 (1.25, 1.35)*	2666 (85.9)	0.99 (0.97, 1.01)
Region				
Mexico City	1433 (66.1)	1.25 (1.16, 1.34)*	1047 (84.0)	0.97 (0.95, 0.99)*
Other states	3159 (50.8)	Referent	2491 (87.3)	Referent
Visited health care provider, past 12 mo				
Yes	3193 (56.8)	1.08 (1.04, 1.12)*	2439 (86.5)	1.01 (0.98, 1.04)
No	1053 (51.5)	Referent	822 (85.9)	Referent
Received HIV test, past 12 mo				
Yes	3113 (59.1)	1.23 (1.19, 1.28)*	2377 (85.6)	0.97 (0.96, 0.99)*
No	1262 (47.5)	Referent	991 (87.7)	Referent
Non-injection drug use, past 12 mo				
Yes	1728 (62.4)	1.19 (1.13, 1.26)*	1362 (87.0)	1.02 (1.00, 1.03)
No	2736 (51.5)	Referent	2075 (85.7)	Referent
Number of male sex partners, past 12 mo				
0 to 1	586 (47.0)	Referent	398 (80.1)	Referent
2 to 4	1176 (49.3)	1.06 (0.99, 1.14)	891 (85.4)	1.06 (1.01, 1.12)*
5 to 9	978 (56.8)	1.23 (1.14, 1.32)*	753 (86.0)	1.07 (1.00, 1.13)*
10+	1565 (63.5)	1.36 (1.22, 1.53)*	1280 (89.8)	1.11 (1.05, 1.18)*
Condomless anal sex, past 12 mo				
Yes	2452 (55.8)	0.98 (0.94, 1.03)	1959 (88.2)	1.06 (1.04, 1.07)*
No	1492 (56.5)	Referent	1085 (83.7)	Referent
Partner's HIV status, at last sex				
Concordant HIV-negative	2141 (53.4)	Referent	1611 (84.6)	Referent
Serodiscordant HIV-positive	146 (73.7)	1.35 (1.21, 1.50)*	110 (84.0)	1.00 (0.93, 1.07)
Unknown	2135 (55.6)	1.04 (1.01, 1.06)*	1689 (88.2)	1.04 (1.01, 1.07)*
Overall	4592 (54.8) ³		3538 (86.3) ³	

Abbreviations: PR=prevalence ratio, CI=confidence interval, mo=months
¹Significant at alpha level of 0.05.
²Participants were asked (1) if they had ever heard PrEP (Aware of PrEP) and (2) if they would be willing to take PrEP if available for free (Willing to use PrEP).
³Column totals for each covariate may not sum to overall column total due to missing covariate data.

[Awareness and willingness to use PrEP¹ among men who have sex with men in Mexico, 2017]

TUPEC423

Health care providers' self-efficacy at providing oral pre-exposure prophylaxis (PrEP) in Kenya: Results from a cross-sectional survey

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BACKGROUND: Oral PrEP for HIV prevention became national policy in Kenya in 2017. PrEP is under the purview of the health system, thus the success of scale-up is dependent on the country's health providers. Although providers are the stewards of PrEP, little investigation has been done on their perceptions of and confidence managing PrEP services in the context of routine scale-up. Jilinde, funded by the Bill & Melinda Gates Foundation, supports Kenya's national scale-up of routine PrEP services. We investigated providers' PrEP knowledge, negative perceptions and self-described confidence with PrEP delivery ("self-efficacy"), and identified independent predictors of greater self-efficacy within Jilinde-supported sites.

METHODS: From July to December 2018, providers from 69 of 93 Jilinde-supported sites answered a self-guided, structured survey regarding their PrEP delivery practices. Three Likert scales were used to assess knowledge, negative perceptions, and PrEP self-efficacy. Composite scores were computed for each. Regression analysis was used to identify independent predictors of greater self-efficacy.

RESULTS: A response rate of 94.8% resulted in responses from 329 providers. The mean age was 32.9 years, with an average of 7.5 years of experience. Providers scored a mean of 9.8/15 on knowledge, 12.5/30 for negative perceptions, and 39.1/45 for self-efficacy. Controlled for other variables, providers linked to HIV services, exposure to curriculum-based training, higher knowledge and lower negative perception were significantly associated with greater self-efficacy.

CONCLUSIONS: Self-efficacy measures around provision of PrEP are scarce, and this measure provided useful information about providers' confidence delivering PrEP, including the association of negative PrEP perceptions and low knowledge with lower self-efficacy, which may affect their propensity to offer the service. Cultivating knowledgeable providers holds promise towards attaining greater provider self-efficacy but broader and contextualized interventions that address attitudes and skills across various cadres ought to be implemented to accelerate scale-up in low resource settings.

Variable	Categories	Frequency (%)	Self-efficacy mean score ± SD	Bivariate analysis statistic and p-value	Generalized linear model - B (95% CI)	p-value
Provider cadre	Nurse	89 (27.1)	37.6±7.1	F(3, 319)=6.65; P<0.001	1.02 (-1.32 - 3.36)	0.394
	Clinical officer	116 (35.3)	40.3±6.9		2.73 (0.41 - 5.05)	0.021
Training	HIV testing provider	76 (23.1)	40.8±5.1		3.64 (1.21 - 6.06)	0.003
	Auxiliary providers	48 (14.6)	36.4±8.4		Ref.	
Training	Curriculum-based	83 (25.2)	41.0±5.6	F(2, 320)=6.47; P=0.002	2.26 (0.22 - 4.30)	0.030
	On-the-job	144 (43.8)	39.3±6.9		1.74 (0.03 - 3.46)	0.046
PrEP knowledge score	CME/ Whole-site orientation	102 (31.0)	37.3±7.8		Ref.	
		-	-	r=0.249; p<0.001	0.48 (0.16 - 0.81)	0.003
Negative perceptions score		-	-	r=-0.220; p<0.001	-0.26 (-0.46 - -0.07)	0.008

[Predictors of provider self-efficacy scores]

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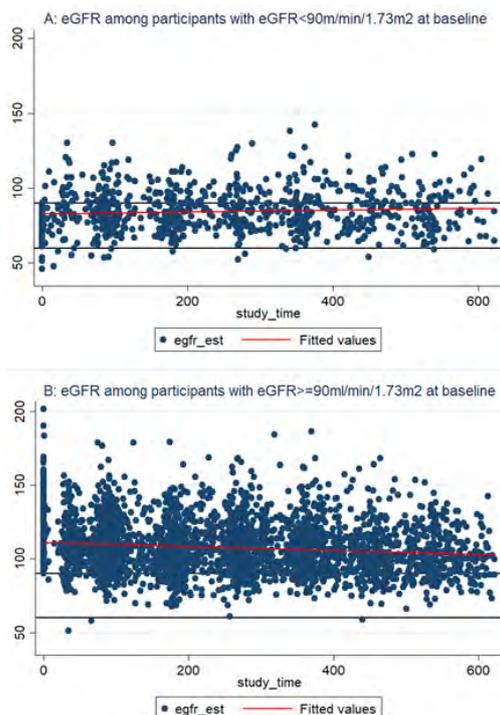
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Longitudinal analysis of renal function among participants in a large Australian PrEP demonstration study, PrEPXK. Ryan^{1,2}, J. Asselin³, C. Fairley^{3,4}, L. Nguyen², N. Roth⁵, M. Penn⁶, J. Willcox⁷, M. West⁸, B.K. Tee⁹, S. Ruth¹⁰, M. Hellard^{1,2}, J. Hoy¹, M. Stooove², E. Wright^{1,2}, PrEPX Study Group¹Alfred Health and Monash University, Department of Infectious Diseases, Melbourne, Australia, ²Burnet Institute, Public Health Discipline, Melbourne, Australia, ³Monash University, Central Clinical School, Melbourne, Australia, ⁴Melbourne Sexual Health Centre, Melbourne, Australia, ⁵Prahran Market Clinic, Melbourne, Australia, ⁶Thorne Harbour Health, PRONTO!, Melbourne, Australia, ⁷Northside Clinic, Melbourne, Australia, ⁸Victorian Government, Department of Health and Human Services, Melbourne, Australia, ⁹The Centre Clinic, Melbourne, Australia, ¹⁰Thorne Harbour Health, Melbourne, Australia**BACKGROUND:** HIV pre-exposure prophylaxis (PrEP) guidelines recommend prescribing PrEP to people whose estimated glomerular filtration rate (eGFR) is at, or above >60mL/min/1.73m². We report changes to eGFR and predictors of eGFR among participants enrolled in a large Australian PrEP demonstration study.**METHODS:** Enrolment survey and serum creatinine data from four study clinics participating in the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) were extracted from July 2016-April 2018. Analyses include male participants PrEP-naïve at baseline with ≥2 serum creatinine results. eGFR was estimated using the Modification of Diet in Renal Disease Equation; rates were classified as low (< 60mL/min/1.73m²), moderate (60-90mL/min/1.73m²) and normal (>90mL/min/1.73m²). Linear regression explored associations between study time (days) and age (years) with eGFR (mL/min/1.73m²) among participants with low/moderate and normal baseline eGFR. Participants with low eGFR were characterised.**RESULTS:** Analysis includes 927 PrEPX participants, median follow-up time 381 days (IQR: 231-533 days). At baseline, three (0.3%) participants recorded low eGFR and 180 (19%) recorded moderate eGFR. Among participants with low/moderate baseline eGFR (n=183), eGFR was associated with study time (β :0.009, 95%CI:0.003-0.014) and negatively associated with age (β :-0.46, 95%CI:-0.62-0.30). Among 744 participants with normal baseline eGFR, there was a negative association between eGFR and study time (β :-0.01, 95%CI:-0.12-0.007) and age (β :-0.54, 95%CI:-0.65-0.44) (Figure 1).

[eGFR recorded among participants with A) low/moderate and B) normal baseline eGFR]

Among the 15 (1.6%) participants who recorded 20 low eGFR; median baseline eGFR was 72 (IQR:60-85), median time to low eGFR was 89 days (IQR:28-307) and among the 12 with follow up testing, median time to recovery was 14 days (IQR:7-43days).

CONCLUSIONS: eGFR decline among PrEP users was small, including among older participants and those whose eGFR was low/moderate at baseline. A decline to low eGFR was rare and it quickly normalised. Concerns about a decline in renal function during short term PrEP use should be minimal and not serve as an obstacle to prescribing or commencing PrEP.

TUPEC425

Model-based comparison of the individual-level and community-level benefits of PrEP in South Africa: Implications for priority populationsE. Mudimu¹, A. Bershteyn²¹University of South Africa, Decision Sciences, Midrand, South Africa,²Institute for Disease Modeling, Seattle, United States**BACKGROUND:** Use of PrEP prevents individual HIV infection (direct protection) and also has community-level benefits (indirect protection) by reducing prevalence of HIV in potential sexual partners. Disentangling the community-level benefits of PrEP remains a challenge since they are heavily influenced by the underlying HIV transmission sexual network.

We used a network transmission model to simulate the individual and community-level benefits of PrEP in different subpopulations in South Africa, the first country in sub-Saharan Africa to approve the use of PrEP.

METHODS: An agent-based network model, EMOD-HIV, was fit to national estimates of HIV prevalence, number on ART, and number receiving voluntary male medical circumcision (VMMC), using age- and sex-disaggregated estimates from five nationally representative HIV surveys as well as programmatic data from the Department of Health. PrEP roll-out was simulated for HIV negative adolescent girls and young women (AGYW 18-24 years) classified as either high risk (commercial sex workers) or medium (those with multiple partners) assuming 30% coverage.

We compared the effect of PrEP on incidence among recipients or equivalent non-recipients, as well as to a PrEP-free counterfactual simulation, to disaggregate the direct and indirect benefits.

RESULTS: PrEP exhibited substantial community-level benefit, especially >5 years after roll-out, when it exhibited a stronger indirect community-level benefit. For medium-risk AGYW (those with multiple partners, but not engaged in formal commercial sex work), the indirect community-level benefits of PrEP outweighed the direct benefits within five years of roll-out.

Compared to the direct effect of PrEP at preventing infection among users, the number of infections averted by indirect community-level effects was 20% greater at 5 years and 60% greater at 10 years.

CONCLUSIONS: HIV prevention using PrEP has the potential for considerable individual-level and population-level benefit if optimal models for PrEP delivery reach individuals who provide indirect protection to their communities through sexual networks.Monday
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TUPEC426

"I always use condoms - with that one" - different risk compensation dynamics in different population groups: Evidence from a qualitative study of PrEP clients in Eswatini

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BACKGROUND: Pre-exposure prophylaxis (PrEP) is a promising HIV prevention method but the protective benefits may be limited by risk compensation. Understanding the perceived and acted risk behaviours of those using and considering to use PrEP is essential for informing future PrEP programs.

METHODS: We conducted 125 semi-structured in-depth interviews with purposefully selected male and female PrEP clients from the general population at risk for HIV, enrolled via a PrEP demonstration study in Eswatini. The study was conducted from September 2017 to January 2019 in six public sector, nurse-led, primary-care clinics. Qualitative data from observational notes, daily debriefing sessions and interview transcripts were analyzed using Nvivo, following the tenants of Grounded Theory.

RESULTS: Different types of PrEP clients (35, 38, 27, and 25 people who had, respectively, newly taken up, continued, discontinued, and declined PrEP) described their sexual behaviour in relation to HIV prevention methods, sexual partners and PrEP. Nearly all our female participants said their PrEP use was as a result of their partner's sexual risk behaviours, rather than their own. The majority of male and female clients said that their condom use prior to, and when using PrEP was inconsistent, and that this was dependant on personal and partner sexual preferences, a partner's sero-status, family planning, marital status and sexual concurrency. 15 clients said that PrEP counselling had increased their condom use, 13 clients said that with PrEP they would no longer use condoms, and 10 stated that PrEP increased concurrent sexual partnerships.

CONCLUSIONS: The perception of HIV risk was a major motivation for PrEP uptake, but some PrEP clients reported increased sexual risk taking following PrEP initiation. The changes in risk taking following PrEP were motivated by a variety of complex, dynamic factors. It will be important to identify the best approaches to present PrEP as one important option in a broader package of potential HIV prevention interventions. PrEP messages should be tailored to address the specific needs of different sociodemographic groups.

TUPEC427

Longitudinal changes in condom use with casual partners among gay and bisexual men using HIV pre-exposure prophylaxis

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Viral Hepatitis Service, Melbourne, Australia, ¹¹Monash University, School of Public Health and Preventive Medicine, Melbourne, Australia

BACKGROUND: Gay and bisexual men (GBM) commencing HIV pre-exposure prophylaxis (PrEP) may experience varying degrees of behavioural change at different stages of PrEP use. We explored temporal heterogeneity in change in condom use among GBM enrolled in the PrEPX study, an open-label intervention study.

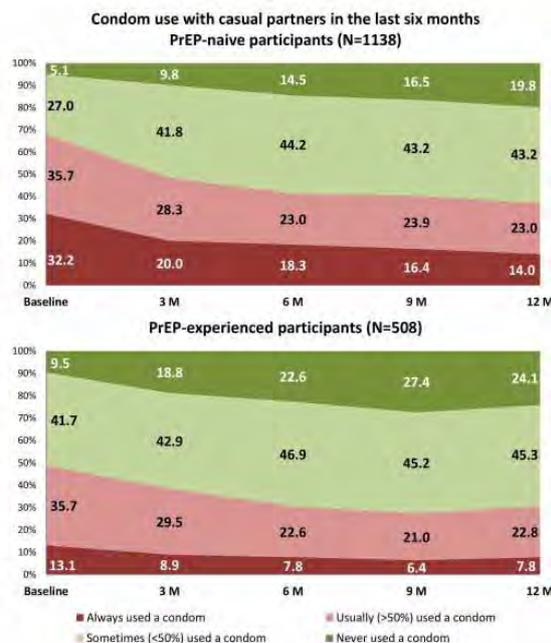
METHODS: Participants taking daily PrEP self-completed an electronic survey approximately three-monthly. Available responses were categorical for condom use in the last six months (always, usually [$>50\%$ of the time], sometimes [$< 50\%$ of the time], never). Among participants who completed a survey at month 12, we explored changes in condom use with casual partners from baseline to months 3 and 12 and associated characteristics using generalised estimating equation logistic models. Two dichotomised outcomes were explored;

(1) inconsistently versus always used condoms, and

(2) never versus sometimes, usually or always used condoms.

RESULTS: Of the 2,440 participants enrolled ≥ 12 months prior to study-conclusion with available data, 1,646 (67%) completed a survey at month 12. Compared to baseline, inconsistent condom use and never using condoms increased by month 3 (OR=1.82, 95% CI=1.56-2.14; OR=2.00, CI=1.59-2.51, respectively) and month 12 (OR=2.55, CI=2.17-3.01; OR=3.67, CI=2.96-4.54, respectively). Condom use at enrolment was lower among participants reporting pre-enrolment PrEP use (PrEP-experienced) and declined further to month 12 among this group (both outcomes $P < 0.001$) [figure]. Overall, inconsistent condom use was greater among those aged >30 years (OR=1.49, CI=1.19-1.88). Asian-born participants (OR=0.62, CI=0.46-0.83) and participants with regular partners (OR=0.68, CI=0.57-0.81) were less likely to report inconsistent condom use with casual partners. Changes in condom use over time did not differ significantly by participant characteristics.

CONCLUSIONS: Reductions in condom use are most common immediately following PrEP commencement, but still occur during later stages of PrEP use, which may indicate population-level normalisation of PrEP over time. These findings highlight the importance of ongoing, frequent monitoring of STIs among PrEP users.



[Condom use with casual partners over 12 months among PrEP-naïve and PrEP-experienced participants]

TUPEC428

HIV infection after stopping PrEP in a U.S. safety-net integrated health system: A mixed methods study

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BACKGROUND: PrEP is highly effective, although PrEP persistence has been limited in real world PrEP implementation. Little is known about the HIV risk after stopping PrEP and the experience of individuals who stop PrEP and later HIV seroconvert.

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METHODS: We identified individuals who initiated PrEP in the San Francisco Primary Care Clinics (SFPC), a 15-clinic safety-net integrated delivery system, and performed in-depth chart review to determine person-time on and after stopping PrEP through 11/2018. We identified all PrEP seroconversions using the CDC's Enhanced HIV/AIDS Reporting System. We calculated the HIV incidence using Poisson models while individuals were using PrEP and after stopping. We performed in-depth interviews with patients who seroconverted.

RESULTS: Overall, 986 individuals initiated PrEP, with a median age of 35; 12% were transwomen, 66% MSM 12% Black, and 26% Latino. There were 895 person-years (P-Y) of follow-up on PrEP and 953 after stopping PrEP. The HIV incidence on PrEP was eight-fold higher after stopping PrEP compared to while on PrEP (95% CI 1-336; $p=0.03$; 0.8 vs. 0.1/100 person-years). Of the eight individuals who HIV seroconverted, three were transwomen, five MSM; only one was taking PrEP at the time of seroconversion. Of the seven individuals who seroconverted after stopping PrEP, two stopped due to side effects, one after changing insurance, one moved and lost access to PrEP care, one moved into a shelter and lost his pills, one relapsed on methamphetamine, and one stopped due to entering a stable relationship. All but one received primary care services after stopping PrEP; most reported difficulty assessing their HIV risk and anger that they had not received additional outreach while on PrEP. The individual who developed HIV while taking PrEP reported taking intermittent PrEP during all sexual encounters, although was incorrectly taking one rather than two pills prior to sex.

CONCLUSIONS: The HIV incidence after stopping PrEP was eight-fold higher than while on PrEP. Many individuals who stop PrEP remain at risk of HIV, and proactive outreach could potentially have prevented many of the HIV infections in this cohort. Individuals using non-daily PrEP should be provided additional education and support.

TUPEC429

The global PrEP research landscape: Mapping studies of oral PrEP implementation and impact

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BACKGROUND: Since WHO issued its first guidance on oral pre-exposure prophylaxis (PrEP) in 2012, 191 projects and programs have assessed the impact and feasibility of oral PrEP for HIV prevention, including a focus on different parts of the product introduction framework. AVAC began tracking global PrEP programs in 2014, and continues maintenance of a database as part of the OPTIONS Consortium. Data are collected through a quarterly survey covering program demographics, geography, funding, service-delivery settings, program types, tools created and resistance testing.

METHODS: A review of completed, ongoing and planned oral PrEP projects from 2014-2018 was conducted. Projects included were limited to those that provide oral PrEP and have a clear research objective. Projects were analyzed by geography, size and population, and research questions were mapped along the product introduction framework (which includes areas such as planning and budgeting, supply chain management, PrEP delivery platforms, individual uptake, and effective use and monitoring) to analyze and identify gaps and overlaps.

RESULTS: This review identified 112 organizations working on 191 projects in 71 countries. The majority of the research questions focused on uptake, adherence, acceptability, risk behaviors, and drug safety. Few projects examined questions related to provider support, demand creation, or user preferences for service delivery. Programs were spread across areas of high and low HIV prevalence, with the highest concentration of projects observed in Kenya, South Africa, Thailand, the United States and Zimbabwe. Overall, 89% of projects involved less than 1,000 individuals each and the most commonly served populations were men who have sex with men, female sex workers, and adolescent girls and young women.

CONCLUSIONS: This analysis brought to light several gaps in the research on oral PrEP, including the lack of research focused on provider support, demand creation and user preferences. Globally, PrEP projects were designed to answer many of the same questions, and in many cases the

small scale of projects has limited the applicability of findings to large-scale national rollout. Overall, a more coordinated approach to designing introduction of new products is needed to address identified gaps in the research landscape and to aid in designing more effective large-scale programs.

TUPEC430

Initiation and persistence of oral pre-exposure prophylaxis (PrEP) by adolescent girls and young women (AGYW) for HIV prevention in Kenya

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BACKGROUND: The PEPFAR DREAMS Initiative aims to reduce incident HIV infections among AGYW in 10 sub-Saharan African countries. It is built on the hypothesis that multiple simultaneous interventions -- including access to PrEP -- will be synergistic for HIV prevention. However, efficacy of PrEP is highly dependent upon adherence, which can be challenging for AGYW. We used programmatic data from DREAMS to evaluate patterns of persistent PrEP use among AGYW in Kenya.

METHODS: PATH collected PrEP delivery data on AGYW 18-24 years in Kisumu and Homabay counties, Kenya between March 2017 and August 2018. AGYW who were eligible (HIV-uninfected and at high risk of acquiring HIV) and agreed to enroll were scheduled for monthly PrEP program visits. We defined PrEP program persistence as return for PrEP monthly refill visits, even if overdue. Descriptive summaries and survival analysis were conducted.

RESULTS: Of the 1165 AGYW age 18 to 24 years who were enrolled into the DREAMS PrEP program and initiated PrEP, the majority (64%) were unmarried or not living with a partner at the time of DREAMS enrollment and from Homabay county (55%). Among those who initiated PrEP in Kisumu county, PrEP program persistence was 30%, 16%, and 6% at 1, 3 and 6 months after PrEP initiation, respectively. Among those who initiated PrEP in Homabay county, PrEP program persistence was 53%, 30% and 15% at 1, 3 and 6 months following PrEP initiation, respectively. Overall, among AGYW who initiated PrEP in both counties, PrEP program persistence was 43%, 24% and 11% at 1, 3 and 6 months after PrEP initiation, respectively.

CONCLUSIONS: Most AGYW who initiated PrEP in both counties stopped attending their PrEP refill appointments within 3 months of PrEP initiation. Further data collection is planned to better understand AGYW PrEP use patterns, including PrEP adherence and discontinuation as well as factors influencing these two measures.

TUPEC431

Tracking oral PrEP access globally: Using initiation trend data to inform product introduction

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BACKGROUND: To date, 43 regulatory agencies have approved oral TDF/FTC for PrEP and 68 countries have begun offering PrEP in some form. However, the decentralized nature of PrEP initiation data has posed a challenge for tracking progress and identifying global trends. To address this challenge, AVAC began tracking global PrEP initiation in 2014 to generate new insights for product implementation and inform prevention advocacy efforts.

METHODS: The Global PrEP Tracker is a comprehensive database of information on ongoing and planned PrEP demonstration projects, implementation initiatives and national programs. Project data is collected through

a quarterly survey to 191 programs, covering PrEP initiation numbers, demographics, geography, funding, service delivery settings, program types, tools created and resistance testing.

RESULTS: Available data collected in December 2018 indicates that the number of people initiated on PrEP increased by more than 107% over the past year, to 391,948 globally. North America and sub-Saharan Africa continue to have the highest overall number of initiations, accounting for 51% and 32% of the total number of PrEP users respectively. Regionally, South America, sub-Saharan Africa and Europe had the greatest increase in initiations in 2018, while Northern Africa was the only region to see a decrease. Overall, men who have sex with men (MSM) still constitute the vast majority of PrEP users worldwide (nearly 80% of the global total), followed by female sex workers (12%), and AGYW (5%). With regard to service delivery settings, 71% of programs providing PrEP are public sector, with primary/general health clinics comprising 23% and NGOs 21% of the total. Research clinics, hospitals, and testing centers are also common access points and account for 16%, 14%, and 13% of service delivery facilities, respectively.

CONCLUSIONS: The capacity to track and share data on PrEP rollout globally is crucial for advocates, implementers, policy makers, product developers and funders to identify national, regional and global trends and recommend program modifications to address gaps. Through regularly collecting and disseminating data on PrEP projects, the Global PrEP Tracker contributes to a more robust data landscape in the HIV prevention field.

TUPEC432

Change in awareness of, willingness to and utilization of PrEP over the past two years in Japan

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BACKGROUND: HIV prevention with oral PrEP is very efficacious. However, PrEP has neither been implemented nor approved in Japan so far. We have reported awareness of, willingness to and utilization of PrEP among Japanese MSM before (Yamaguchi et al, IAS2017). In this study, we conducted an internet survey for Japanese MSM who use gay specific geosocial-networking-app. de novo, and studied the perceptual and behavioral change toward PrEP over the past two years among Japanese MSM.

METHODS: A nationwide, anonymous, self-administered internet survey was conducted for Japanese MSM who use gay specific geosocial-networking-app. between October 31 and November 30, 2018. This study was approved by the research ethics committee of PLACE TOKYO.

RESULTS: During the study period, 6,467 people responded and 5,048 completed the survey (completion rate: 78%). They answered their sexuality as gay; 82%, bisexual male; 16%, and others; 2%. Of those, 39% were aware of, 67% were willing to use if available, and 10% had ever used PrEP. Over the past two years, the awareness and utilization increased significantly from 11% to 39%, and from 0.1% to 10%, respectively ($p < 0.01$), but willingness to use did not change. Of those who had used, 43% purchased PrEP medicine online, 42% were prescribed at local medical institutions, and 14% at overseas medical institutions. Daily dosing was 65% and 35% on demand. Nearly half (46%) had taken regular medical checkup for PrEP, whereas 30% had not received it at all, and 9% answered that they wanted to receive it but could not find or did not know the place to be taken.

CONCLUSIONS: As of today, PrEP has not approved in Japan, therefore many Japanese at risk cannot access to PrEP program. Many have purchased PrEP medicines online and regular medical checkup is not provided to them. In Japan, it is necessary to obtain approval of PrEP as soon as possible and to establish systems to provide medical services for PrEP users.

TUPEC433

PrEP as a potential solution in Yangon, Myanmar to address high behavioral risk for HIV acquisition among men who have sex with men and transgender women: A mixed-methods assessment

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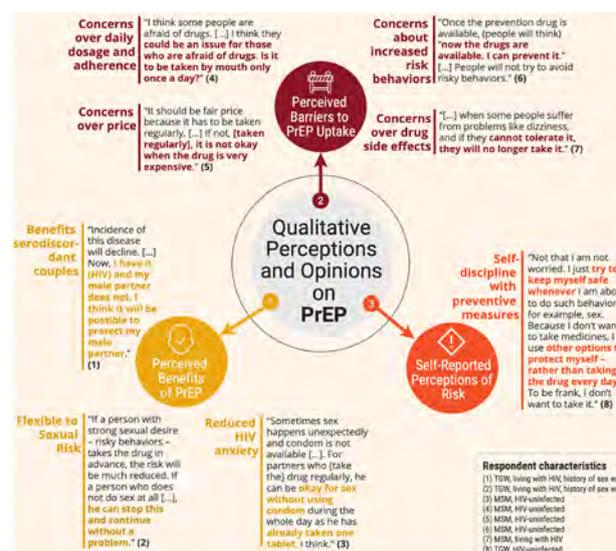
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BACKGROUND: The HIV epidemic is concentrated among men who have sex with men (MSM) and transgender women (TG) in Myanmar. Though included in the Myanmar National Strategic Plan on HIV and AIDS, PrEP is unavailable and research on key populations' readiness and willingness for PrEP remains limited.

METHODS: A mixed-methods, explanatory sequential assessment was conducted among MSM and TG (N=573), recruited via respondent-driven sampling in Yangon between November 2015-June 2017. Participants completed sociobehavioral surveys and HIV testing. Measures of PrEP knowledge and acceptability were later added to the survey and completed by 397 participants. Qualitative interviews among a maximum variable sample (n=20) of survey participants were conducted in May-June 2018 to further explore perceptions of PrEP.

RESULTS: Among 501 HIV-uninfected MSM and TG participants, 33.9% reported ever exchanging sex for money, 79.1% of those with regular male partners did not know their partner's HIV status, and only 4.2% reported condom during last receptive anal sex with a regular male partner. Among 72 participants with laboratory-confirmed HIV infection, 43.1% reported being in a stable sexual relationship and 73.3% did not know the HIV status of their regular male partner. Among 397 participants who completed the PrEP survey, 12.6% had ever heard of PrEP. Among self-reported HIV-infected participants, 98.2% wanted their partner(s) to take PrEP. 94.0% of self-reported HIV-uninfected participants indicated interest in taking PrEP themselves. Qualitative interviews corroborated high perceived benefits of PrEP among these populations (Figure 1). Increased risk behaviors, medication side effects, daily regimen, and low perceived risk of HIV were anticipated barriers to PrEP.

CONCLUSIONS: High behavioral risk among HIV uninfected prevent HIV acquisition in this context. Sexual partnership structures among HIV-infected participants highlight an opportunity to prevent serodiscordant transmission. These findings substantiate the addition of PrEP to a comprehensive package for HIV prevention among priority populations in Myanmar.



[Figure 1. Qualitative findings on PrEP among MSM and TGW in Yangon, Myanmar]

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TUPEC434

Short-term adherence marker to PrEP is strongly associated with future discontinuation in a large PrEP Demo Project in the U.S: Implications for point-of-care urine adherence testing

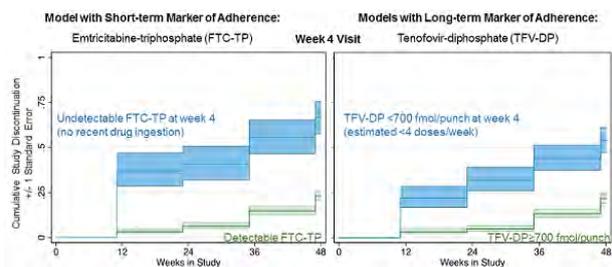
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BACKGROUND: With the recent availability of a urine point of care (POC) test to measure short-term adherence to tenofovir-disoproxil-fumarate (TDF)-based PrEP, PrEP adherence counseling enhanced by real-time PrEP drug levels is on the horizon. However, the ability of short-term adherence metrics to serve as proxies for future PrEP discontinuation is unknown.

METHODS: We analyzed data from the U.S. PrEP Demonstration Project utilizing dried blood spot (DBS) levels of FTC-triphosphate (FTC-TP)—a metric for recent adherence (dose in the last 2–4 days), which is analogous to the time interval examined by POC urine assays; and TFV-diphosphate (TFV-DP)—a metric for longer-term dosing. HIV-uninfected MSM and transwomen at risk for HIV acquisition were followed for 48 weeks, with DBS analyzed at weeks 4, 12, 24, and 36. An adjusted Cox-proportional hazards model examined the relationship of both short and long-term adherence with future PrEP discontinuation.

RESULTS: Overall, 294 individuals (median age 33 years, 13% Black, 32% Latino, and 3% transwomen) contributed drug levels within U.S. PrEP Demo for a median of 24 weeks. The strongest predictor of future PrEP discontinuation was having a prior undetectable DBS FTC-TP level [adjusted hazard ratio (AHR) 6.3; 95% confidence interval (CI) 3.8–10.2]. Sub-optimal adherence based on low DBS TFV-DP level (estimated < 4 doses/week) was also strongly associated with discontinuation (AHR 4.3; 95% CI 2.4–7.6). FTC-TP examined at week 4 was associated with future discontinuation (AHR 3.1; 95% CI: 1.8–7.3; Figure), but detected 23% of individuals who eventually discontinued compared to 51% if an FTC-TP drug level was measured at every visit.

CONCLUSIONS: Both short and long-term PrEP adherence metrics are strongly associated with future PrEP discontinuation. Short-term point-of-care metrics of adherence using a low-cost POC assay could be measured at every PrEP visit to direct real-time tailored retention and adherence interventions.



[Short and Long-Term Markers of Adherence at the Week 4 Visit Predict Study Discontinuation in the U.S. PrEP Demo Project]

TUPEC435

Barriers to and facilitators of PrEP uptake: Lessons from FHI 360/Ministry of Health demonstration Project in the Kingdom of Eswatini

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BACKGROUND: The effectiveness of pre-exposure prophylaxis (PrEP) is well documented, but there is limited understanding of factors that influence uptake for scale-up. This study assessed the individual and health-system-level factors that influence PrEP uptake in Eswatini.

METHODS: Between August 2017 and October 2018, a mixed-methods study was conducted among individuals and health care workers (HCWs) at five clinics in two regions. HIV-negative people ages 18 and above attending the health clinics were screened using a structured risk-assessment guide, and those at substantial risk for HIV were offered PrEP. Those who consented and were eligible enrolled in a prospective study and were provided with PrEP pills. Twenty-five in-depth interviews were conducted with individuals who accepted PrEP and five focus group discussions with HCWs providing PrEP. Data were analysed using bivariate and content analysis.

RESULTS: Sixty percent of eligible people accepted PrEP. Acceptance rates were significantly higher among older (30.6 vs. 26.3 years) people, males (64.7%), those who had an HIV-positive partner (89.3%), people with multiple partners (69.7%), and those with tertiary education (64.7%). People who accepted PrEP reported being excited about PrEP, as it offers hope for serodiscordant couples and helps to overcome the physical discomfort associated with condom use. Key barriers to PrEP, cited by individuals who accepted PrEP included time burden for accessing PrEP by people who are not sick, and misinformation, as many people still believe that PrEP can cause infertility. Key systemic issues identified by HCWs included that HCWs' main focus is to provide care to sick people; they are still learning about PrEP, which can detract from core duties; additional staff needed to support follow-up individuals with missed appointments; high data collection burden; individuals not clear on differences between PrEP and ART; and the need to reduce waiting time for "healthy individuals" returning for refills. HCWs were happy they could offer serodiscordant couples an acceptable prevention package.

CONCLUSIONS: PrEP is acceptable among people at high risk of HIV in the Kingdom of Eswatini. Individual risk perceptions, overburdened HCWs, confusion with ART and long wait for medication need to be addressed.

TUPEC436

Longer term PrEP users in a Boston community health center: Sociodemographic factors and PrEP persistence

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BACKGROUND: PrEP use decreases HIV incidence, but some have noted low rates of persistence, which could lead to infection. The current study analyzed the socio-demographic characteristics of long term PrEP users (LTPU) compared to those with lesser periods of use, which may inform interventions to promote PrEP persistence.

METHODS: Data from patients who received a PrEP prescription at a Boston health center between 1/1/2012 and 12/31/2015 who had ≥ 3 years of follow-up were analyzed. Chi-square and Fisher's exact tests were used to compare those who discontinued PrEP within 6 months of initial prescription and those who had an active PrEP prescription ≥ 3 years after initial prescription.

RESULTS: Of 1,402 patients who initiated PrEP during the study period and were followed for at least 3 years, 10.1% discontinued within 6 months, 42.3% continued > 6 months, but < 3 years, and 47.6% had an active PrEP

prescription 3 or more years after their first prescription. Of 176 18-24 y.o. PrEP users (PU), 29.5% were LTPU, compared to 63.8% of those aged >= 50. Most PU had private insurance (83.1%) with 49.4% being LTPU compared to 30.2% of the 43 uninsured patients. Most PU were White (81.1%) with 49.4% being LTPU, compared to 46.8% of 94 Black PU, 50% of 52 multiracial PU, and 33% of 63 Asian-American PU. Of 13.4% Latinx PU, 40.9% were LTPU compared to 48.6% non-Latinx PU. Of 91.7% PU identified as LGBT, 46.9% were LTPU, compared with 30.7% of heterosexual PU. Of 41 transgender PU, 24.4% were LTPU.

CONCLUSIONS: Almost half of individuals initially prescribed PrEP had an active prescription after 3 years, but disparities were demonstrated, suggesting that tailored efforts to engage subpopulations may be needed in order to optimize the long term PrEP benefits.

TUPEC437

Barriers and facilitators of PrEP use: A synthesis of proceedings of the Empowering Women's Health Summit, Miami, FL, 2018

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BACKGROUND: Pre exposure prophylaxis (PrEP) use is suboptimal among women of color in South Florida who may be at HIV risk. To create awareness around PrEP, a community mobilization summit regarding PrEP was conducted. The study objective was to determine barriers and facilitators of PrEP among women of color in South Florida.

METHODS: Reports were developed based on three 90-minute group discussions among 279 cis- and transgender women of color (African American, Latina, and Haitian women) conducted at the Empowering Women's Health Summit in Miami, FL in May 2018. A social ecological framework was used to guide focus group discussions to probe for barriers and facilitators for increasing PrEP use in the women's communities.

RESULTS: Individual, structural and community level PrEP barriers were identified. Overall, the women identified cultural gender norms and roles as an overarching barrier, with religiosity reinforcing these norms such as 'sexual silence' that can influence sexual and possibly curtail empowerment and PrEP negotiating power in relationships. Unique barriers for transgender women were unmet basic needs (i.e. income, housing, food security) which led to financial hardship and created competing health priorities (e.g. hormone replacement therapy versus HIV prevention/PrEP). An individual barrier among all was economic dependence on sexual partners precluding sexual and PrEP negotiating power. Other social and systemic barriers were: distrust of medical providers, administrative issues with the healthcare system related to health literacy, insurance coverage, lack of effective communication with providers, and, structural racism and stigmatization leading to chronic stress. Facilitators that were predominantly identified among African American and Haitian women were: perceived resilience and strength from families and community, and, a historical precedence that provided evidence of the benefits of community activism that could be applied to community level dissemination and implementation of PrEP.

CONCLUSIONS: Increasing PrEP utilization among women of color requires a multi-tiered approach addressing individual, structural and community barriers while simultaneously drawing upon the existing social networks and strengths of ethnic/community social groups and community organizations to facilitate the process. Emphasis can be placed on provider-level interventions to promote the use of PrEP among at-risk female populations.

TUPEC438

PrEP uptake, engagement, and adherence following population-wide HIV testing in rural Kenya and Uganda in the SEARCH study

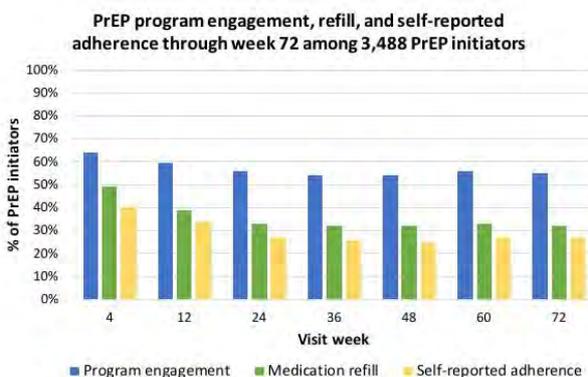
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BACKGROUND: Optimal PrEP delivery approaches in sub-Saharan Africa are needed. We report population-level PrEP uptake and engagement following near-universal HIV testing in the ongoing SEARCH study (NCT01864603) in rural Kenya and Uganda.

METHODS: Following community-level PrEP mobilization (outreach/education), we conducted HIV and multi-disease health campaigns/home-based testing and offered PrEP (TDF/FTC) to higher HIV-risk individuals (identified via self-assessed risk behavior, seroconversion risk score, or serodiscordance) at campaigns/nearby clinics. Overall and within higher-risk subgroups, we assessed PrEP uptake within 90 days of HIV testing. Among PrEP initiators, we assessed program engagement (visit attendance), medication refill, and self-reported 3-day adherence over 72 weeks.

RESULTS: Among 71,825 HIV-uninfected residents in 16 communities, 3,488 (4.9%) initiated PrEP. Uptake among higher-risk young women 15-24 years was 413/2,362 (17%), young women using contraception 158/764 (21%); young men 508/2,385 (21%); discordant partners 594/1,551 (38%); fishing/bar/transport workers 509/2,241 (23%); mobile persons 179/1,121 (16%). We also observed 36% PrEP uptake (334/928) among men ≥45. Among 3,488 PrEP initiators, 82% started same-day; 50% were women, 28% aged 15-24. At weeks 4, 24, and 72 following PrEP initiation, program engagement was 64%, 56%, 55%, respectively (Figure). Week 24 engagement, refill, and adherence were higher among discordant partners (70%/56%/48%) and fishing/bar/transport workers (73%/43%/35%) than young women (54%/22%/17%), young men (42%/19%/13%), and mobile persons (31%/20%/18%). HIV testing was performed at 3,962/5,099 (78%) visits where participants had discontinued PrEP. Self-reported barriers to PrEP use included daily pill-taking, side effects, non-supportive partner, and travel.

CONCLUSIONS: PrEP implementation via a population-based approach resulted in over 3,000 PrEP starts; most were same-day. However, engagement and adherence were sub-optimal; only half remained on PrEP by week 4. Among those discontinuing PrEP, ongoing program engagement provided opportunities for repeat HIV testing and re-starting PrEP. Strategies to increase engagement and adherence are needed, particularly for youth and mobile populations, to maximize the benefits of PrEP.



[PrEP program engagement, refill, and self-reported adherence among 3,488 PrEP initiators]

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TUPEC439

Identifying and addressing barriers to pre-exposure prophylaxis initiation via telecommunication intervention in urban NYC

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BACKGROUND: Callen-Lorde Community Health Center provides sensitive, quality health care and related services to New York's lesbian, gay, bisexual, and transgender communities. In 2015, Callen-Lorde opened a sexual health clinic specifically for testing and PrEP. While patients have obtained prescriptions for PrEP through Callen-Lorde, many have faced barriers once leaving our doors. The objectives of this intervention was to analyze the different barriers inhibiting efficient access to PrEP, provide relief and to gather recommendations on how to better prepare already vulnerable populations.

METHODS: After attending their PrEP intake appointment, a two week follow-up call was made to every person accessing PrEP for the first time at Callen-Lorde (January - December 2018). During the phone calls, open-ended qualitative interviews were conducted focusing on whether patients were able to begin taking the medication and whether they were experiencing any problems. Answers were then grouped into categories to identify common barriers and areas of improvement. Phone calls and data evaluation occurred at Callen-Lorde.

RESULTS: A total of 1208 patients initiated PrEP at Callen-Lorde in 2018. 425 of these patients reported no barriers to PrEP. 67 patients reported side effects; 9 of which decided to stop taking PrEP. 58 patients reported barriers stemming from insurance issues. 14 patients reported problems at the pharmacy. 46 patients delayed initiating PrEP due to personal reasons. 7 patients did not initiate PrEP due to having unanswered question about PrEP while 2 others required additional labs. Outcomes for 550 patients are unknown as they were unable to be reached or did not respond to a voicemail.

CONCLUSIONS: This study found it beneficial to follow-up with patients post PrEP initiation. In many cases, patients received additional resources and relief to barriers they were facing. The study was successful in that not only were barriers identified, but the study gave insight into areas of improvement and has consequently shaped the information that Callen-Lorde now includes in their digital signage, on their PrEP brochures and in many in-person conversations.

TUPEC440

Determinants of PrEP uptake in the general population in EswatiniA. Hettema¹, A. Hughey¹, S. Mukherjee¹, S. Matse², T. Bärnighausen³¹Clinton Health Access Initiative, Mbabane, Eswatini, ²Eswatini National AIDS Program, Mbabane, Eswatini, ³Heidelberg Institute of Public Health, Heidelberg, Germany

BACKGROUND: HIV pre-exposure prophylaxis (PrEP) reduces the risk of HIV infection among HIV-negative individuals and holds great promise to help end the epidemic. Globally PrEP uptake has been found to be low and it is important to understand predictors of uptake among clients at substantial risk for targeting and to inform future designs of PrEP promotion and supporting interventions.

METHODS: A PrEP demonstration study for the general population began in August 2017 in Eswatini to assess the operationalization of PrEP as an additional prevention method provided through public-sector primary-care clinics for clients ≥16 years at substantial risk for HIV. Data were collected electronically from clinic-based client records. An analysis of data from August 2017 through December 2018 is presented. A total of 1245 clients, 953(76.5%) females and 293(23.5%) males who were identified at substantial risk for HIV were analyzed for predictors of uptake using a generalized linear model with a binomial distribution family, controlling for outcome clustering at the clinic level.

RESULTS: Overall, 503(40.4%) clients initiated PrEP including 365 females (38.3% of females at risk) and 138 males (47.0% of males at risk). Gender, pregnancy or lactation status did not significantly predict uptake.

Clients with high self-perceived risk of HIV infection ($p < .001$), clients age 26 and above ($p < .05$), clients with a recent sexually transmitted infection ($P < .001$), clients with a known HIV-positive partner ($p < .001$) or partner with unknown HIV status ($p < .05$) and those specifically attending the clinic for PrEP services ($p < 0.001$) were significantly more likely to initiate PrEP compared to other clients.

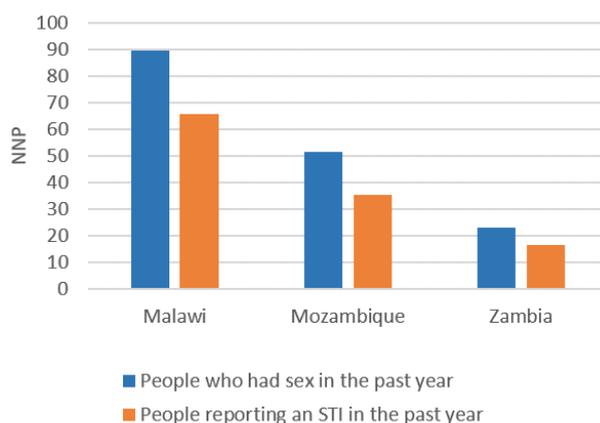
CONCLUSIONS: PrEP uptake varies among clients with different characteristics. Increased uptake among clients with a high self-perceived risk emphasizes the need to improve clients' risk perception, especially in younger clients. Improved PrEP education and awareness might lead to more clients making an informed decision to start PrEP.

TUPEC441

Mapping the need and benefit of PrEP in three African countries to estimate programmatic targetsD. Stelzle¹, P. Godfrey-Faussett², C. Jia³, O. Amiesimaka⁴, M. Mahy²,D. Castor⁵, I. Hodges-Mameletzis⁶, R. Baggaley⁶, S. Dalal⁶¹Center for Global Health, Technical University of Munich, Department of Neurology, Munich, Germany, ²UNAIDS, Strategic Information Department, Geneva, Switzerland, ³University of Heidelberg, Heidelberg, Germany, ⁴Technical University of Munich, Department of Sport and Health Sciences, Munich, Germany, ⁵U.S. Agency for International Development (USAID), Washington D.C., United States, ⁶World Health Organization, HIV/AIDS Department, Geneva, Switzerland

BACKGROUND: PrEP is being increasingly considered in many countries. However, establishing programmatic targets for PrEP by determining the population at risk, particularly in generalized epidemic settings, remains a challenge.

METHODS: We analysed the latest demographic and health surveys of Malawi, Mozambique and Zambia to determine the proportion of adult men and women who reported a sexually-transmitted infection (STI) as a behavioural marker of HIV risk. We computed prevalence ratios to estimate the association of STIs with HIV status. Using a multiplier method, we combined the STI proportion with incident HIV infections by district derived from a geospatial model. Based on these numbers, different scenarios of age, gender, geography and sexual behaviour were analysed to estimate the number needed to take PrEP for one year to prevent one HIV infection (NNP), assuming an efficacy of 100%.



* Females 15–34 years; males 20–34 years

Abbreviations:

PrEP – Pre-exposure prophylaxis

STI – sexually transmitted infection

NNP – Number needed to take PrEP for one year to prevent one HIV infection

[NNP by country among high risk age groups* who live in high incidence districts]

RESULTS: An estimated 38,000, 108,000 and 46,000 new infections occurred in Malawi, Mozambique and Zambia in 2016. In these countries, 9%–20% of new infections occurred among people reporting an STI in the past year. Around 50% of new infections occurred in districts with incidence

rates $\geq 1.0\%$ in Mozambique and Zambia, and $\geq 0.5\%$ in Malawi. If females aged 15-34 years and males 20-34 years reporting an STI in the past year who lived in high-incidence districts took PrEP, it would take 65.8 people on PrEP to avert one HIV infection in Malawi, 35.2 in Mozambique and 16.4 in Zambia. This would avert 3,300, 5,200 and 1,700 new infections over one year in the three countries, respectively.

CONCLUSIONS: A large proportion of new HIV infections were estimated to occur among people who reported an STI in the past year. Prioritizing PrEP by district, gender and age resulted in lower NNPs, increasing the cost-effectiveness of PrEP, but limiting the impact on reducing new infections.

Treatment as prevention

TUPEC442

Leveraging mobile health to promote uptake, retention and success of elimination of mother to child transmission of HIV (EMTCT) in Uganda, 2016 -2017

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BACKGROUND: Uganda, with over 41 million people bears a heavy burden of HIV with current adult prevalence at 7.0%. In absence of any intervention, mother to child HIV transmission rates range from 15% to 45% during pregnancy, labour, delivery and breastfeeding. Although positive strides have been made to initiate mothers into EMTCT programmes, sustainability of mother-baby pairs in EMTCT is low with only 56% of mothers retained under care after 6 months. We sought to assess if using mobile health services can promote uptake, retention and success of EMTCT.

METHODS: The Medical Concierge Group (TMCG) runs a medical call centre that provides free access to doctors for consultations 24/7 through voice calls, SMS, and social media platforms. TMCG partnered with 17 health facilities in high HIV catchment regions countrywide where pregnant ladies that tested HIV positive consented for mobile health services. Quarterly follow up calls were made and SMS reminders on ART adherence, positive living, and return health facility visits for ART refill and monitoring until their babies reached 18 months. A retrospective review of the HIV positive mother database was done from 2016 to December 2017.

RESULTS: From 2016 to 2017, 1,374 HIV positive clients consented for mobile health support. 201 mothers consented for EMTCT mobile health support (voice calls and SMS reminders). During the follow up calls in June 2017, 152 (75.62%) mothers reported to have honoured all appointments. Their babies had completed taking Nevirapine, were taking Co-trimoxazole and had undergone first PCR test. 28 (13.93%) mothers were lost to follow up. 21 (10.45%) did not honour their health facility appointments. On follow up during December 2017, 144 (71.64%) mothers had been fully retained in care, their babies had had the second PCR. 32 (15.92%) were lost to follow up whereas 25 (12.44%) had not honoured appointments. By December 2017, 40 babies (19.9%) had successfully completed the 18 months EMTCT program after testing HIV negative with the HIV anti-body test at 18 months.

CONCLUSIONS: Integration of mobile health into the general health system presents great promise in promotion of uptake, retention, and overall success of the EMTCT and general HIV/AIDS care.

HIV self-testing

TUPEC443

Awareness, preferences, and willingness to pay for HIV self-tests in Kenya

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BACKGROUND: HIV self-tests (HIVST) have only recently begun to be scaled-up in Kenya. We sought to understand awareness of self-testing, preferences for blood versus oral fluid kits, and willingness to pay (WTP) for self-tests in a country-wide household survey.

METHODS: This study was nested within a larger social-behavior change communications (SBCC) survey. Sexually active men ages 15-64 and women ages 15-49 were recruited across 12 counties in Kenya as part of a baseline data collection for a cluster-randomized SBCC effectiveness evaluation for VMMC, HIV care-seeking, and condom use campaigns. Respondents provided written informed consent. Data were analyzed in Stata 15.0 and adjusted for clustering at the community level.

RESULTS: We recruited 1,637 respondents who averaged 30.3 years of age (IQR: 23-35), were majority male (66.7%). 68% resided in urban areas. Nearly 35% of respondents reported knowing of HIVST kits prior to the survey, though only 6% reported having used an HIVST. Knowing of HIVST was significantly more common among previous HIV testers (36% vs. 21%, $p=0.001$), those in rural areas (47% vs. 29%, $p<0.001$), and those with jobs outside the home (38% vs. 31%, $p=0.003$). Among those who had heard of HIVSTs, most had learned of them from a friend, family member, or health-care provider (64%), the radio (22%), or TV (16%). Most of those familiar with HIVSTs said they would prefer a blood-based kit (79%), while only 15% said they would prefer an oral fluid kit. Preferences for the blood-based product were driven by perceptions of greater test accuracy (64%), while those preferring oral-fluid HIVSTs thought the tests were easy to use (39%) and didn't require a finger stick (54%). WTP for self-tests averaged 244Ksh, and did not differ significantly by gender or residence.

CONCLUSIONS: More than a third of respondents had heard of HIV self-tests, though surprisingly awareness was higher in rural areas compared to urban ones. There was variation in preferences for specimen type, locations where test kits could be obtained, and a modest willingness to pay for HIVST kits, suggesting a diversity of strategies and product types may be needed to ensure maximum impact of HIVST introduction in Kenya.

TUPEC444

Immune biomarkers are associated with HIV exposure or infection in children using DBS

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BACKGROUND: The analysis of inflammatory biomarkers could improve the study of HIV disease progression and predict the risk of comorbidities. Dried blood specimens (DBS) are validated to collect and transport blood samples, and used for HIV monitoring in settings with limited infrastructures. In this study, we assessed the expression of ten inflammatory and immune checkpoint biomarkers by RT-qPCR using DBS samples from a Congolese paediatric cohort.

METHODS: DBS were collected from 30 paediatric patients from Monkole Hospital in Kinshasa, Democratic Republic of the Congo. Ten were HIV-1-infected, 10 HIV-1-exposed but born -uninfected (HEU) and 10 HIV-unexposed and uninfected (HUU) children also free of other co-infections. We monitored the immune status testing 10 biomarkers: B7.1, B7H5, IRAK-M, Galectin-9, Siglec 10, HIF-1 α , HVEM, CD14, CD163 and PD-L1. Nucleic

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acids from the DBS were extracted by Nuclisens EasyMag (bioMerieux) platform. Gene expression levels were measured by reverse transcription of total RNA from one DBS dot (cDNA Reverse Transcription kit, Applied Biosystems) and quantitative real time PCR (qPCR, Light-Cycler, Roche) using specific primers including exon-exon junctions. Statistical analysis was performed by Mann-Whitney U-test.

RESULTS: We found a significant higher expression of B71 (membrane protein present in activated antigen presenting cells), Siglec-10 (sialic acid-binding Ig-like lectin 10), CD163 (marker of monocyte/macrophage activated cells) and HIF-1 α (transcription factor) in HIV-infected and HEU children compared with HUU children. HVEM (Herpesvirus entry mediator) and CD14 (co-receptor for lipopolysaccharide released from monocytes upon activation) were significantly overexpressed in HIV-infected children when compared with HEU and HUU. Although PD-L1, B7H5, Galectin-9 and IRAK-M did not show statistically significant differences between groups; the expression of IRAK-M (interleukin-1 receptor associated kinase) was slightly higher in HIV-infected and HEU children than in HUU. As well, the suppressor of T cell activation, B7H5, exhibited a higher expression in HIV-infected group compared to HUU.

CONCLUSIONS: Inflammatory status showed differences in HEU and HUU children. We identified four inflammatory biomarkers linked to both HIV exposure and infection (B71, Siglec-10, HIF-1 α , CD163) or only to HIV infection (HVEM, CD14) in this cohort. DBS could be a feasible alternative to plasma to monitor inflammatory status and to quantify inflammatory biomarkers.

TUPEC445

Factors associated with acceptability of HIV self-testing among men who have sex with men in 12 Brazilian cities

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BACKGROUND: The recent launch of HIV self-testing (HIVST) policy (2019) in the Brazilian Public Health System is a significant milestone in the evolution of HIV testing approaches. The HIV prevalence among men who have sex with men (MSM) is 18.4% in Brazil. About 56% of MSM in Brazil are unaware of their infection, a critical gap in the HIV prevention cascade and in reaching the 90-90-90 targets. We investigated the factors associated with acceptability of HIVST among MSM in 12 Brazilian cities.

METHODS: A cross-sectional study recruited 4,176 MSM from 12 Brazilian cities using Respondent Driven Sampling (RDS) in 2016. The associations of behavioral, sociodemographic, health service related variables and history of violence and discrimination with HIVST acceptability were explored. For each city, individuals were weighted using Gile's estimator obtained by RDS Analyst[®]. Combined data was analyzed by STATA[®] 15 complex survey procedure using each city as a stratum. Odds ratios and 95% confidence interval were estimated using logistic regression.

RESULTS: Most MSM were < 25 years old (58.3%), single (85.3%), black (63.8%), with 12+ years of education (70.4%) and belong to higher (42.4%) or middle (41.7%) socioeconomic status. Almost two-thirds (64.6%) reported discrimination in their lifetime, 32.8% had never taken an HIV test and 32.7% had been tested more than one year before the interview. Almost half of them would accept an HIVST (49.1%; CI 95%: 47.21-54.6). Only 14.1% would accept an HIVST among those who had never tested for HIV. Factors associated with acceptability of HIVST were: ever taken an HIV test

(OR: 1.46), higher education levels (OR: 2.31), self-reported discrimination in their lifetime (OR: 1.41), HIVST offered by a medical provider (OR: 3.07); protected receptive anal sex (OR: 1.69), being affiliated with an LGBT-NGO (OR: 2.59) and higher perception of HIV risk (OR: 1.10).

CONCLUSIONS: Acceptability of HIVST is still low, especially among the most vulnerable sub-groups. Promotion and increased availability of HIVST among MSM in Brazil needs to be scaled up to address the testing gap. This study showed that health care providers and LGBT-NGOs are key to increase the acceptability and use of HIVST.

TUPEC446

Stakeholders perceptions towards implementing HIV self-testing as an assisted partner services strategy to reach men in Haiti

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BACKGROUND: HIV testing among Haitian men is significantly lower than women in the country. HIV self-testing (HIVST), which allows people to test at home, is an innovative testing strategy that has been shown to increase HIV testing among men. Delivering HIVST kits to men via their female partners is one promising assisted partner services strategy. However, little research has been conducted on HIVST in Haiti. The purpose of this study was to assess healthcare leaders and workers' perspectives on their perceived advantages, disadvantages of HIVST, and recommendations for implementing HIVST in Haiti, with a focus on secondary distribution of HIVST to men by their female partners.

METHODS: Sixteen key informant interviews and four focus groups with a total 44 healthcare workers were carried out in Haiti to assess their perceptions of HIVST in the context of assisted partner services. Key informants were representatives of the Ministry of Health at national and regional levels, and of a non-governmental agency involved in HIV partner services. Focus group members included program leads and staff members from the HIV care and treatment program, the Option B+ program, the community health service program, and the HIV counseling and testing services from 2 large hospitals in urban settings in Haiti.

RESULTS: Perceived HIVST advantages included that HIVST would increase the number of people who learn their HIV status and start treatment. The perceived disadvantages were the lack of counseling and psychological support to ensure self-testers initiate treatment, uncertainty about a male partner's reaction after receiving an HIVST kit from a woman, and the inability of a woman to counsel a man in case his self-test result is positive. Recommendations for integrating HIVST and secondary distribution of HIVST included coupling HIVST distribution with public information, education, and communication through media and social marketing, relying on community health workers to mediate use of HIVST and ensure linkage to care, piloting HIVST programs on a small scale.

CONCLUSIONS: HIVST is an appropriate and feasible strategy HIV prevention for men; however, more research is needed on how best to implement different strategies for this approach in the Caribbean.

TUPEC447

Uptake of HIV self-testing among key populations taking HIV pre-exposure prophylaxis in central Uganda

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BACKGROUND: About 12% of Ugandans living with HIV are yet to be identified by 2020. HIV incidence is higher among Key Populations (KPs) such as sex workers, fishermen and men who have sex with men. HIV self-testing (HIVST) among KPs taking HIV Pre-Exposure Prophylaxis (PrEP) has not been studied in Uganda yet it could be an alternative testing approach for these population categories. We assessed the uptake of HIVST among KPs enrolled on PrEP in Uganda.

METHODS: A mixed methods cross-sectional study was conducted on 366 KPs attending PrEP clinics at MARPI Mulago and Kasensero HC II Uganda during May-August 2018. Respondents aged 15 years and above with no prior history of HIVST were issued with "Oraquick" HIV rapid diagnostic test (kit) for self-testing. Data were collected using interviewer administered structured questionnaire and in-depth interviews of selected respondents. A chi square test was performed to determine association between socio-demographic, economic factors and propensity to uptake HIVST. Logistic regression was used to determine the predictors of HIVST uptake. Deductive thematic content analysis was performed to explore factors that promote and inhibit HIVST uptake.

RESULTS: HIV self-testing acceptability was 100% (n=365) with 73% (n=265) of respondents willing to pay for a kit. Of these, 85% (n=227) would pay not more than 1.4USD. Sixty-six percent (n=243) of respondents had high propensity to uptake HIVST.

Predictors of uptake were clinic location (rural vs urban) (aOR = 17.63 95% CI 8.44 - 36.81, p< 0.001); KP category (female sex worker's vs others) aOR= 4.36 (95% CI: 1.63 - 11.66, p=0.003) and education level (\leq primary vs post primary) aOR=0.38 (95% CI: 0.20 - 0.73).

Using an oral fluid based kit "Oraquick" was reported to be free of pain, convenient, easy to use and time saving hence preferred over other HIV testing modalities. A multi-modal approach to distributing HIVST kits was suggested by respondents.

CONCLUSIONS: HIV self-testing using an oral fluid based test kit can be an alternative conventional routine 3 monthly follow up HIV screening for KPs on PrEP. Kits distribution may employ several models. Majority of KPs would afford the kits at a cost not more than 1.4USD.

TUPEC448

Retesting for HIV on antiretroviral therapy (ART) against policy recommendations: Investigating the impact on sensitivity of self-testing, Blantyre, Malawi

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BACKGROUND: Patients established on antiretroviral therapy (ART) sometimes retest for HIV, potentially unaware that prolonged viral load (VL) suppression and associated low antibody levels can reduce test sensitivity leading to incorrect results. We investigated OraQuick HIV Self-Test (oral-fluid) and INSTI HIV Self-Test (finger-prick) HIV self-testing (HIVST) kit performance in ART patients.

METHODS: Consenting adults ³16 years taking ART for ³4 years in Malawi completed a standardised questionnaire before randomisation to either INSTI HIVST or OraQuick HIVST from April-October 2018. Following pre-test demonstrations, participants self-tested privately, with video-recording. HIVST kits were re-read by health-workers who collected blood for further testing using the national algorithm (Determine HIV-1/2, Uni-Gold), and VL testing (Xpert HIV-1). Sensitivity used standard methods, omitting invalids and assuming participants were HIV-positive, with sample size of 250 patients per arm to give lower 95%CI of ³95% assuming self-read sensitivity ³98%.

RESULTS: Of 609 ART patients approached, 502 were recruited (38 declined, 66 ineligible), with equal numbers (251) allocated to INSTI and OraQuick.

On self-read (Table), sensitivity of INSTI (1 invalid excluded) was 98.8% (95%CI: 96.6-99.9%), with 3 false-negatives. Self-read sensitivity of OraQuick was 98.0% (95%CI: 95.4-99.4%) with 5 false-negatives and no invalid results.

Health-workers read the same result as self-reads for all INSTI kits (Table) but reclassified 4 OraQuick kits (three negative to positive, and one positive to negative), increasing sensitivity to 98.8%.

Clients with undetectable VLs were more likely to have negative self-read HIVST results (7/233 [3.0%] sensitivity 97.0%) for undetectable vs 0/163 detectable VL: p=0.027, and included 4 clients negative on Determine and Unigold. VL testing was not run for the final 95 patients, and 14 had invalid VL results.

CONCLUSIONS: Long-term ART affected WHO pre-qualified HIVST kit performance, although sensitivity remained ³98% for each kit, with combined-kit sensitivity of 97.0% in clients with undetectable VL.

Arm/Kit	Reader	True Pos	False Neg	Invalid	Sensitivity	95% CI	Comments
INSTI/INSTI	Self	247	3	1	98.8%	96.5 - 99.8%	3/3 VL UD. 2/3-ve on all reads and RDTs
INSTI/INSTI	HW	247	3	1	98.8%	96.5 - 99.8%	Same 3 clients as INSTI -ve self-read above
INSTI/Determine	HW	249	2	0	99.2%	97.2 - 99.9%	2/2 VL UD. 2/2-ve on all reads and RDTs
INSTI/Unigold	HW	249	2	0	99.2%	97.2 - 99.9%	Same 2 clients as Determine-ve above
OQ/OQ	Self	246	5	0	98.0%	95.4 - 99.4%	4/5 VL UD. 1/5 VL invalid. 1/5 all reads & RDTs-ve. 3/5 all other reads & RDTs+ve
OQ/OQ	HW	248	3	0	98.8%	96.5 - 99.8%	3/3 VL UD. 1/3-ve on OQ only; 1/3 +ve only on OQ self-read; 1/3 all reads & RDTs -ve
OQ/Determine	HW	249	2	0	99.2%	97.2 - 99.9%	2/2 VL UD. 1/2 +ve only OQ self-read; 1/2 all reads & RDTs -ve
OQ/Unigold	HW	249	2	0	99.2%	97.2 - 99.9%	Same 2 clients as Determine-ve above

[Table]

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TUPEC449

HIV self-testing method preferences among men who have sex with men in TaiwanS.T. Huang, J.R. Huang, H.Y. Huang
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BACKGROUND: Men who have sex with men (MSM) were disproportionately affected by HIV in Taiwan. Early antiretroviral therapy was an innovative strategy to reduce the probability of HIV transmission. Prompt diagnosis was a crucial step in linkage to care and early treatment. However, there were barriers for MSM to receive HIV testing in the health-care settings. World Health Organization endorsed self-testing in order to increase uptake of HIV testing among key populations. The self-testing method preferences of MSM in Taiwan were not well understood.

METHODS: We conducted a survey to find out MSM's method preferences. The survey using on-line anonymous questionnaires was implemented on August 2017. The links of survey were distributed by advertising banners on geosocial applications, webpages of Facebook, and employees at MSM community centers. Self-testing method preferences were dichotomized into using oral fluid and taking finger-prick blood. Basic demographic characteristics, sexual behaviors, preventive measures, HIV testing experiences, considerations to choosing testing methods were all collected. The associated factors of preference for taking oral fluid testing were analyzed by logistic regression.

RESULTS: 4,423 MSM were enrolled. More than 85% participants were between the age of 15 and 34. MSM with receptive sexual roles accounted for 44% of respondents. 35 percent of MSM had unprotected sex during the last sexual intercourse. Nearly 65% MSM preferred oral fluid testing and others favored HIV testing using finger-prick blood.

The common considerations of choosing testing methods were accuracy (78%), privacy (73%), easy operating (67%), time to results (60%), and cost (57%). Younger MSM (AOR=1.4) were more willing to use oral fluid testing than finger-prick blood testing.

Conversely, MSM with HIV testing experience (AOR=0.6), having visited MSM community centers (AOR=0.7), and having more sexual partners (AOR=0.8) favored finger-prick method.

CONCLUSIONS: MSM who did not receive traditional HIV preventive services may be reached by promoting oral fluid self-testing program. However, finger-prick test was more acceptable for MSM with multiple sexual partners. We could provide tailored health education to MSM with diverse preferences and dispatch different testing kits precisely to target populations. More never-testers could be reached and the uptake of HIV testing among MSM would be increased.

TUPEC450

Factors influencing HIV self-testing amongst men who have sex with men (MSM) in Singapore - Understanding barriers and motivators using the Protection Motivation Theory (PMT) frameworkC.S. Wong^{1,2}, M.A. Ibrahim³, C.M. Wong⁴, Y.Y. Chan³, O.Z. Lim³, B.C.H. Choong³, R.K.J. Tan⁵, M.I.-C. Chen^{1,5}

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BACKGROUND: The Protection Motivation Theory (PMT) postulates that in response to health threats, two mediating cognitive processes - threat and coping appraisals - are evoked. The decision to get tested for HIV involves the interaction between self-evaluation of risk, perceptions of HIV severity, and the individual's response to these.

METHODS: As part of a formative study on HIV prevention strategies amongst MSM, semi-structured interviews were conducted with 30 MSM aged 18-39 from January-July 2016, (15 HIV-negative; 15 HIV-positive). Opinions were sought on self-perceived HIV risk; and motivators and barriers to self-testing. Data was analyzed using qualitative thematic analysis, guided by PMT framework.

RESULTS: Regarding HIV threat appraisals, participants reported that perceptions of HIV severity have changed, viewing it as a chronic condition, rather than a lifespan-limiting disease to be feared. Most participants were cognizant of their vulnerability to HIV. Despite having these threat appraisals, participants highlighted moderators that led to continued high-risk behavior, including intrinsic rewards of the pleasure of unprotected sex; and extrinsic pressures to have unprotected sex.

High response costs such as cost of self-test kits, psychological stress of positive results, being viewed as sexually promiscuous, and lack of linkage to care, were barriers to the uptake of HIV self-testing.

CONCLUSIONS: HIVST may increase uptake of HIV testing, early diagnosis and linkage to care, and is an essential strategy to reach the first of the UNAIDS 90-90-90 goals. Efforts to reduce cost, enhance guidance for self-testing and ensure proper linkage to care are needed for successful rollout of HIV self-testing in Singapore, and should be guided by the PMT framework.

MSM Groups/Types	Characteristics of Groups/Types	Strategies and Interventions
• High Threat Appraisal • High Coping Appraisal	Good knowledge of HIV, aware of their own risk, and able to take adaptive responses to this threat, e.g. regular testing, protective/preventative measures	Encourage this group to continue uptake and maintenance of adaptive responses. Recommend HIV self-testing as they have good threat appraisals and good coping appraisals.
• High Threat Appraisal • Low Coping Appraisal	Good knowledge and are aware of risk, but have maladaptive coping responses; e.g. doubt effectiveness and reliability of tests, and also have doubts about their own ability to carry out tests	Increase adaptive response by increasing self-efficacy and response efficacy through education, outreach, and support on the benefits and ease of HIVST. This can include having personalized product inserts and inclusion of video-assisted self-testing interventions.
• Low Threat Appraisal • High Coping Appraisal	Poor knowledge of HIV, and/or misconceptions about own risk. However, people in this group are highly aware of the effectiveness of various interventions and strategies to cope with HIV such as testing, protective, preventative measures. They are also highly confident in undertaking adaptive responses to threat.	Address poor knowledge of HIV and misconceptions of risks by promoting HIV education, increasing awareness and enhance self-risk assessment. May recommend HIV self-testing as they have a good understanding of coping appraisals but need to increase the awareness of HIV knowledge such as the window period for HIV testing, and the false assurance of security from taking the test.
• Low Threat Appraisal • Low Coping Appraisal	Poor knowledge of HIV and STI, low perception of HIV/STI risk, probably does not consider going for HIV testing, doubts the effectiveness and reliability of interventions and strategies. They may also have doubts about their own ability to carry out tests.	A concerted multifactorial intervention is needed as MSMs in this category are likely to be non-gay, non-bisexual and older MSMs who have limited access to HIV/STI information and services. They also have doubts regarding the reliability of HIV testing and self-testing. Education, early outreach, support is required to increase awareness of HIV risk and reliability of HIV testing/STI. Possible interventions may include the need to ramp up risk education and assessment, general population interventions or intervening through healthcare providers to increase awareness of HIV and testing.

[Table. Recommended strategies and interventions for specific MSM groups based on their threat and coping appraisals]

TUPEC451

HIV self-testing: Assessing potential to improve efficiency of community-based index case testing in Mwenzi district, ZimbabweT.A. Mavimba, N. Mahachi
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BACKGROUND: In Zimbabwe, of the 1.4 million PLHIV, 74.2% know their status, of those 86.8% are on ART, and 86.5% of those, virally suppressed. Innovative strategies must therefore be employed to overcome the testing "leak" along the national treatment cascade to achieve the UNAIDS 90-90-90 targets. HIV self-testing (HIV-ST) has been recommended by the WHO as useful in increasing uptake of HIV testing services; however, evidence of this intervention's ability to improve identification of PLHIV within the Zimbabwean context was required to inform operational guidance.

METHODS: We performed a secondary retrospective comparative analysis to assess whether HIV testing volumes and yields in a district (Mwenzi) that introduced HIV-ST differed from surrounding districts in the same province where access to HIV-ST was not present. We collected program data from the Zimbabwe HIV Care and Treatment (ZHCT) Project that spanned six months before and after introduction of HIV-ST in Mwenzi (December 2017 to November 2018), and conducted a pre- and post-comparison of testing volumes and yields using paired t-tests.

RESULTS: Following the introduction of HIV-ST, Mwenzi showed an upward trend in yield, while the districts within the same province where HIV-ST had not been introduced had no statistically significant variations (figure 1).



[Yield rates before & after the introduction of HIV-ST in Mwenzi vs districts in the same province with no HIV-ST]

There was a 43% reduction in testing volumes from 1427 to 816 between the baseline and implementation periods in Mwenezi, yet a 39% increase in the mean testing yield from 35% to 48% ($p=0.03$).

CONCLUSIONS: In addition to expanding access to HIV testing services, the results suggest that HIV-ST provides potential for improving efficiencies within community-based index testing by identifying more PLHIV with fewer total tests. This reduces the workload of nurse testers and concentrates their efforts on clients with a reactive self-test, and therefore most at risk of HIV infection.

TUPEC452

Value of secondary distribution of HIV self-test kits to male partners of female sex workers

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BACKGROUND: As the proportion of people diagnosed with HIV increases, the cost-effectiveness of any form of HIV testing declines, making it important to identify targeted strategies that offer value for money. Distribution of HIV self-tests (HIVSTs) to partners of HIV-negative female sex workers (FSW; partners-of-sex-workers) is feasible and can reach men at high risk of HIV.

METHODS: We simulated 904 setting-scenarios for adult HIV epidemics and care programmes typical of southern Africa using a dynamic-transmission model, with projection 50 years from 2018. For each setting-scenario, we compared outcomes under continuation of current testing policy to those obtained by also providing HIVSTs to HIV-negative FSW to distribute to their partners (if age>18 and having condomless-sex). We assessed the epidemiological impact and cost/DALY averted. We assumed that ~90% of FSW would participate, that of these 70% will distribute HIVSTs to their partners, that 80% of partners-of-sex-workers testing positive with an HIVST would have confirmatory testing by a health care worker (HCW) within 1 year. We assumed a 3% annual discount rate, and cost-effectiveness threshold of US\$500/DALY averted.

RESULTS: In an adult population of 10 million in 2018, our assumptions result in 36,000 (median per 3 month; 90% range: 7,000-197,000) partners-of-sex-workers being eligible to receive HIVSTs, representing 0.4% of the adult population. The average number of HIVSTs distributed/year would be 175,000 with 62% of eligible men self-testing/year, of whom 28% first-time testers. The secondary distribution intervention would increase demand for HCW HIV tests by partners-of-sex-workers from ~10,000 to ~17,000 tests/year and HIV-positivity among all HCW tests from 31% to 54%. This intervention would increase the proportion of partners-of-sex-workers diagnosed from 40% to 68% and avert ~2000 HIV infections/year (3% of all new infections). Assuming a cost/partner-of-sex-worker HIV self-tested of US\$5, our estimated ICER was US\$164/DALY averted, well below the US\$500/DALY threshold and robust to variations in time-frame (20 years), discount rate (10%) and rate of confirmation for positive HIVST (50%).

CONCLUSIONS: Given our assumed uptake of HIVST distribution by FSW, this is predicted to avert almost 3% of all HIV infections over the next 50 years, and likely to be cost-effective when delivered at US\$5 per kit used.

TUPEC453

Value of secondary distribution of HIV self-test kits to male partners of women attending antenatal clinics

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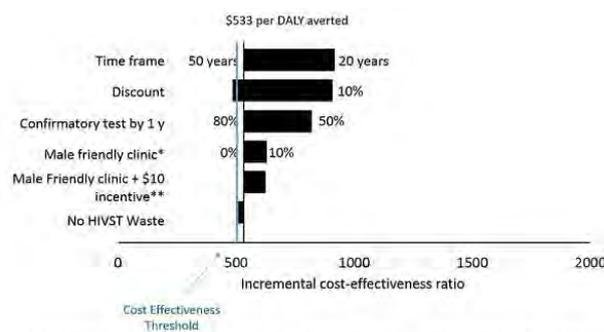
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BACKGROUND: As the proportion of people living with HIV already diagnosed increases, the cost-effectiveness of any form of HIV testing declines. Countries are considering secondary distribution of HIV self-tests (HIVSTs) to partners-of-women-attending-ANCs, as it could be a sustainable approach to reach men.

METHODS: We simulated 904 setting-scenarios for adult HIV epidemics and care programmes typical of southern Africa using a dynamic-transmission model, and projected 50 years from 2018. For each setting-scenario we compared outcomes under continuation of current testing policy to those obtained by providing, in addition, an HIVST to long-term partners-of-women-attending-ANC (males not diagnosed with HIV and not tested in the last 3 months). Our aim was to assess impact and cost-effectiveness. The cost-per-partner-of-woman-attending-ANC tested using HIVST of US\$5.16 was based on costing from Malawi (excluding cost of male-friendly clinics). We assumed that 80% of men tested positive with HIVST would have confirmatory testing by a health-care-worker (HCW) within 1 year, a discount rate 3%/annum and cost-effectiveness threshold of US\$500/DALY averted.

RESULTS: In an adult population of 10 million in 2018 (pregnancy incidence: median = 11.8/100 person-years (p-y); 90% range: 2.8/100p-y; 21.4/100p-y), our assumptions result in 302,000 (median; 90% range: 11,000-675,000) men/year eligible, 3% of the adult population. The number of HIVST distributed/year would be 273,000, corresponding to 80% of eligible men self-testing/year, of whom 36% would be first-time testers. The intervention would allow increasing the positivity rate of HCW test among partners-of-women-attending-ANCs from 4% to 19% and the proportion of partners-of-women-attending-ANCs diagnosed from 63% to 80% and averting ~500 infections/year, with an estimated incremental-cost-effectiveness-ratio of \$533/DALY averted. Sensitivity analyses are presented in the figure.

CONCLUSIONS: With these assumptions, HIVST distribution to partners-of-women-attending-ANC in southern Africa (covering about 3% of the adult population/year) is predicted to avert ~500 infections/year over the next 50 years and is borderline cost-effective in our primary analysis, although results were sensitive to assumptions (Figure).



[Figure. Univariate Sensitivity Analysis]

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TUPEC454

Leaving no one behind: Demonstration project of HIV self-testing among men who purchase sex in IndonesiaL.P.L. Wulandari^{1,2}, J. Kaldor¹, R. Guy¹¹The Kirby Institute for Infection and Immunity in Society, University of New South Wales, Kingsford, Australia, ²Udayana University, Denpasar, Indonesia

BACKGROUND: HIV self-testing is an important strategy to expand HIV testing among risk populations particularly those hesitant to come to the clinic for HIV testing. Men who purchase sex are a key population for HIV prevention, but no studies have explored the acceptability and uptake of self-testing in this group.

METHODS: In December 2017- January 2018, men attending seven brothels in Bali Indonesia were invited to a general health survey, and once they completed the survey, were offered a HIV self-test. In accepting the test, men could opt to conduct their test off-site or on-site at the brothel (with partial or full supervision). Men were also asked to complete a follow up survey on their views of HIV self-testing.

RESULTS: Among the men approached, 292 completed the health survey; only 12.7% reported a HIV test in the past. A high proportion (64.7%, n=189) of the men who participated in the health survey agreed to have a HIV self-test. Nearly all men (98.4%, n=186), requested to have a HIV self-test on-site and 3 (1.6%) off-site. Of those testing on-site, 156 (83.9%) preferred full supervision including when reading their results, and 30 (16.1%) partially assistance without supervision when reading their results. Of the HIV self-tests done, 4 men (2.1%) had a reactive result. Two thirds (75.1%) of those who completed the follow up survey said there was nothing they did not like about the test; and 77.5% trusted the result.

CONCLUSIONS: This is the first international study among men who purchase sex involving HIV self-tests distributed by lay workers in brothels. The study shows the testing model was acceptable among the men and increased HIV testing rates by more than 5 times compared to baseline levels. Most men preferred assistance when conducting the HIV self-test, and trained lay workers were able to provide this support.

TUPEC455

High feasibility and acceptability for HIV self-testing among men who have sex with men, male sex workers, and transgender people in NepalD.P. Bhandari¹, K. Bam¹, P.K. Thakur¹, A. Shrestha¹, N. Thapa¹, H. Subhani¹, B. Shrestha¹, K.C. Kahendra Prakash¹, B. Joshi¹, R. Adhikari², M. Sharma³, H. Upreti³, T.N. Pokhrel⁴¹FHI 360, LINKAGES Nepal Project, Kathmandu, Nepal, ²Tribhuvan University, Kathmandu, Nepal, ³National Public Health Laboratory, Kathmandu, Nepal, ⁴National Center for AIDS and STD Control, Ministry of Health and Population, Kathmandu, Nepal

BACKGROUND: An estimated one in four people living with HIV globally and nearly one in three living with HIV in Nepal are unaware of their HIV status despite the rapid expansion of standard facility-based HIV testing services. The average annual HIV case finding following standard testing approach were 0.63 percent for Nepal and 0.36 percent for LINKAGES project districts. To improve the identification of people living with HIV, an additional testing approach of HIV self-testing (HIVST) has been recommended.

To understand the feasibility and acceptability of HIVST among men who have sex with men (MSM), male sex workers (MSWs), and transgender (TG) people, a pilot study was conducted in Lalitpur District of Nepal.

METHODS: A cross-sectional, mixed-methods study was conducted during June- September 2018. All participants were provided the option of independent self-testing or self-testing supported by outreach staff. Reactive self-tests were confirmed using a testing algorithm approved by the World Health Organization.

Ten percent of study participants with non-reactive results, all participants with reactive results, clinic- and community-based service providers, and government officials overseeing HIV testing were invited for qualitative interviews. Focus group discussion and in-depth interviews were methods of data collection.

RESULTS: A total of 440 (91%) of the study participants (mean age 24 years), accepted HIVST and 99 percent of them chose supervised HIVST. Twelve (3%) had reactive HIVST results, and all 12 had confirmed HIV-positive results, resulting in higher HIV case finding than standard approach. Qualitative findings showed that three in four individuals would use HIVST in the future for repeat HIV testing, as HIVST was easy to use and not painful. All participants preferred getting the HIVST kit from community-based providers. Government officials mentioned that implementation of HIVST is feasible as an additional method of HIV testing for hard-to-reach people in the country. There were no significant barriers for supply, distribution, use and disposal encountered.

CONCLUSIONS: HIVST was highly acceptable among MSM, MSWs, and TG people, and is feasible for implementation as an additional method of HIV testing and implementation would complement existing HIV testing options with a cost-effective strategy to achieve epidemic control.

TUPEC456

Perceptions of HIV self-testing to support PrEP delivery among Kenyan PrEP usersN. Thuo¹, E. Casmir¹, K. Ortblad², F. Ongolly¹, E. Owino¹, P. Mogere¹, J. Kearney², C. Kiptinness¹, N. Mugo^{1,2}, J.M. Baeten², K. Ngure³
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BACKGROUND: The delivery of pre-exposure prophylaxis (PrEP) for HIV prevention presents new challenges for an already burdened Kenyan health system. HIV self-testing (HIVST) has the potential to ease the burden of PrEP delivery for clinics by decreasing the number of PrEP clinic visits required for refills and HIV testing. We sought to understand perceptions of HIVST among Kenyan PrEP users to provide insights on how HIVST may be utilized to optimize PrEP delivery.

METHODS: We conducted in-depth qualitative interviews with participants enrolled in a randomized trial that tests the use of HIVST to decrease the frequency of clinic visits among PrEP users in Thika, Kenya. Eligible participants were ≥18 years, HIV uninfected, and had been using PrEP for 1 months. Participants were 1:1 randomized to an oral-fluid HIVST, blood-based HIVST, or standard-of-care arm; those randomized to the HIVST arms received a 6-month PrEP drug supply (compared to a 3-month supply) and two HIV self-tests. Participants in the HIVST arms were systematically sampled for interviews one week following enrollment. We used thematic analysis to identify categories related to PrEP users' HIVST perceptions.

RESULTS: From May 2018 to January 2019, we interviewed 24 participants (median age: 33 years, IQR: 33[27-40]) 13 women at HIV risk, and 5 women and 6 men in an HIV serodiscordant relationship. Almost all participants liked the idea of HIVST were willing to self-test. The majority of the participants reported that HIVST while on PrEP reduced transport costs, saved travel and waiting time associated with PrEP visits, and addressed privacy and confidentiality concerns associated with being seen at and getting HIV test results from ART clinics. Some participants reported that the clinic-based HIV test (at enrollment) and PrEP use gave them the confidence to HIV test at home. Few participants expressed concerns with HIV status disclosure or that performing HIVST at home would lead to perceptions that they were HIV positive.

CONCLUSIONS: Kenyan PrEP users perceived HIVST as a helpful intervention that allowed them to maintain their daily routines. PrEP users also felt that HIVST supported continued PrEP use by enabling them to confirm their HIV status while on PrEP.

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TUPEC457

Facilitators and barriers toward HIV self-testing among transgender women in Mumbai and Delhi, India

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BACKGROUND: HIV self-testing (HIVST) is emerging as a technology to achieve UNAIDS goal of 90-90-90 and treatment for all. In India, transgender women's (TGW) experiences of stigma and ostracism impacts their health-seeking and HIV testing behaviors, and increases their vulnerability to HIV and STIs. It thus becomes critical to diversify efforts toward increasing HIV testing and connecting TGW to HIV prevention and care services. This qualitative study explored facilitators and barriers of HIVST among TGW communities in Mumbai and Delhi.

METHODS: Eight focus group discussions (FGD), eight in-depth interviews (IDI) and eight key informant interviews (KIIs) were conducted in Hindi/English by trained interviewers, translated/transcribed, and thematically analyzed. FGDs and IDIs were conducted with TGW community members, while KIIs were conducted with healthcare providers, HIV intervention agencies, and TGW community leaders. FGD/IDI participants were compensated INR 500 for their participation. The study was approved by IRBs of all participating institutions; informed consent was sought from all participants.

RESULTS: Participant characteristics for FGDs (n=51) are as follows: Mean age = 29 years; mean monthly income = INR 16,396; 12% reported illiteracy; 29% reported fulltime sex work and 69% reported part-time involvement in sex work. Mean age for IDI participants (n=8) was 31 years; none reported illiteracy, and most reported full-time sex work. Only two FGD participants had prior awareness about HIVST. Following facilitators were reported: convenience to test at will; saving time; partner (commercial and intimate) testing; less exposure to stigma from healthcare settings; and confidentiality. Reported barriers were: cost; linkage to care; limited/no pre-/post-test counseling; and possible exposure to coercion to undergo testing by peers, Gurus (masters) or partners (reported mostly by Delhi participants). Participants preferred accessing HIVST kits from community-based settings, favored assisted self-testing for initial attempts; and were willing to pay INR 50-200, if not provided for free (willingness to pay was higher among Mumbai participants).

CONCLUSIONS: Overall, TGW participants found HIVST acceptable. HIVST is expected to be a strong component of the differentiated service delivery, and can be recommended for Indian TGW communities, and together with community-based HIV interventions will further improve uptake of HIV testing

TUPEC458

Identification of HIV-positive partners and changes in sexual behavior following secondary distribution of HIV self-tests by high-risk women in Kenya

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BACKGROUND: Secondary distribution of HIV self-tests by women to their male partners has been shown to increase male partner testing and is being implemented in several countries. There are limited data, however, on the extent to which this approach results in identification of HIV-positive partners or changes in sexual decision-making.

METHODS: We examined 6-month follow-up data from the intervention arm of an ongoing randomized trial in 66 community clusters in Siaya County, Kenya (NCT03135067). HIV-negative women aged ≥ 18 years who

self-reported ≥ 2 partners in the past month were eligible. Participants received 5 oral fluid-based self-tests at enrollment and additional self-tests, as needed, at 3-month intervals. Follow-up data were collected at 6 months on overall self-test distribution to sexual partners, partner test results, and general changes in sexual behavior. Participants also reported specifically on self-test distribution and sexual behavior in their 3 most recent transactional sex encounters.

RESULTS: Among 1,063 participants in the intervention arm, 664 (66.6%) had completed 6-month follow-up by January 14, 2019 (all participants will be contacted by April 2019). Participants' average age was 27 years and 71% reported sex work as an income source. Over 6 months, participants on average received 8 self-tests and distributed 3.7 to sexual partners. A total of 128 partners had reactive self-tests, implying HIV-positivity of 5.3% among self-tests distributed and 0.19 HIV-positive partners per participant. Among all participants, 13.1% declined to have sex and 10.8% used a condom with at least one partner who self-tested HIV-positive or refused self-testing. In 1,375 transactional sex encounters, 915 (67%) included an offer of a self-test to the partner. HIV status was ascertained in 819/851 (96%) of encounters where partners accepted self-tests. Condom use was significantly higher with transactional partners who obtained an HIV-positive versus HIV-negative result (88.5% vs. 59%, $p < 0.01$) or versus those who refused to self-test (79.7% vs. 59%, $p < 0.01$).

	HIV self-testing outcome with women's transactional sex partners				
	HIV-positive (N=26)	HIV-negative (N=793)	Participant did not learn result (N=32)	Refused to accept self-test (N=64)	Did not offer self-test (N=460)
Used a condom, N (%)	23 (88.5%)	468 (59.0%)	21 (65.6%)	51 (79.7%)	297 (64.6%)

[Sexual behavior of participants based on their male partners' self-testing outcomes]

CONCLUSIONS: Providing high-risk women with multiple self-tests facilitated partner testing and identification of HIV-positive partners. Partner self-testing outcomes, including refusal to accept self-tests, enabled women to engage in safer sexual behavior.

Prevention for co-morbidities (e.g., TB, viral hepatitis)

TUPEC459

Maternal factors for adherence in infant isoniazid preventive therapy provision among HIV-exposed uninfected infants (HEU) in Kenya

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BACKGROUND: Infant isoniazid preventive therapy (IPT) adherence is not well characterized. We assessed prevalence and correlates of infant IPT adherence within an ongoing randomized trial (RCT).

METHODS: In an ongoing RCT (NCT02613169) among HIV-exposed uninfected (HEU) infants randomized to 12 months IPT vs. no IPT, we assessed adherence by maternal report within the IPT arm. We determined IPT missed doses, reasons for missed doses, and association between adherence and maternal/infant characteristics using analysis of variance or univariate logistic regression. Adherence at the 6-month visit was defined as no missed INH within the last week per maternal report. A questionnaire was administered to mothers to assess influential factors for adherence.

RESULTS: Among 134 HEU infants in the INH arm at 6 months follow-up, 17.9% missed a dose in the last week and 82.1% were adherent (no missed dose within past week). Top reasons for missed doses among non-adher-

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ent mothers (n=24) included forgetting to give medicine (33%), running out of medicine (38%), and child vomiting on taking medicine (8%). Adherence was associated with prior maternal TB diagnosis (15% vs. 0%; p=0.047) and initiation of ART during/early post-partum (vs. before this pregnancy; 20% vs. 46%; p=0.008), comparing adherent vs. non-adherent mothers. Maternal factors influencing adherence included: understanding the benefit of providing medicine to child (OR 3.6; CI 1.4-8.9; p=0.007), support from research staff (OR 2.6; CI 1.1-6.5; p=0.034), self-identified strategies to remember medication (OR 3.0; CI 1.2-7.6; p=0.021), and disclosure of medication use (OR 2.8; CI 1.1-7.3; p=0.034).

CONCLUSIONS: Mothers face challenges in sustaining infant IPT adherence. Mothers with prior TB and recent ART initiation may be concerned about infant TB susceptibility and thus, more likely to adhere. Education and support from healthcare workers to enhance education, adherence strategies and address disclosure could enhance infant IPT adherence.

	Adherent N = 110 N (%)	Non-adherent N = 24 N (%)	OR	95% CI	p-value
Importance of giving medicine to child	75 (68%)	9 (38%)	3.6	1.4-8.9	0.007
Support from research staff	76 (69%)	11 (46%)	2.6	1.1-6.5	0.034
Strategies to remember to dispense medication	66 (60%)	8 (33%)	3.0	1.2-7.6	0.021
Disclose medication use	59 (54%)	7 (29%)	2.8	1.1-7.3	0.034

[Maternal factors influencing IPT adherence]

TUPEC460

Acceptability and willingness to pay for hepatitis C virus services in Vietnam

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BACKGROUND: Reaching and linking undiagnosed people living with hepatitis C virus (HCV) to care is key to the 2030 World Health Organization HCV elimination targets. In Vietnam, this is particularly challenging in HIV-negative and -positive key populations (KP). Integrated community-based HCV/HIV services offered by community-based organizations (CBOs) and clinics aimed to increase access to HCV services among KP in Ho Chi Minh City.

METHODS: A cross-sectional survey of 797 participants (men who have sex with men [MSM] accounted for 43.9%; people who inject drugs [PWID], 32%; people living with HIV [PLHIV], 18.3%; and general population [GP], 5.8%) assessed acceptability and willingness to pay (WTP) for rapid HCV antibody screening, confirmatory testing, and treatment, among clients seeking HIV services at three CBOs and three private clinics in HCMC in 2018. Acceptability was defined as the proportion of clients opting for HCV services. An interactive bidding technique elicited WTP for HCV services.

RESULTS: 93.6% of clients opted for HCV screening; 96% reported being first-time HCV testers. 9.7% were reactive; 83.3% received a confirmatory test. Only 17.5% of confirmed cases initiated HCV treatment.

WTP for HCV screening at the median price of US\$4.5 (market price) was significantly lower (p<0.001) in PWID (9.8%) and PLHIV (67.4%) than in MSM (89.4%) and GP (88.6%). Similarly, WTP for HCV confirmatory testing at the median price of US\$16.8 (half market price) and HCV treatment at the median price of US\$112 per month (half market price) were significantly lower (p<0.001) in PWID (9.8%, 36.5%) and PLHIV (51.4%, 62.3%) than in MSM (76.6%, 86.9%) and GP (65.6%, 71.9%). Multivariable analysis found PWID (adjusted odds ratio [aOR] = 0.01; 95% confidence interval [CI]: 0.00-0.05) and PLHIV (aOR = 0.05; 95% CI: 0.01-0.31) were less likely to pay for HCV screening. Clients with higher education (aOR = 27.56; 95% CI: 3.82-198.60), and those with an average monthly income of ≥US\$286 (aOR = 3.84; 95% CI: 1.88-8.33) were more likely to pay for HCV screening.

CONCLUSIONS: Our findings suggest that community-based HCV screening reaches HCV-undiagnosed people in Vietnam, but a mismatch between the market price and WTP hinders KP's ability to access essential HCV services.

TUPEC461

Knowledge and attitudes toward human papillomavirus (HPV), HPV vaccine and cervical cancer among female students in Chittagong, Bangladesh

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BACKGROUND: Cervical cancer is a major public health problem worldwide. It is the second most common cancer among females with an estimated 11,956 new cases and 6,582 deaths in 2012 in Bangladesh. We have conducted a study to estimate female student's knowledge of and attitude toward human papilloma virus, cervical cancer and to understand their intention, barriers, facilitators towards HPV vaccine and screening test uptake.

METHODS: A cross sectional study was conducted among female students recruited from Chittagong Women's College, Asian University for Women and Chittagong university. Data collection was done using a semi-structured questionnaire with sections on socio-demographic characteristics, reproductive history, risk factors of cervical cancer/HPV and knowledge, attitude and perception of cervical cancer, HPV, HPV vaccine, screening and preventive strategies. Four AUW students were involved as Research Assistant for data collection, data entry and analysis. The study was approved by the ethical review committee of Asian University for Women.

RESULTS: In total, 357 female students were interviewed with nearly one of third of them had age 19 years or less and 84% being single. Only 34.8% of the participants knew about human papilloma virus (HPV) as a cause of cervical cancer while 79.2% knew about cervical cancer itself. Only 21.1% of the young students knew about screening test, 31.7% knew about HPV vaccine while 50% of the participants showed their willingness to get HPV vaccine. Of the female students, 18.0% reporting having abnormal vaginal discharge, 15.2 had abnormal vaginal bleeding. Only 10.9% reported having had penetrative sex, of them 40% reported having had used condom in their last sex.

CONCLUSIONS: Knowledge about CC was moderately high, however, knowledge about HPV, screening test, and HPV vaccine were relatively low. High proportion of the participants intended to receive HPV vaccine and supported their friends to take vaccine. Awareness raising programs should be strengthened to cover cervical cancer, HPV and vaccine availability.

STI diagnosis, treatment and prevention

TUPEC462

Incidence of sexually transmitted infections among Men who have sex with men in West Africa (CohMSM ANRS 12324-Expertise France)

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BACKGROUND: Although men who have sex with men (MSM) are at high risk of sexually transmitted infections (STIs), data on incidence of STIs in this key population is lacking in West Africa. We assessed the incidence of STIs among MSM in four West-African countries.

METHODS: We performed a prospective cohort study in MSM followed up between 2015 and 2018 in Abidjan (Côte d'Ivoire), Bamako (Mali), Lomé (Togo) and Ouagadougou (Burkina Faso). Men aged 18 years or older, and

reporting at least one episode of anal intercourse with another man within the previous 3 months were offered a quarterly comprehensive HIV intervention including diagnosis and treatment of STIs using the syndromic approach, HIV testing, peer-led support, condoms and lubricants. Pre-exposure prophylaxis (PrEP) for HIV was not available.

Data on sociodemographic characteristics and sexual behaviours were collected at enrolment and follow-up visits. Incidence of symptomatic STIs was calculated. Factors associated with STI incidence were investigated using mixed-effect Poisson regression models.

RESULTS: A total of 855 MSM (631 HIV-, 224 HIV+) were included in this analysis, with a total follow-up time of 1327.2 person-years. Baseline prevalence of symptomatic STIs was 14.7% (126/855; 95% confidence interval (CI) 12.5-17.3). It was higher among HIV-positive MSM than among HIV-negative MSM (19.2% versus 13.2%; $p=0.028$).

Three hundred and twenty-four participants (37.9%) reported symptomatic STIs during follow-up; the incidence rate was 45.1 cases per 100 person-years (95% CI 42.5-47.7).

In multivariable analysis, study sites (incidence rate ratio (IRR) for Abidjan 1.80, 95% CI 1.23-2.66; IRR for Ouagadougou 5.04, 95% CI 3.53-7.20; Ref: Lomé), level of education (IRR for high level 0.52, 95% CI 0.27-0.98), HIV status (IRR for HIV+ 0.75, 95% CI 0.59-0.96), and follow-up time (IRR 0.96, 95% CI 0.93-0.98) were associated with incident symptomatic STIs.

CONCLUSIONS: Incidence of STIs in West-African MSM was high and heterogeneous between the study sites. The decrease over time suggests that the quarterly intervention had a positive impact. These data will be useful for assessing the impact of HIV PrEP which has been implemented in the same study sites from November 2017.

TUPEC463

High prevalence of HIV, syphilis and HCV among key populations and their partners: Results from an integrated multiple diseases testing led by community in Vietnam

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BACKGROUND: In Vietnam, HIV, HCV and syphilis are concentrated in key populations (KP), including people who inject drugs (PWID), men who have sex with men (MSM), sex workers (SWs) and their partners. Despite being disproportionately affected, including co-infections, testing coverage remains low. Feasibility and effectiveness of integrated community multi-disease testing was assessed.

METHODS: Starting in Jan 2017, community-led multi-disease testing was introduced in two high burden provinces Can Tho and Thai Nguyen. HIV, HCV and syphilis testing was offered to KP and partners by trained peer educators.

Clients had a choice of lay testing or self-testing. Assisted partner notification was also provided. Demand creation supported through community-outreach and social networks.

Client demographics were collected while offering testing services. For HIV self-testers, test result was collected by peer educators via social network or telephone. Linkage to care was supported and documented.

RESULTS: Between Jan 2017 and November 2018, a total of 6534 clients received testing services: 332 received HIV, HCV and syphilis, 1583 received HIV and HCV or syphilis tests and 4619 received only HIV test. Most clients were male (92.7%) and first-time testers (69.8%). Mean age 27.6±8.1. Prevalence of HIV, anti-HCV and syphilis was 5.2%, 18.9% and 6.3% respectively. HIV prevalence was highest in partners of both clients with HIV and KP (53.1% and 22.2%).

Prevalence of anti-HCV positive and active syphilis was also high in these groups (45.4% and 30.8% respectively). While linkage to HIV and syphilis treatment was high (94.9% and 93%), linkage to HCV treatment was not possible due to treatment not being covered by health insurance.

CONCLUSIONS: and their partners were well reached by community-led multi-disease testing services. High prevalence of HIV, HCV and syphilis in KP and their partners suggested scale-up of focused KP and their partners with multi-disease testing is needed, but must be coupled funding for HCV treatment.

Key populations	HIV test (N=6521)*			Syphilis (N=1580)			Anti-HCV (N=663)	
	# tested	# (%) positive**	# (%) received ART	# tested	# (%) active syphilis§	# (%) received treatment	# tested	# (%) positive
PWID	2279	64 (2.8)	60 (93.8)	186	0	5 (62.5)	305	104 (34.1)
MSM	3687	145 (3.9)	134 (92.4)	1230	51 (4.1)	50 (98)	308	10 (3.2)
FSWs	279	5 (1.8)	5 (100)	66	8 (12.1)	5 (62.5)	19	0
Partner of clients diagnosed with HIV	193	103 (53.1)	103 (100)	88	40 (45.4)	38 (95)	26	8 (30.8)
Partner of KP	83	18 (21.7)	17 (89.5)	10	0		5	3 (60.0)
TOTAL	6521	335 (5.2)	319 (94.9)	1580	99 (6.3)	93 (93.0)	663	125 (18.9)

*exclude 13 cases (5 LFU, died or not yet tested for confirmation; 3 already known HIV status and on ART; 4 false reactive cases and 1 child); ** HIV positive confirmed by national HIV testing algorithm; § active syphilis was confirmed by national testing algorithms.

[Table 1. Results of testing for HIV, HCV and syphilis and linkage to care by key populations]

TUPEC464

Variability in comprehensiveness of sexual health care and HIV prevention

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BACKGROUND: Post exposure prophylaxis (PEP) is an important tool to prevent HIV acquisition after sexual exposure and an opportunity for care engagement for ongoing prevention of HIV and other sexually transmitted infections (STIs). It is unknown whether prevention services vary by where follow-up care occurs.

METHODS: The Mount Sinai Health System (MSHS) supported by the NYC Department of Health and Mental Hygiene instituted a PEP phone hotline for 24/7 access to PEP and subsequent follow-up care. Of the 1231 individual callers to the hotline in 2017, 456 (37%) received follow up care at MSHS and their clinical data were analyzed using logistic regression to examine whether STI testing varied by clinic type (sites that routinely provide HIV/STI care vs. sites that are more general practice).

RESULTS: Of the 456 PEP patients at MSHS, 88% were < 39 years-of-age, the majority identified as male (89%) and LGBTQ (82%), 58% were non-white and 42% were uninsured. At the time of call, almost all were reports of sexual exposures (98%) with 31% and 52% reporting insertive and receptive anal sex, respectively, 65% reporting condomless sex and 29% condom failure, and 40.6% reporting alcohol or drug use around the time of exposure. Nearly 75% sought services at the MSHS Institute for Advanced Medicine (IAM) where comprehensive sexual health services were available as part of routine HIV/STI care. Compared to care at other MSHS facilities, a greater number of those who received care at the IAM were tested for chlamydia (CT), gonorrhea (GC) and syphilis, and STIs were more likely to be detected at IAM sites ($p < .05$). A multivariable logistic regression controlling for gender and health coverage showed greater odds for having 3-site CT/GC testing at the IAM than at the other facilities (AOR=12.58, 95%CI:6.57-24.08).

CONCLUSIONS: Individuals meeting criteria for PEP are at elevated risk for STIs and provision of PEP with linkage to follow-up is an opportunity to engage at-risk individuals in clinical care. When PEP is delivered as part of comprehensive sexual healthcare including multi-site STI testing, otherwise undiagnosed STIs can be identified and treated.

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TUPEC465

Prevalence of sexually transmitted infections in pregnant women and their partners in Porto Alegre, BrazilN. Yeganeh¹, R. Kreitchmann², J. Klausner³, T. Kerin¹, P. Gorbach⁴, K. Nielsen-Saines¹¹David Geffen School of Medicine at UCLA, Dept of Pediatrics, Los Angeles, United States, ²Irmandade da Santa Casa de Misericórdia de Porto Alegre, HIV Research Dept, Porto Alegre, Brazil, ³David Geffen School of Medicine at UCLA, Dept of Internal Medicine, Los Angeles, United States, ⁴Fielding School of Public Health at UCLA, Dept of Epidemiology, Los Angeles, United States**BACKGROUND:** Male partners are encouraged to participate in prenatal care by the Brazilian Ministry of Health. Prior studies have shown that most men who attend prenatal care would accept testing and treatment for HIV and other sexually transmitted infections (STI).**METHODS:** In an ongoing study initiated in 09/2018 in Porto Alegre, Brazil, women are counseled to bring male partners to prenatal care. Participating sites are Santa Casa Hospital and three public clinics. All subjects undergo rapid testing for HIV, syphilis, Hepatitis C and Hepatitis B via lateral flow platform POC tests made available by the Brazilian Government. Enrolled participants also receive testing for *Neisseria Gonorrhoea*, *Chlamydia trachomatis*, and *Trichomonas vaginalis* via self-collected vaginal swabs (women) or urine samples (men) using the Gene Xpert platform. Men and women also answer questionnaires via a computer assisted survey interview regarding high risk behaviors.**RESULTS:** We have recruited 68 pregnant women and 38 males to date (56% partners). Among recruited women, 1 (1.4%) tested positive for HIV, 5 (7.3%) had positive results for syphilis, 1 (1.4%) had positive results for Hepatitis B, 7 (10.3%) were positive for Chlamydia, and 1 (1.4%) tested positive for Trichomonas. In men, 1 (2.6%) tested positive for syphilis, 2 (5.2%) were positive for Chlamydia. None of our participants tested positive for *N. Gonorrhoea*. 47% of women who tested positive for an STI did not have partners attend prenatal care with them despite multiple attempts to encourage partner visits. Lack of alcohol use was associated with male partner attendance. (p< 0.05)**CONCLUSIONS:** Despite high rates of STIs in our patient population, clinic based partner testing is an imperfect means of recruiting male partners of pregnant women. Other approaches should be considered for enhanced male partner engagement for testing and treatment during the vulnerable period of pregnancy.

TUPEC466

Trends for the future: Binational HIV risk patterns among women who inject drugs living on the U.S.-Mexico borderO. Beltran¹, R. Ramos², G. Perez², J. Lechuga³, S. Beachy³¹Programa Compañeros, A.C., Juarez, Mexico, ²Alliance of Border Collaboratives, El Paso, United States, ³Lehigh University, Bethlehem, United States**BACKGROUND:** The growing rates opioid use among women on the U.S.-Mexico border increases their risk for HIV, sexual transmitted infections, and other associated risk behaviors (e.g. partner violence). We examined the HIV risk factors and behaviors of women who inject drugs in the El Paso-Juarez border region and how these differ from their male counterpart.**METHODS:** We analyzed data from a cross-sectional survey focused on social networks of people who inject drugs on the U.S.-Mexico border. A total of 200 people were recruited (75% male, 25% female) using respondent driven sampling. Data analysis was conducted using SPSS (v.25); Independent sample t-test and chi-squared were used to explore gender differences across the different risk factors (i.e. demographics, substance use, HIV testing, sexual risk behaviors, partner violence, etc.).**RESULTS:** The median age of women was 37 (vs 41 for men). Women are twice as likely (Odds Ratio [OR]=2.11) to count with health coverage in comparison to their male counterpart (P< 0.001), but also have higher odds of having trichomoniasis (OR=10.75, p=0.010) and HIV (OR=9.25, p=0.022). For sexual risk behaviors during the last 30 days, women reported a higher

number of sexual partners (Mean: 25.02 vs 2.50), more condomless sex (Mean: 5.81 vs 1.13), new sexual partners (Mean: 8.98 vs 0.83), sex under the influence of drugs (Mean: 17.13 vs 8.42), exchanged sex for money (Mean: 9.92 vs 1.41) all these at a p-value< 0.001. Finally, women experience more physical violence by their sexual partner (OR=5.55, p< 0.001), and reported sexual abuse by a family member or a friend (OR=5.95, p< 0.001).

CONCLUSIONS: The study shown that women who inject drugs engage in more high-risk sexual behaviors than men who inject drugs and have higher odds of being diagnosed with HIV and other STIs. Understanding the specific needs that women who inject drugs have can increase the preventive services available for them and the development of more gender-focused interventions.

TUPEC467

Human papillomavirus type distribution in head and neck: A meta-analysis from infection to cancer among HIV-negative and HIV-positive patientsY. Lu¹, H. Zou²¹School of Public Health, Sun Yat-sen University, Guangzhou, China,²School of Public Health (Shenzhen), Sun Yat-sen University, Shenzhen, China**BACKGROUND:** Human papillomavirus (HPV), one of the most common sexually transmitted infections in the world, is a major etiological factor of genital malignancies. Over the past decades, HPV has also been shown to be involved in the carcinogenic mechanisms of non-genital malignancies such as head and neck cancers. Particular HPV types may preferentially progress from infection to cancer of head and neck. However, prospective data on the carcinogenesis process of head and neck cancer still remain limited. We aimed to assess data on the relative carcinogenic potential of HPV that can inform head and neck cancer prevention through vaccination and screening.**METHODS:** We did a literature search in MEDLINE, Embase and Cochrane Library to identify studies published before April, 2018, which reported type-specific HPV prevalence at head and neck. We did a meta-analysis of type-specific HPV prevalence across the full spectrum of head and neck diagnoses, from normal cytology to head and neck cancer. We pooled data across head and neck diagnosis, anatomical site, gender, geographic region and HIV status.**RESULTS:** A total of 150 studies were included in our review, contributing 6985 cases of normal cytology, 1782 cases of head and neck lesions, and 13587 cases of head and neck cancer (4627 cases of oral cavity cancer, 5902 cases of oropharynx cancer, 561 cases of hypopharynx cancer, and 2497 cases of larynx cancer). In HIV-negative individuals, pooled HPV prevalence was 6.42% (95% CI: 4.13-9.18%) for normal cytology, 18.86% (95% CI: 10.84-28.49%) for head and neck lesions, and 28.86% (95% CI: 24.26-33.70%) for head and neck cancer. Pooled HPV 16 prevalence increased with diagnosis severity, from 2.14% (95% CI: 0.86-3.94%) in normal cytology to 20.47% (95% CI: 16.58-24.65%) in head and neck cancer in HIV negative individuals. HPV prevalence varied by diagnosis, anatomical site, geographic region, but not by gender.**CONCLUSIONS:** In HIV negative individuals, HPV prevalence increased with diagnosis severity. And HPV 16 was the most carcinogenic HPV type in head and neck, with enrichment from normal cytology to head and neck cancer.Tuesday
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Strategies to increase HIV testing and linkage to the prevention cascade

TUPEC468

Using continuous quality improvement interventions to increase the effectiveness of assisted partner notification services in Kisumu, Kenya

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BACKGROUND: Uptake of assisted Partner Notification Services (aPNS) as a strategy for enhancing identification of hard-to-reach people with undiagnosed HIV infection has been low; hence reducing HIV positive yields. We evaluated the role of continuous quality improvement (CQI) interventions in increasing effectiveness of aPNS.

METHODS: We conducted a root cause analysis on aPNS implementation and gaps identified addressed using a CQI approach which included; providers training, peer mentorship and enhanced contact follow-up. We analyzed retrospective aggregate program data collected from newly-identified seropositive index clients offered aPNS in the pre-CQI period (October 2017-March 2018) and post-CQI (April-September 2018) in 61 health facilities in Kisumu County. We used descriptive (counts and percentages) and inferential statistics to compare HIV positive yield in pre and post-CQI periods as a measure of aPNS effectiveness.

RESULTS: Overall, 10,049 index clients were screened and offered aPNS which elicited 14,558 partners. The average number of partners elicited per index client increased from 1 partner in the pre-CQI to 2 partners in the post CQI period. Among the partners eligible for testing, we tested 61% (n=6540). Testing uptake increased from 42% (n=685) in the pre-CQI to 66% (n=5856) in post-CQI. Among partners tested, 26% (n=1681) were HIV-positive of whom 44% (n=741) were male. The HIV-positive yield was significantly higher in the post-CQI (27%, n=1598) compared to the pre-CQI (12%, n=83) p< 0.001. The overall HIV positive yield was higher in women (27%, n=940) compared to men (24%, n=741). (p=0.003). Further, HIV positive yield for men was significantly higher in the post-CQI (26%, n=698) compared to the pre-CQI period (13%, n=43), p< 0.001. The greatest increase in HIV positive yield was observed in 25-39 year (30%; n=1032) compared to >39 year (24%; n=307) and < 25 year (19%; n=342) age bands.

CONCLUSIONS: Our CQI interventions increased partner elicitation rates, testing uptake and HIV positive yields especially among men who are usually hard to reach with HTS. Thus, a CQI approach is useful for improving program outcomes and can be scaled up in similar settings.

TUPEC470

Maximizing HIV testing yield through index partner testing using assisted partner notification approach: Implementation progress in Uganda

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BACKGROUND: Uganda rolled out Assisted Partner Notification (APN), a form of index client testing in January 2018 as a strategy to optimize identification of 12% undiagnosed people living with HIV (PLHA) by 2020. We present early APN implementation successes, challenges and next steps.

METHODS: The country adopted WHO APN guidelines in 2017. Data cap-

ture and reporting tools (HMIS) together with a 3 days' health facility based APN training curriculum were developed. Capacity building (through national and regional trainings) was conducted in Mid-July 2017. Up to 2,450 health workers from 734 health facilities were trained and implementation started same week.

RESULTS: A total of 73,846 index clients (59% females, 41% males) were eligible for APN; of these, 66% (n=45,817, 60% females, 40% males) were interviewed, enlisting 62,659 (40% females, 60% males) sexual contacts in the last 12 months. Of the enlisted sexual contacts, 81% (n=50,098, 40% females, 60% males) were notified about their potential exposure to HIV and of these 69% (n=33,663, 48% females, 52% males) were tested for HIV with 9,211 (53% females, 47% males) clients testing HIV positive hence a yield of 27% (29% in females, 24% in males). Of the newly identified HIV positive, 91% (n=8,362, 92% females and 90% males) were linked to care. Up to 39% (24,346/62,659) of elicited partners eligible for HIV testing were not tested due to failure to reach them partly due to logistical constraints, provider APN skill gaps or failure to honor scheduled appointments by clients.

CONCLUSIONS: Index client testing (APN) is a novel strategy in identifying the undiagnosed PLHA. As nations strive to end the epidemic by 2030, targeted HIV testing (APN inclusive) should be embraced. Next steps shall focus on curbing losses along the cascade through APN provider' mentorship and leveraging resources for client follow up.

TUPEC471

The 4 youth by youth HIV self-testing contest: A crowdsourced contest to promote HIV self-testing among young people in Nigeria

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BACKGROUND: Promoting HIV testing is critical among young people in Nigeria, where one in five youth have ever tested for HIV. New test options are available, including HIV self-testing (HIVST) whereby individuals collect their own sample conduct the test, and interpret the result. In the context of these newer options, the objective of this study was to explore the feasibility of using crowdsourcing-which involves soliciting the lay public to complete a task, in this case turning young people into citizen scientists-to promote awareness about HIVST in Nigeria.

METHODS: The 4 Youth by Youth Self-Test Challenge was an open contest (both online and off-line) that asked Nigerian youth (14-24 years old) for ideas in response to the following: How might we promote HIVST among young people in Nigeria? Four reviewers initially analyzed through pile-sorting whether the ideas generated were desirable (appealing to young people), feasible (easy to implement) and impactful (will significantly influence HIVST).

RESULTS: A total of 903 young people (average age 17 years, 50% female) submitted creative ideas to the open contest (offline=353; online=550). Ideas were rated as having either high, moderate or low level of feasibility, impact and desirability, on a three point Likert scale. The mean score was 4/9 and 19% ideas were rated as 6/9 or greater, with 37%, 31% and 20% of the ideas ranked as highly desirable, feasible and impactful, respectively. The top 3 ideas included: 1)engaging mobile SMS cards as an entry point for distributing HIVST kits to young people; 2)creating an app that will serve as a secured HIV/STI communication platform for obtaining self-testing kits and related products from nearby vendors; 3)Creating a hygiene/grooming pack for young people that will include condoms, an HIVST kit and hygiene products.

CONCLUSIONS: The 4 Youth by Youth Self-Testing Challenge engaged a broad audience of young people to generate awareness on how to promote HIVST within the local Nigerian context. The findings provide a framework for using design and contest architecture to promote uptake of HIVST that resonates with young people both in Nigeria and globally.

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PMTCT, including services for vulnerable populations

TUPEC472

High rate of peripartum virological suppression and its significant implications for elimination of mother-to-child transmission of HIV in resource-constrained settings of Eastern Cape, South Africa: Population-based cohort study

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BACKGROUND: This study assesses the maternal virological suppression at delivery and early detection of mother-to-child transmission (MTCT) of HIV as measures of the public sector's effectiveness at eliminating MTCT in the resource-limited settings of the Eastern Cape Province, South Africa.

METHODS:

Design: Analysis of the baseline data of the multi-centre prospective cohort study.

Setting: Eastern Cape, South Africa, 2015-2016.

Participants: 1709 HIV-infected mother/infant pairs in the Eastern Cape, South Africa enrolled in the prevention of mother-to-child transmission programme. Maternal virological suppression whilst on antiretroviral therapy (ART) and early MTCT were determined.

Main outcome measures: Rate and determinants of maternal viral load (VL) suppression at delivery (peripartum), and early mother-to-child transmission risks.

RESULTS: Out of 1463 mothers with available VL results, the overall rate of VL suppression (VL < 1000 RNA copies/ml) was 82% (undetectable viral load 56.9% and low viraemia 25.2%). The analysis shows that age 24 years and below [AOR=0.54, CI=0.38-0.78], unemployment [AOR=0.54, CI=0.37-0.79], smoking during pregnancy [AOR=0.50, CI=0.26-0.96], short duration on ARV treatment [AOR=0.52, CI=0.33-0.82], lower CD4 counts [AOR=0.10, CI=0.06-0.16], were associated with a lower likelihood of having an undetectable viral load. Women who had never defaulted their ARVs [AOR=3.08, CI=1.88-5.05] had an increased odds of having an undetectable viral load compared to those who defaulted. The overall rate of early MTCT was 1.3% (20 of 1539 babies). There was a positive linear association between early MTCT risk along the gradient of maternal viraemia; VL < 20 copies/ml (0.5%), 20-999 copies/ml (0.6%) and VLs \geq 1000 copies/ml (3.3%), respectively. Parturient women were at increased odds of transmitting HIV to their infants if they had VL > 1000 copies/ml (AOR=8.84; CI=2.33-33.56).

CONCLUSIONS: High maternal virological suppression at delivery and very low MTCT were achieved in the resource-constrained Eastern Cape, South Africa. Intervention strategies focusing on maternal lifestyle behaviours and ART adherence challenges require targeted research.

TUPEC473

Approaching eMTCT in Zimbabwe: Expansion of PMTCT services and declining MTCT, 2012-2018

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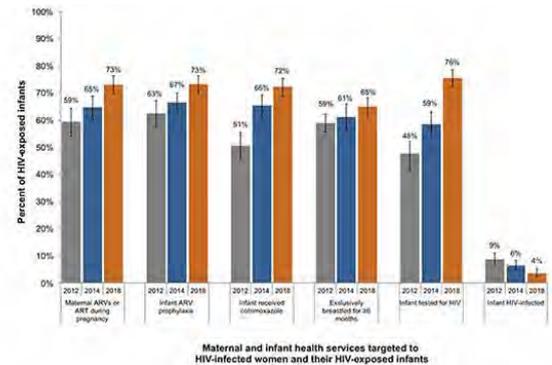
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BACKGROUND: We examined trends in the uptake of prevention of mother-to-child HIV transmission (PMTCT) services and MTCT among women with a recent birth in Zimbabwe from 2012-18.

METHODS: We analyzed serial cross-sectional serosurvey data collected in 2012 (n=8800), 2014 (n=10,404), and 2018 (n=7361) from the evaluation of Zimbabwe's Accelerated PMTCT Program. Using multi-stage clus-

ter sampling, eligible mother-infant pairs were randomly sampled each year from the catchment areas of 157 facilities offering PMTCT services in five provinces. Eligible women were \geq 16 years and mothers of infants (alive or deceased) born 9-18 months prior. Participants were tested for HIV and interviewed about health service utilization during pregnancy and postpartum.

RESULTS: In 2018, of 7361 women surveyed, 6816 (92.6%) attended \geq 1 antenatal care (ANC) visit, 5196 (70.6%) attended \geq 4 ANC visits, 6872 (93.4%) tested for HIV, and 6290 (85.5%) delivered in a health facility. The uptake of these services was stable from 2012-2018. In contrast, uptake of services specifically targeted to HIV-infected women and their infants significantly increased (**Figure**, maternal HIV prevalence in 2012: 12.4%, 2014: 13.4%, 2018: 10.6%). For example, uptake of both maternal antiretroviral therapy (2012: 59.4%, 2014: 64.7%, 2018: 73.2%; $p < 0.01$) and infant ARV prophylaxis (2012: 62.6%, 2014: 66.5%, 2018: 73.3%; $p < 0.01$) significantly increased from 2012-2018. Of infants born to HIV-infected mothers, 8.8%, 6.7%, and 3.6% were HIV infected in 2012, 2014, and 2018, respectively.



[Figure. Prevention of mother-to-child HIV transmission (PMTCT) cascade in Zimbabwe, 2012-2018. The percentages at each step are the proportion of the total number of HIV-infected women and their HIV-exposed infants in the survey receiving each service. Analysis restricted to biological mothers and their eligible infants (9-18 months of age)]

CONCLUSIONS: Zimbabwe has made remarkable progress towards elimination of MTCT. Uptake of health services intended for all women was relatively stable from 2012-2018. However, there were significant improvements in the coverage of services for women living with HIV and declining rates of MTCT. Nevertheless, a minority of women living with HIV did not receive PMTCT services, highlighting the need for continued efforts to expand access to PMTCT services.

TUPEC474

Why is there still high maternal to infant HIV transmission where PMTCT services are available? Analysis of service data from 77 health facilities in rural and semi-urban Kenya

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BACKGROUND: Although substantial gains have been made to reduce mother to child HIV transmission of HIV (MTCT), the goal of elimination of MTCT - below 2% MTCT rate - has not been reached in many countries, including Kenya. In select health facilities offering PMTCT services in rural and peri-urban Kenya, the estimated MTCT rate was 7.4% in 2017. In this analysis we aimed to identify predictors of MTCT.

METHODS: We retrospectively compiled routine PMTCT and Early Infant Diagnosis (EID) service data from 598 HIV-positive mothers and their respective infants registered between October 2016 and September 2017 in 77 health facilities. We compared mother-infant pairs where MTCT oc-

curred to mother-infant pairs where MTCT did not occur. Factors compared included 1) personal characteristics: mother's age and infant's age at EID; and 2) health care seeking behaviors: antenatal care (ANC) and PMTCT attendance, delivery location, mother's ART use, infant's ARV prophylaxis use, and whether the infant was up-to-date on immunizations. Bivariate and multivariable logistic regression models were used to identify factors associated with MTCT.

RESULTS: Of the 598 mother-infant pairs, MTCT occurred in 44. In multivariate analysis, after adjusting for other factors, mothers not receiving ART (AOR: 18.4, $p < 0.001$), delivering at home (AOR: 4.1, $p = 0.005$), and higher infant age (in months) at time of EID (AOR: 1.2, $p > 0.001$) were significantly associated with MTCT. Infants tested for the first time later than 2 months after birth were 14 times more likely to be HIV infected compared to those tested 2 months or earlier.

CONCLUSIONS: The most significant predictors of MTCT - not receiving ART and delivering at home - suggest late or inadequate health-seeking behavior as the primary factor influencing MTCT. Elimination of MTCT would require addressing barriers to optimal health seeking behaviors where HIV-positive women all seek ANC early and deliver in health facilities.

TUPEC475

A systematic review and meta-analysis of HIV incidence during pregnancy and breastfeeding in sub-Saharan Africa

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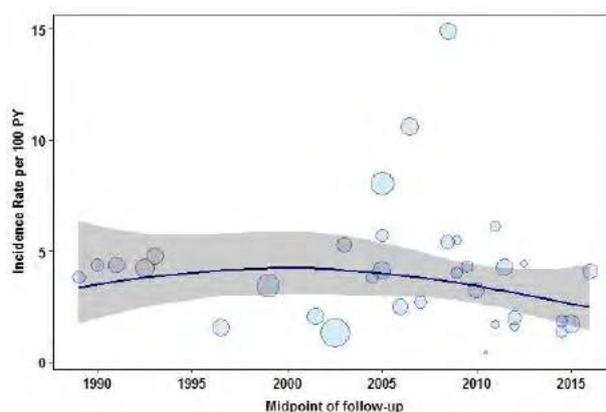
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BACKGROUND: Women in sub-Saharan Africa face a high risk of HIV acquisition during pregnancy and breastfeeding. However, in recent years, the widespread adoption and scale-up of combination HIV prevention (including treatment as prevention) may have reduced HIV incidence during these at-risk periods.

METHODS: We systematically searched four electronic databases and relevant HIV conferences between January 1, 1980 and December 1, 2018 for literature on the incidence of HIV during pregnancy and breastfeeding in sub-Saharan Africa. Inverse-variance weighted random-effects models were used to estimate pooled incidence rates and examine trends over time. Calendar time was defined as the midpoint of study implementation and examined continuously and categorically. Our categorical time windows corresponded roughly to eras of combination HIV prevention: pre-implementation (pre-2010), early adoption (2010-2014), and program expansion (post-2014).

RESULTS: Forty-one studies met our inclusion criteria. These represented 35 independent cohorts that contributed 104,203 person-years (PY) of follow-up and 36 estimates of the incidence rate of HIV during pregnancy and breastfeeding. Twenty-three estimates were generated before 2010, nine between 2010 and 2014, and four after 2014. The overall pooled incidence rate was 3.7/100PY (95%CI: 3.0-4.5). We observed high heterogeneity of the incidence rate (95% prediction interval: 1.2-11.6), and no apparent difference between pregnancy and breastfeeding periods (ratio of stratum-specific pooled incidence rates: 1.0, 95%CI: 0.6-1.7). Combined, HIV incidence during pregnancy and breastfeeding appeared to decline over calendar time (Figure). The pooled estimate of the incidence rate was highest during pre-implementation (4.3/100PY, 95%CI: 2.7-6.8), followed by early adoption (3.0/100PY, 95%CI: 1.7-5.2), and program expansion (1.7/100PY, 95%CI: 0.9-3.0).

CONCLUSIONS: Declines in HIV incidence among pregnant and breastfeeding women in sub-Saharan Africa over the past decade coincide with the implementation and expansion of combination HIV prevention. Overall rates remain high, however, underscoring the need for novel intervention efforts tailored to pregnancy and breastfeeding.



[Figure. Incidence of HIV during pregnancy and breastfeeding over time]

TUPEC476

Who seeks safer conception care in rural Uganda? A call for client-centred care for men and women affected by HIV

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BACKGROUND: Many HIV-affected men and women need support to meet reproductive goals while minimizing HIV-transmission risks. We integrated a safer conception program into a public HIV treatment clinic in rural Uganda and assessed the characteristics of clients presenting for care.

METHODS: People living with HIV (PLWH) or exposed to HIV who want to have children in the next two years are welcome to enroll in the Healthy Families Clinic program, although not actively recruited. At enrolment and 3-monthly follow-up, clients participate in safer conception counselling with or without partners. Counseling reviews ART-mediated HIV-RNA suppression, PrEP, limiting condomless sex to peak fertility, couples-based HIV counselling/testing, STI screening/treatment, manual insemination, and sperm washing. Clients complete a counsellor-administered questionnaire, and laboratory data capture HIV-RNA and pregnancy.

RESULTS: Between November 2016-2018, 257 HIV-affected individuals (52% women) enrolled. Women were younger than men (median=29 years [IQR:25-34] vs 38 years [IQR:32-44], $p < 0.001$). Most were married/living as married (97%) and reported an HIV sero-different partnership (98%). 75% were PLWH (56% women, 96% men; $p < 0.001$). Among 190 PLWH, 97% had disclosed HIV-serostatus to their desired pregnancy partner, 99% were on ART, and 90% were virally suppressed (< 550 copies/mL). Most clients (81%) attended the baseline clinic visit alone (86% women, 76% men; $p = 0.046$). However, 95% had discussed childbearing desires with their pregnancy partner, and 91% reported partner willingness to attend the program. Overall, 53% of women and 76% of men ($p < 0.001$) had children with and 55% of women and 71% of men desired ≥ 3 more children with the referent partner.

47% of women and 29% of men had been trying for pregnancy prior to the clinic visit with 34% of women and 25% of men trying for > 12 months.

CONCLUSIONS: These data highlight demand for safer conception services accessed by men and women, individuals and couples, and people living with and affected by HIV. Most clients are planning for several children, highlighting the importance of a reproductive life-course approach. Findings also underscore opportunities to clearly communicate U equals U messaging, given that over 90% clients enrolled with viral suppression. Undiagnosed infertility is common and may drive unnecessary HIV-exposure.

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Committed, effective and consistent leadership for a sustained PMTCT program in Cameroon: The case of the Cameroon baptist convention health board (CBCHB)

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BACKGROUND: Cameroon is one of the countries most affected by the HIV/AIDS epidemic in West and Central Africa with a national HIV prevalence of 3.9% in 2018. Mother to child transmission of HIV constitutes a major source of new pediatric infections and accessibility of HIV services to prevent vertical transmission remains low despite engagement of the government and partners in efforts to reduce the disease burden in the country.

Therefore, the CBCHB initiated a comprehensive HIV Care and Prevention Program in 1998 in response to the urgency of the pandemic.

METHODS: In February 2000, CBCHB started implementing services to prevent mother to child HIV transmission (PMTCT) following a grant from the Elizabeth Glaser Pediatric AIDS Foundation. With additional funding from the United States Agency for International Development and the President's Emergency Plan for AIDS Relief, CBCHB rapidly expanded program coverage to more communities in the Northwest, Southwest, Littoral and Center regions supporting the full cascade of HIV services. CBCHB used innovative and strategic planning, effective program management and implementation, systems strengthening, effective monitoring and evaluation for quality improvement throughout the years. Key partnerships for collaboration and social impact have been established with the Ministry of Public Health and other local organizations.

RESULTS: Between 2000 and 2011, CBCHB provided PMTCT services to over 519,000 women at 457 facilities and maternal HIV prevalence dropped from 10.3% to 5.3% in the Northwest and Southwest regions. By December 2018, CBCHB had supported PMTCT services cumulatively for over 1.5 million pregnant women in four regions. In addition, CBCHB developed two complementary initiatives: A Women's Health Program which screened over 7,110 women for cervical cancer, and treated 209 women with pre-cancer lesions out of 423 diagnosed in 2017. During the same period, CBCHB treated 269 children with malnutrition identified in PMTCT and Infant Welfare clinics to improve infant feeding practices under the Nutrition Improvement program.

CONCLUSIONS: In the last 20 years, CBCHB has played a key leadership role in HIV prevention and care for vulnerable population in Cameroon with the assistance of strategic partners. Many strategies and lessons can be shared with other Sub-Saharan Africa countries.

TUPEC478

Measurement system analysis: HIV rapid test interpretation in prenatal care in Mexico

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BACKGROUND: The elimination of mother-to-child transmission of HIV and syphilis was established as a health priority, and regional and international combined efforts have been launched. Several strategies have been implemented to accomplish this goal, including timely diagnosis and treatment. However, there is no record of an evaluation on the interpretation of rapid tests results in prenatal care screening in Mexico.

METHODS: A cross-sectional descriptive study was carried out in health care facilities of the Mexican Social Security Institute (1) and Ministry of Health (2), in a convenience sample of 33 medical units in 5 states. Health personnel responsible for HIV screening in prenatal care were subjected to two evaluations (A and B), each with the same 24 images of rapid tests in different order, in which they chose to interpret them as reactive, non-reactive or invalid. To evaluate the level of agreement with the correct interpretation according to the manufacturer (standard), a kappa statistic

was calculated and compared (Mann Whitney/Kruskal Wallis/ Wilcoxon) between medical units, states, institutions and optimal value of 0.8. Kappa statistic was interpreted as: 0= agreement by chance and 1= complete agreement with standard.

RESULTS: Personnel (99 individuals) from the 33 medical units were evaluated. Overall kappa statistic was 0.66; for reactive tests was 0.72; for non-reactive tests: 0.60, and for invalid: 0.65. There was a statistically significant difference between overall kappa statistic and optimal value of 0.8 ($p < .000$). State 1 to 5 had a kappa of 0.71, 0.72, 0.54, 0.67 and 0.53, respectively; there was no statistical difference among states ($p=0.18$). Institution 1 had a kappa of 0.69, and Institution 2 of 0.63: there was no statistical difference ($p=0.49$).

CONCLUSIONS: The overall level of agreement of the tests was significantly different from the optimum level (0.8) in a measurement system, even being less than 0.55 in some states. The elimination of mother-to-child transmission of HIV and syphilis requires training efforts to for the correct interpretation of the screening test in prenatal care.

Integration of family planning and HIV services

TUPEC479

Association between contraceptive use and PrEP uptake and continuation in adolescent girls and young women in Cape Town, South Africa

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BACKGROUND: Oral pre-exposure prophylaxis (PrEP) has the potential to diminish HIV acquisition and AIDS-related death among adolescent girls and young women (AGYW), a key population in the HIV epidemic. Many have called for PrEP implementation to be integrated into reproductive health services, as both contraception and PrEP offer prevention controlled by women during time periods of need. We hypothesized that contraceptive use was associated with PrEP uptake and continuation in young women accessing sexual and reproductive health services (SRHS) from a mobile clinic.

METHODS: A demonstration project (POWER) was implemented to determine AGYW's PrEP uptake and continuation. Sexual reproductive health service including HIV testing, contraception (oral, injectable and implant), and PrEP was offered to all sexually active AGYW ages 16-25 accessing the Tutu Teen Truck, an adolescent-friendly mobile clinic servicing limited-resource high disease-burden community in Cape Town, South Africa. Chi-squared analysis was performed to explore the potential association between hormonal contraceptive use in AGYW with their PrEP uptake and continuation.

RESULTS: From June 2017 - October 2018, 1096 AGYW accessed SRHS in which PrEP was offered to all and 31% (n=341) initiated PrEP on the same day. AGYW who were using contraception were significantly more likely to initiate PrEP on the same day compared to those who declined PrEP (76% vs 66% on contraception at that visit; $p=0.001$). PrEP initiation was also significantly associated with contraception initiation; contraception was initiated by 44% of AGYW on the same day as PrEP initiation compared to 30% contraception starts in AGYW who declined PrEP ($p=0.003$). There was a trend towards higher contraception use among AGYW who ever came back for a PrEP refill compared to those who initiated PrEP but were lost to follow up (79% vs 71% contraception use; $p=0.10$).

CONCLUSIONS: Contraception and PrEP initiation and continuation were correlated in this group of young African women. While young women's contraception use facilitated PrEP initiation and continuation, PrEP initiation also encouraged young women to initiate contraception use. These findings support the integration of sexual reproductive health services with the provision of PrEP for African young women.

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TUPEC480

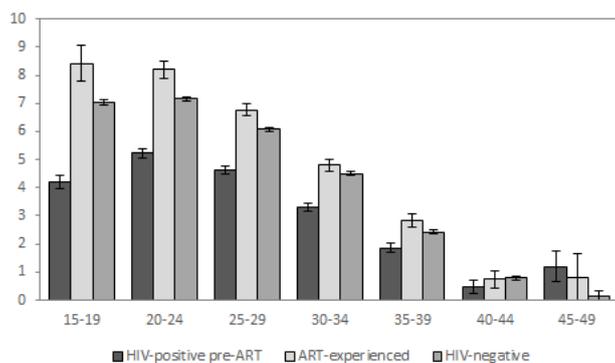
The effect of HIV and antiretroviral treatment on pregnancy rates in the Western Cape province of South Africa: Findings from a health service linkage studyL. Johnson¹, T. Mutemaringa^{1,2}, A. Heekes^{1,2}, A. Boulle^{1,2}¹University of Cape Town, Centre for Infectious Disease Epidemiology and Research, Cape Town, South Africa, ²Provincial government of the Western Cape, Department of Health, Cape Town, South Africa

BACKGROUND: Previous studies suggest that untreated HIV infection is associated with reduced incidence of pregnancy, but studies of the effect of antiretroviral treatment (ART) on pregnancy incidence have been inconsistent.

METHODS: Routine data from health services in the Western Cape province of South Africa were linked to identify pregnancies over the 2007-2017 period and maternal HIV records. Pregnancies were coded as probable (pregnancy confidence score ≥ 0.7) or possible, depending on the strength of evidence in the routine data. The time from the first (index) pregnancy outcome date to the next pregnancy (possible or probable) was modelled using Cox proportional hazards models. In a sensitivity analysis we limited analysis to probable pregnancies.

RESULTS: Over the 2007-2017 period, 917 498 pregnancies (possible or probable) were recorded. In all age groups, pregnancy incidence rates were highest in women who had started ART, lower in HIV-negative women and lowest in ART-naïve HIV-positive women (Figure). In multivariable analysis, after controlling for most recent CD4 count, pregnancy incidence rates were higher in women on ART when compared to untreated HIV-positive women (adjusted hazard ratio [aHR] 1.63, 95% CI: 1.59-1.67), and were also higher in women on ART when compared to HIV-negative women. Pregnancy incidence was also associated with higher CD4 count in HIV-positive women, independent of ART use. The effect of ART remained when the analysis was restricted to probable pregnancies (aHR 1.42, 95% CI: 1.37-1.46).

CONCLUSIONS: This is the first study in an African setting to report pregnancy incidence rates in women on ART greater than those in HIV-negative women. Better integration of family planning into HIV care services is needed.



[Pregnancy incidence rates (per 100 women years), by HIV status and age at index pregnancy]

PrEP and transwomen

TUPEC481

Willingness to use pre-exposure prophylaxis (PrEP) for HIV prevention and PrEP implementation preferences among transgender women in Malaysia: A cross-sectional studyJ. Galka¹, M. Wang², D. Tahir³, I. Azwa¹, B. Gibson-Ganesan⁴, S.H. Lim⁵, J. Wickersham^{2,3}¹University of Malaya, Centre of Excellence for Research in AIDS, Kuala Lumpur, Malaysia, ²Yale University School of Medicine, Department of Infectious Diseases, New Haven, United States, ³University of Malaya, Center for Excellence in AIDS Research, Kuala Lumpur, Malaysia, ⁴Quinnipiac University, School of Medicine, Hamden, United States, ⁵University of Malaya, Faculty of Medicine, Department of Social and Preventive Medicine, Kuala Lumpur, Malaysia

BACKGROUND: Transgender women face one of the highest HIV burdens worldwide. In Malaysia, HIV prevalence in transgender women is more than thirty-fold higher than in the general population. Pre-exposure prophylaxis (PrEP) for HIV prevention may be an effective intervention for reducing HIV transmission. This study examined factors associated with willingness to use PrEP among transgender women in Malaysia.

METHODS: Between June and August 2017, 374 transgender women from seven cities in four Malaysian completed a survey on willingness to use PrEP. PrEP willingness was measured using a five-item scale. Other measures include socio-demographics, substance abuse, healthcare engagement, and criminal justice involvement. Bivariate and multivariable linear regression was used to identify correlates of PrEP willingness.

RESULTS: Participants were mostly ethnic Malay (75.1%), single (67.6%), and had at least a high school education (69.3%). Willingness to use PrEP was high (82.0%), despite only 22% having been previously aware of PrEP. Bivariate associations with willingness to use PrEP included having a high school education ($B=0.375; p<0.001$), having more sex work customers ($B=0.027; p=0.008$), use of mobile phone apps to find sex work customers ($B=0.265; p=0.024$), hormone use across the lifetime ($B=0.639; p=0.003$) and last 90 days ($B=0.283; p=0.013$), having seen a doctor in the last year ($B=0.339; p=0.037$), willingness to pay for PrEP ($B=1.554; p<0.001$), prior post-exposure prophylaxis (PEP) use ($B=0.273; p=0.050$), and being concerned about cost ($B=0.250; p=0.036$). Willingness was lower for ethnic Chinese ($B=-1.378; p<0.001$), older participants ($B=-0.029; p<0.001$), amphetamine use ($B=-0.519; p<0.01$), injection drug use ($B=-1.165; p<0.001$), previous incarceration ($B=0.035; p=0.015$), and prior knowledge of PrEP ($B=-0.378; p=0.009$). In the multivariate model, lifetime hormone use ($B=0.490; p=0.016$), prior PEP use ($B=0.253; p=0.026$), and having a high school education ($B=0.281; p=0.054$) were associated with higher willingness to use PrEP, while injection drug use ($B=-0.686; p=0.041$), older participants ($B=-0.019; p=0.002$), and Chinese ethnicity ($B=-1.076; p=0.002$) were associated with lower PrEP willingness.

CONCLUSIONS: This is the first-ever study to evaluate PrEP willingness among transgender women in Malaysia. Results suggest that PrEP is a highly acceptable HIV prevention tool for transgender women. Differences in PrEP willingness by education, ethnicity, substance abuse, and age suggest different strategies may be needed to scale-up PrEP for this diverse community of transgender women.

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TUPEC482

Pre-exposure prophylaxis (PrEP) indication, use, and adherence among transgender women in six U.S. cities: Interim findings from the LITE cohort, 2018

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BACKGROUND: Transgender women (TGW) in the U.S. experience a disproportionate burden of HIV, which warrants effective and acceptable prevention interventions, including pre-exposure prophylaxis (PrEP). The LITE study is a multi-site cohort of TGW across six eastern and southern U.S. cities assessing HIV acquisition. This analysis aims to describe baseline patterns of PrEP use and experiences among TGW enrolled in the LITE cohort to-date.

METHODS: Adult TGW, regardless of HIV status, are recruited and enrolled into a baseline cohort screening visit. Participants complete a socio-behavioral survey (English or Spanish), oral HIV screening with referral for confirmatory testing, and STI testing (Neisseria gonorrhoea, Chlamydia trachomatis, syphilis). Participants with negative HIV test results (regardless of PrEP status) and meeting behavioral risk criteria are eligible to continue participation in the cohort, which includes app-based surveys and HIV self-tests conducted every 3months and STI testing every 12months for 24months.

RESULTS: Enrollment launched in March 2018. As of December 2018, 620 TGW completed the baseline visit. Of these, 30% were living with HIV and 390 (63%) continued into the HIV-uninfected cohort. 21% reported lifetime PrEP use at baseline. Common experiences reported while using PrEP: side effects (38%), dislike of daily medication (36%), others' perceptions of promiscuity (36%), and partner unwillingness to use condoms (31%). Among HIV-uninfected participants, 47% met modified CDC indications for PrEP: 12% laboratory-confirmed STI, 32% condomless anal sex at last receptive act, 2% HIV-infected sex partner, 32% sex work in last 3 months. Of those PrEP indicated, 28% reported using PrEP within the last 30 days (18% of all HIV-uninfected). 89% of PrEP indicated reported current exogenous hormone use, with no difference in PrEP use by hormone status. 68% of current PrEP users reported adherence based on zero missed doses in prior 7days.

CONCLUSIONS: Half of HIV-uninfected TGW in this study met clinical indication for PrEP use, but current use was low. Findings highlight the need to address concerns about PrEP and investigate innovations in demand generation and distribution for this population. Monitoring PrEP use over time among cohort participants will provide insight into PrEP use patterns and adherence among TGW in the U.S.

Integration of HIV prevention services into health and other platforms

TUPEC483

Integration of HIV prevention and primary care for gay, bisexual, and other men who have sex with men in Puerto Rico

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BACKGROUND: Primary healthcare (PC) settings represent an extraordinary opportunity for disease prevention and health promotion. However, stigma, discrimination, and limited properly trained staff may impede the use of these platforms for HIV prevention. In order to address HIV prevention among gay, bisexual, and other men who have sex with men (GBMSM), healthcare providers must integrate routine comprehensive sexual health care. Uninviting environment as well as negative healthcare encounters may impede disclosure of sexual orientation, sexual identity and sexual practices. In Puerto Rico (PR), GBMSM are at disproportionate risk HIV infection and little is known of their experiences in healthcare.

Acknowledging this, we conducted a secondary data analysis to inform the development of strategies to incorporate HIV prevention in primary care services for GBMSM in PR.

METHODS: Data from an on-line survey conducted in June 2017 with 256 HIV-negative GBMSM in PR was used. Participants were self-identified Spanish-speaking GBMSM living in PR at the time of the study. Besides sociodemographic data, participants also reported their experiences accessing HIV services and disclosing sexual health-related information to their PC providers.

RESULTS: Most participants self-identified as gay (91%), were 29yo or younger, and were living in non-urban areas (59%). The majority reported HIV testing at least once during their lifetime (93%), but less than half (42%) tested in PC settings. Most participants have never been asked by their primary care provider about their sexual orientation (70%) or sexual practices (54%).

Those with primary care providers reported having had an HIV test more often (56% vs. 36%; p -value=0.04) and having had their last general health check-up more recently (22% vs. 9%; p -value=0.003) than those without a primary care provider.

CONCLUSIONS: Primary care settings are frequently used for HIV testing by GBMSM in PR. Opportunities for HIV prevention can be improved by increasing access to primary care and by providing training to healthcare professionals for proper assessment of sexual health related information. With better information and positive healthcare encounters, more relevant information can be captured and used for screening and health promotion. These opportunities are particularly important for the implementation of PrEP and other biomedical HIV prevention strategies.

Safer conception strategies

TUPEC484

Improved partnership stability while participating in a safer conception program - Perspectives from HIV serodiscordant couples in Kenya

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BACKGROUND: Many African HIV serodiscordant couples desire to have children; the use of safer conception strategies helps couples achieve their fertility goals while reducing the risk of HIV transmission. However, it is unknown how focused attention to fertility goals during a safer conception program can impact partnership stability. This qualitative analysis aimed to describe changes that occurred in partnership dynamics while couples were participating in a safer conception program.

METHODS: We enrolled 74 heterosexual HIV serodiscordant couples with immediate fertility desires into the Safer Conception Intervention for Partner (SCIP) pilot study in Thika, Kenya. Counseling and safer conception tools were provided including: Pre-exposure prophylaxis (PrEP) for the HIV negative partner, antiretroviral therapy (ART) for the index partner, fertility prediction tools and referral for male circumcision. Semi-structured qualitative interviews were conducted with 19 couples and 5 healthcare providers purposively sampled to represent the range of pregnancy experiences.

Qualitative transcripts were thematically analyzed for concepts related to relationship stability and future fertility goal changes and how these concepts influenced engagement in SCIP.

RESULTS: Couples in the study reported developing stronger bonds reinforced by the need to work together to achieve reproductive goals with minimal risk of HIV transmission to the HIV-negative partner. For some, these efforts also prevented their potential break-up due to concerns about how to live as a serodiscordant couple and unmet fertility needs. *„Earlier on we would never leave home together and go to a place but now I see him keeping me company; [...] (female living with HIV).* Couples also reported reduced fear of HIV transmission which led to better sexual experiences: *„[...] we thought there are high chances of being infected but since we came here we have benefited and then we can get a baby who is negative [...] (female living with HIV).* Couples reported making adjustments in daily routines to incorporate fertility tracking activities and conception attempts. Some reported having a stronger desire to have a baby after participating in SCIP.

CONCLUSIONS: HIV serodiscordant couples participating in SCIP reported a positive experience working together to achieve conception without sexual HIV transmission. Improved partnership stability may impact utilization of safer conception interventions.

TUPEC485

“She takes hers and I take mine”: Experiences of HIV serodiscordant couples using safer conception strategies in Thika, Kenya

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BACKGROUND: Studies have reported that HIV serodiscordant couples in low resource settings have strong fertility desires that often override considerations about potential HIV transmission. Although several safer conception strategies are now available, data describing the acceptability of scalable safer conception strategies for HIV serodiscordant couples are limited.

METHODS: The Safer Conception Intervention for Partners (SCIP) delivered a comprehensive safer conception intervention to 74 HIV serodiscordant couples in Thika, Kenya. The intervention provided ART (HIV infected partner), PrEP (HIV uninfected partner), counseling on menstrual cycle monitoring, vaginal self-insemination, and condom use except during peak fertility days, and STI diagnosis and treatment. To understand experiences practicing and delivering safer conception, we interviewed 19 couples and 5 health providers using a semi-structured guide. Interviews were audio-recorded, transcribed and translated into English, and coded using a framework approach.

RESULTS: Condoms were the only HIV risk reduction strategy couples knew prior to joining SCIP thus, the counselling provided by SCIP providers played an important role to increase knowledge about alternative strategies and encourage their uptake. Couples and providers described simultaneous use of multiple strategies to reduce the risk of HIV transmission while increasing the chance of conception; PrEP and ART were the most preferred methods, *“I am I taking PrEP and he is also using his ART. But when that day comes (fertile period), we have sex without condom.”* Couples also timed condomless sex to the fertile period though many reported challenges in consistent condom use outside of fertile days, *“sometimes you might find yourself not using a condom but when you have swallowed PrEP it helps you very much.”*

Of the fertility indicators tracked, couples and providers reported that cervical mucus was the most challenging to monitor. Providers and couples reported that couples-based counseling provided a chance for each of the partners to support each other to practice safer conception, *“when I forget she reminds me and if she forgets I remind her.”*

CONCLUSIONS: Our comprehensive safer conception intervention was highly acceptable to participants and providers and provides valuable lessons for scale-up of safer conception programming in the East Africa region.

Strategies for identifying key populations

TUPEC486

How better predict MSM becoming HIV-infected in West Africa? A combined approach of sexual behavior (CohMSM ANRS 12324 - Expertise France)

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BACKGROUND: Previous research on HIV risk behavior among men who have sex with men (MSM) has mainly focused on unprotected anal sex without attention to other risky sexual practices. We investigated whether an indicator of HIV risk based on a combination of risky sexual practices would better identify MSM becoming HIV-positive in West Africa.

METHODS: HIV-negative MSM were provided a quarterly preventive follow-up in the community-based cohort CohMSM in four West African countries (Mali, Cote d'Ivoire, Burkina Faso, Togo). They completed face-to-face questionnaires every 6 months including questions about four risky sexual practices:

- 1) inconsistent condom use (ICU) during anal sex;
- 2) ICU during oral sex;
- 3) receptive/versatile position during anal intercourse;
- 4) having ≥2 male sexual partners.

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Multi-trajectory modeling was used to combine these practices into a global single indicator of sexual behavioral profiles (SBP). The main outcome indicated whether seroconversions occurred or not over the 18 months of follow-up. Mixed logistic model was used to estimate odd-ratios (OR) for each separate practice and for the global indicator. The population-attributable risk percentage (PAR%) was calculated for each practice and for the global indicator of SBP to show its relative contribution to HIV seroconversions.

RESULTS: For the 520 MSM included, two SBP were identified: high-risk exposure (HRE) (61%) and moderate-risk exposure (MRE) (39%). HRE-MSM (versus MRE-MSM) reported greater ICU during anal (53% versus 41%) and oral sex (84% versus 43%), receptive practices (93% versus 8%) and more multiple partners (63% versus 60%).

The global indicator identified the highest proportion of seroconversions (92% are HRE-MSM) compared to each separate practice (Table). The PAR% of seroconversions explained by the global indicator was 86.5 [95% Confidence Interval (CI); 78.8; 94.2]. Separate practices PAR% ranged from 5.9 [-6.7; 18.5] among MSM having ≥ 2 partners to 77.2 [66.8; 87.6] for those reporting receptive practices.

CONCLUSIONS: HIV risk behavior should be assessed by taking into account several risky sexual practices to better tailor risk reduction interventions among West African MSM.

	% HIV seroconversions (n=53)	OR [95% CI]	PAR% [95% CI]
High-risk exposure profile (Ref. Moderate risk exposure profile)	92	7.9 [4.5; 14.2]	86.5 [78.8; 94.2]
Inconsistent condom use during anal sex (Ref. No)	55	1.4 [0.99; 1.9]	16.9 [-0.2; 34.2]
Inconsistent condom use during oral sex (Ref. No)	80	2.0 [1.3; 3.0]	44.6 [24.4; 64.7]
Receptive/versatile position during anal sex (Ref. Exclusively insertive)	87	4.9 [3.1; 7.9]	77.2 [66.8; 87.6]
Having two or more male sexual partners (Ref. No)	65	1.2 [0.8; 1.7]	5.9 [-6.7; 18.5]

[Table: HIV seroconversions during the first of 18 months of follow-up and PAR% according to indicator of HIV risk behavior]

TUPEC487

Quality of health care for key population: Mixed method study among service providers using Donabedian model

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BACKGROUND: Ghana developed a four-year National Strategic Plan (NSP) for Most-At-Risk Populations. This NSP was focused on expanding access to HIV services for Key Populations (KPs) with its aim to reach 80% of them by 2015 with a comprehensive package of HIV prevention, care, treatment, and support services. These programmes include: peer education, mobile outreach, condom and lubricant distribution and mobile- or Internet-based services to provide counseling and other services. Despite this, uptake of these services has been low among men who have sex with men (MSM) and female sex workers (FSW). The Donabedian framework identifies the drivers of quality of care as structural (organizational setup), process (service delivery) and outcomes (effects of the health care on the status of the patients). We conducted this study to assess the quality of health care using the Donabedian model.

METHODS: This was a mixed quantitative and qualitative study. The quantitative study was conducted among 80 healthcare providers involved in HIV service delivery. The finding of the quantitative study was triangulated focus group discussions (FGDs) with MSM (30) and FSW (30) and one among health workers.

RESULTS: Of the 80 health workers interviewed, 22(27.5%) were uncomfortable providing HIV-related services to FSW because of religious beliefs. Fourteen (17.5%) respondents have experienced a health worker unwilling to provide service to FSW. Majority, 63 (78.7%) of respondents

have never experienced a health worker rendering poor quality of service to FSW, whilst 17 (13.7%) indicated they have ever witness a health worker providing poor quality service to FSW. Majority, 52 (65%) of the respondents strongly agreed that their facility provided enough confidentiality. About 54 (67.5%) and 61 (76.3%) of the respondents believed their health facilities did not have facilities available to address the needs of FSW and MSM respectively. In FGDS, MSM raised concerns about structures of service delivery outlet not conducive for ensuring privacy and confidentiality. Both MSM and FSW indicated they expect quick service, good privacy and humane treatment at biomedical facilities.

CONCLUSIONS: Providing MSM and FSW with good quality care will increase the utilization of health services that are tailored towards meeting the needs of KPs.

TUPEC488

Expanding HIV testing among hard-to-reach populations through index testing

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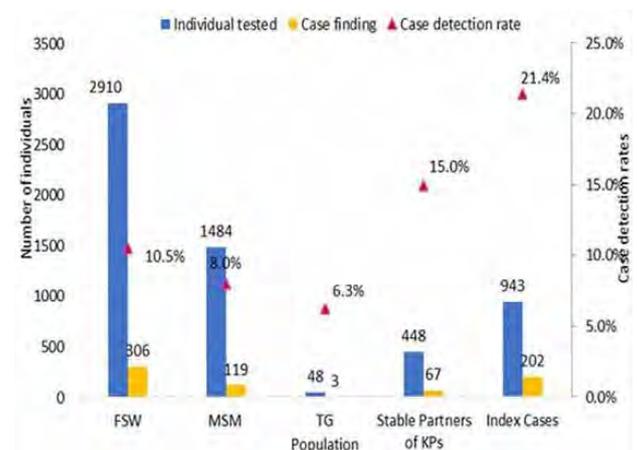
BACKGROUND: Progress towards the global 90-90-90 targets has been slow in many West African countries. According to UNAIDS, only 54% of people living with HIV in Côte d'Ivoire know their status. To accelerate HIV case finding in Côte d'Ivoire, the USAID- and PEPFAR-supported LINKAGES project introduced index testing with newly diagnosed key population (KP) members, including female sex workers (FSW) and men who have sex with men (MSM).

We describe the acceptance of HIV testing by index patient contacts and their contribution to case finding in Côte d'Ivoire.

METHODS: To implement index testing, program staff invited KPs who tested positive to develop a list of contacts who may have been exposed to HIV through them. Once the index patient selected a notification option for each individual listed, a community-based staff person contacted that individual and offered HIV testing.

Routine program data from a 3-month period of performance were analyzed and disaggregated by population type to examine the contribution of index testing to case finding.

RESULTS: A total of 5,833 individuals were tested for HIV between October-December 2018. Among the 284 newly diagnosed KPs who were offered to list contacts, 261 provided an average of 4 individuals (1,045 total) to contact, 90% of whom agreed to testing. The overall case-finding rate 12%, and it was highest among those who were referred for testing by an index patient (21.4%) (Figure 1).



[HIV testing and case finding by type of population, October-December 2018]

No significant differences in HIV case detection rates were found among male and female contacts (20.8% vs. 22.6%). Case detection rates increased with age among both male and female contacts ($p < 0.05$; Chi-Squared test for trend).

CONCLUSIONS: Index testing is an efficient modality for improving HIV case detection by finding and engaging high risk populations in testing and is a model that can be scaled among at-risk populations.

TUPEC489

Innovative HIV testing strategy with Burundian female sex workers: Enhanced peer outreach approach to improve case detection by comparing outcomes between recruitment chains of HIV-positive and unknown HIV serostatus peers

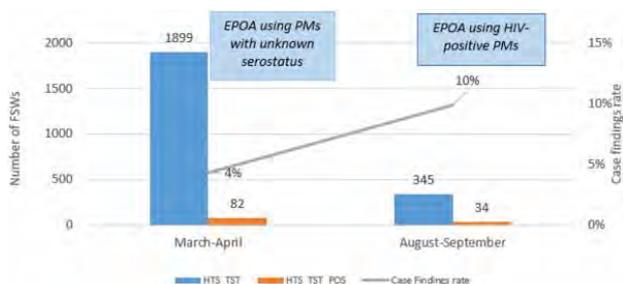
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BACKGROUND: The enhanced peer outreach approach (EPOA) was utilized to increase HIV case finding by engaging existing female sex worker (FSW) peer outreach workers to ask other FSWs (e.g., peer mobilizers [PMs]) in their network to distribute coupons to their sexual and social contacts for HIV testing. The aim of EPOA was to engage never or rarely tested FSWs in HIV testing to increase HIV case finding. The program utilized both HIV-positive and unknown HIV serostatus PMs and we sought to determine which networks would be more likely to test those who were HIV-positive.

METHODS: In 2018, LINKAGES Burundi organized two EPOA campaigns. The first was March-April 2018 using 100 PMs of unknown serostatus. The second was August-September 2018 with 38 HIV-positive PMs. Both campaigns were implemented in five provinces—Bujumbura Mairie, Bujumbura Rural, Ngozi, Kayanza, and Kirundo. Using routine program data, we compared the results of the two campaigns with respect to case finding and linkage to treatment.

RESULTS: In the March-April 2018 campaign, 1,899 FSWs were tested and 82 tested positive, producing a case-finding rate of 4%. In the August-September 2018 campaign, 345 FSWs were tested, and 34 were found HIV-positive, producing a case finding rate of 10%. (Figure 1). Overall, 99% in the March-April 2018 campaign and 100% in the August-September 2018 campaign who were newly diagnosed HIV-positive were initiated on treatment.



[Comparison of EPOA results using PMs of unknown HIV serostatus and HIV-positive PMs]

CONCLUSIONS: Engaging HIV-positive PMs in EPOA resulted in higher case finding than engaging unknown HIV serostatus PMs. These results demonstrate the potential added benefit of engaging HIV-positive PMs in EPOA for identifying those who are HIV-positive and initiating them on treatment. The model could accelerate progress towards the UNAIDS 95-95-95 goals.

Use of the Internet, social media, mobile phones and other e-devices for prevention

TUPEC490

Characteristics of younger MSM and association of age with PrEP awareness and willingness in Brazil, Mexico and Peru

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BACKGROUND: HIV continues to rise among key populations in Latin America, especially MSM aged 18-24 years (yMSM). We assessed the association between younger age and PrEP awareness and willingness among MSM from Brazil, Mexico and Peru.

METHODS: MSM were recruited to complete an online survey via advertisements on Facebook, Grindr, and Hornet from March-June 2018. Eligible individuals were cisgender men, ≥ 18 years-old, HIV negative or of unknown status, lived in these countries, and provided informed consent. HIV-related risk was based on WHO recommendations for PrEP use: reporting unprotected sex, having an HIV+ sex partner, transactional sex, or having an STI all in the past 6 months. We used chi-square to describe MSM according to age and logistic regression modeling to calculate adjusted associations with younger age.

RESULTS: From 19,456 MSM who completed the survey, 5,877 (30%) were yMSM. Compared to older MSM (>24 years), a higher proportion of yMSM were recruited on Facebook (13% vs. 9%, $p < .001$), low income (62% vs. 30%; $p < .001$), less educated (≤ 12 years; 56% vs. 22%, $p < .001$), fewer self-reported being gay/homosexual (85% vs. 91%; $p < .001$), had no steady partner (82% vs. 70%, $p < .001$), used apps for sex less frequently (daily; 42% vs. 48%, $p < .001$) and never tested for HIV (34% vs. 14%; $p < .001$). Although yMSM had more HIV-related risk (34% vs. 32%, $p < .001$) and male sex partners (>5 ; 71% vs. 63%, $p < .001$), yMSM had less condomless receptive anal sex (56% vs. 61%, $p < .001$), lower HIV risk perception (67% vs. 64%, $p < .001$), lower PrEP awareness (56% vs. 69%, $p < .001$) and lower PrEP willingness (62% vs. 65%, $p < .001$). In multivariable model adjusted by country, education, income, sexual orientation, steady partner, HIV risk-related and use of apps: younger age was associated with lower PrEP awareness (aOR0.90 [95%CI:0.84-0.97]). Younger age was not associated with PrEP willingness adjusting for the same variables (aOR1.06 [95%CI:0.98-1.14]), but the association becomes statistically significant after additionally adjusting for PrEP awareness (aOR1.08 95%CI:1.00-1.17)].

CONCLUSIONS: Although at higher HIV risk, yMSM are less aware of PrEP. Interventions to increase PrEP awareness and willingness among yMSM are paramount.

TUPEC491

Novel online technology to reach individuals at risk of HIV with HIV testing services in Nepal

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BACKGROUND: In Nepal, the number of virtual hot spots for sex solicitation through online conversation is increasing. However, HIV risks among virtually active individuals are not officially documented and are therefore unknown. Here we report on a novel web-based technology for documenting, categorizing HIV risk and booking HIV testing services in Nepal.

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METHODS: The LINKAGES Nepal Project has developed the MeroSathi ("My Friend") web application, which allows online HIV risk assessment and booking for HIV testing services. MeroSathi was promoted through the project's social media platforms, through virtual hot spots, and by outreach staff during online outreach. A descriptive analysis of 261 individuals who had booked HIV testing services through MeroSathi from October-December 2018 was conducted. MeroSathi categorized participants into high-, medium-, low-, and no-risk categories based on voluntary responses to sociodemographic and behavioral questions.

RESULTS: Among 261 individuals who booked HIV services, 32% were identified as members of key populations. Of the individuals booked for services, 190 (73%) had never been tested for HIV. Eighty-three (32%) of the individuals received HIV testing services, and 13% had received HIV testing from other sites within the past six months. The mean age of the individuals was 29 years. In the past six months, 69% had inconsistently used condoms, 16% had exchanged sex for goods or money, 4% had used injecting drugs, and 26% had experienced forceful sexual intercourse. In terms of risk category, 32% were categorized as high risk, 49% as medium risk, and 19% as low risk or no risk for HIV. Of the 83 individuals who tested for HIV, two were diagnosed with HIV (a case finding rate of 2.4%, which is higher than traditional/general testing approach i.e. 0.7%), and four were diagnosed with and treated for sexually transmitted infections.

CONCLUSIONS: Our findings clearly illustrate that online interventions could be an avenue for contacting unreached, hidden, and virtually active individuals who have behaviors that put them at high risk of HIV. An online platform would also be helpful for providing information about HIV testing services and linking individuals to HIV testing services in Nepal.

TUPEC492

Population size estimation of men who have sex with men using online social network multiplier method

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BACKGROUND: The HIV epidemic in Vietnam is concentrated among key populations (KPs). The country's national HIV sentinel surveillance shows steady declines in HIV prevalence among people who inject drugs (PWIDs) and female sex workers (FSW) between 2011-17, from 16.4% to 14.2% and 5.9% to 4.0% respectively. Over the same period, prevalence among men who have sex with men (MSM) increased from 5.2% to 12.5%. Conventional beliefs hold that MSM comprised approximately 1% of the population of Tay Ninh province (e.g. 3,000 MSM), and that MSM-focused HIV interventions should be scaled as such. A 2018 survey aimed to update these beliefs by estimating the size of the MSM population, and inform HIV resource allocation to serve this population at an appropriate scale.

METHODS: Social networking applications are widely used among MSM in Vietnam, including the MSM-focused application Blued. We enumerated the number of active Blued users in the province over one month. Then, a web-based respondent driven sampling (RDS) survey was used to explore Tay Ninh-based MSM's use of the app and size of their HIV risk networks. Data from the two-overlapping sources was used to estimate population size.

RESULTS: A total of 3,226 Blued accounts were active in Tay Ninh within one month. Web-based RDS collected 177 eligible responses. Of these, 52.4% (95% CI: 40.7%-64.0%) reported using the app during the same period. Based on these sources, the size of the MSM population in Tay Ninh was estimated at 6,161 (95%CI: 5,039-7,926).

CONCLUSIONS: MSM size estimation will help policy makers and program administrators understand and plan appropriate interventions to serve this population at risk of HIV. The study provided a rapid and inexpensive means to estimate the size of this population. As a result, local HIV stakeholders and health authorities are scaling-up MSM-focused interventions, including online outreach, risk assessments, and linkages to MSM-friendly HIV testing and treatment services.

Behavioural interventions to prevent HIV transmission

TUPEC493

Tailored, adolescent-friendly mobile clinic sexual health services are convenient, trust-building, and highly preferred over conventional clinics: Investigating acceptability of a youth-directed sexual health services in Cape Town, South Africa

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BACKGROUND: The rapidly growing HIV epidemic amongst South African adolescents and young adults (AYA) is associated with significant HIV related morbidity and mortality. Although HIV testing, prevention and treatment options are widely available, many AYA delay health-seeking until illness occurs, underlining the need for AYA responsive and integrated sexual and reproductive health services (SRHS) to support AYA to engage in healthcare. The feasibility and cost-effectiveness of mobile AYA clinics have been established. The objective of the current study was to investigate patient acceptability of mobile AYA SRHS and compare usage and HIV outcomes with nearby conventional clinics.

METHODS: Clients presenting to a mobile clinic in Cape Town were invited to participate in a study investigating the acceptability of the mobile clinic. A trained researcher administered a questionnaire-based acceptability survey. Mobile clinic medical records during the study period were compared with the records of AYA attending four clinics in the same community.

RESULTS: 304 participants (16-24 years, 247 (81.3%) female) rated mobile AYA SRHS acceptability highly (median = 4.6 out of 5), with 90% rating their experience as better or much better than conventional clinics. Most participants (96%, n=291) stated that they believed the service was confidential and (92%, n=280) were not concerned about being seen by someone they knew. Compared with conventional clinics, the mobile clinic attracted more men (26% v 13%, $p < 0.00$), younger patients (18 v 19 years, $p < 0.00$), and yielded more HIV diagnoses (4% v 2%, $p < 0.00$).

CONCLUSIONS: This study highlights the importance of using novel methods to encourage hard to reach groups, such as young men, to access healthcare services. Given the high ratings of acceptability, and the preference for mobile clinics over conventional primary health clinics, the scalability of mobile clinics should be investigated as part of a multipronged approach to diagnostic, prevention, and treatment options for AYA in resource-limited, high disease burden settings in South Africa. Future studies should evaluate acceptability of these services amongst those even harder to reach, including young men and boys, and debut testers. These studies should investigate the adaptation and optimal intervention approaches for mobile clinics that incorporate men's healthcare needs.

Integration of HIV services with TB programmes

TUPED643

Clinical and economic benefits of multi-disease testing on GeneXpert platform in a public health system in Malawi: An observational study

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BACKGROUND: Though HIV services are increasingly decentralized, tests for early infant diagnosis (EID) and viral load (VL) monitoring are predominantly conducted through centralized laboratories, leading to long result turnaround times and delayed clinical action. Point-of-care (POC) testing enables rapid clinical action, but increasing POC test access requires investment in new devices. This study evaluated integrated HIV and TB testing on GeneXpert, already in widespread use for TB diagnosis, as a way to efficiently increase access to on-site EID and VL testing.

METHODS: An observational, 6-month pre- and post-implementation study was conducted in 10 district hospitals in Malawi. All EID dried blood spot and TB sputum samples and targeted VL tests, were conducted on-site; the remaining VL samples were referred centrally. EID and TB testing and patient outcomes, and costs were compared before and after integration; VL outcomes were compared between centralized and on-site testing during the study. Regression analysis was used, while controlling for clinic-level clustering.

RESULTS: 1159 infants were tested during baseline and 1261 during the study (48% female), with a median age of 49 days in both periods. For HIV positive infants, time from sample collection to ART initiation decreased from a median of 34 days (IQR:27-60) at baseline to 13 days (IQR:6-30) ($p=0.06$) using GeneXpert; 78% and 79% of positive infants initiated ART ($p=0.89$), respectively. 8% (647) of VL tests were conducted on-site, 70% (454) of which were targeted. Less than half of viremic patients ($VL \geq 1000$ copies/ml) had a recorded clinical action (adherence counseling or regimen switch), but the median time decreased from 70 days (IQR:42-98) using centralized testing to 3 days (IQR:0-30) with GeneXpert ($p < 0.001$). 2143 TB tests were run during baseline (48% female) and 2506 during endline (41% female); the median age was 38 years for both periods. Timely TB treatment initiation remained unchanged. Integrated testing was projected to save the TB and HIV programs 48% (-\$18,000) and 37% (-\$24,000), respectively, during the study.

CONCLUSIONS: Integrated testing is feasible, enables expedited action for HIV patients without compromising TB care or exceeding device capacity and enables cost-savings. To ensure maximal impact of on-site testing, additional system improvements are needed.

TUPED644

Integrated TB/HIV care and treatment improves outcomes among children and adolescents living with HIV

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BACKGROUND: Tuberculosis (TB) is the leading cause of mortality in people living with HIV. Children and adolescents living with HIV (C/ALHIV) are up to 24 times more likely to develop TB compared to HIV-negative peers, and are at risk for worse outcomes. This analysis uncovers gaps in TB care for C/ALHIV enrolled in HIV services.

METHODS: TB outcomes of C/ALHIV receiving care between April 2013 - June 2017 was analyzed across seven BIPAI clinics offering integrated TB/HIV care in Botswana, Eswatini, Lesotho, Malawi, Tanzania (inclusive of two clinics) and Uganda. Data was extracted from electronic medical records and national paper registers.

This study evaluated 22,490 C/ALHIV, including 1,217 individuals who were diagnosed with TB disease (aged 0 - 18.99 years in Tanzania and 0 - 19.99 years in the remaining five countries). Descriptive and bivariate analysis was performed to describe the cohort and inform associations with TB outcomes. An Adaptive Lasso Regression was employed to support optimal descriptive power while offering an unbiased approach for identifying risk factors impacting TB outcome.

RESULTS: TTB symptom and contact screening was performed at a rate of >97% across the sites. C/ALHIV showed 4% average annualized prevalence rate of TB disease, with young CLHIV (< 5 years of age) having the highest risks of developing TB, followed by ALHIV (10-18 years of age). Those with normal/mild immune suppression were 58% less likely to have an unfavorable outcome compared to those with advanced immune suppression. Antiretroviral therapy (ART)-naïve patients who received ART within 2 months of TB diagnosis were 59% less likely to have an unfavorable outcome compared those starting ART after 2 months or 6 months preceding (OR = 0.41, $P < 0.0051$).

CONCLUSIONS: This analysis supports the need to promote policies/practices that fully integrate pediatric and adolescent TB/HIV care and treatment. Children under five and adolescents living with HIV show particular risk for TB, and early ART initiation mitigated this risk. Integration of TB screenings within HIV services affords an opportunity to promote early TB case detection and improved outcomes. Fully integrated TB/HIV care and treatment is effective and should be an adopted model of care for C/ALHIV.

TUPED645

Regional progress in achieving 75% reduction in AIDS-related TB deaths: Will we achieve the 2020 target?

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BACKGROUND: In 2016 Member States adopted the UN Political Declaration on HIV and AIDS, with a target of reducing TB deaths among people living with HIV (PLHIV) by 75% by 2020, compared to 2010. However, TB remained the leading cause of HIV deaths globally in 2017, and estimates only show a 41% reduction. Analysis of regional trends may help catalyse action.

METHODS: WHO regional estimates of the annual HIV-positive TB deaths from 2010-2017 were extracted from WHO's Global TB Database and data on ART scale-up were extracted from the UNAIDS-AIDSinfo database. Trends in high TB burden countries were reviewed to identify regional influencers. Data were analysed using descriptive statistics.

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RESULTS: The WHO African region (AFR) accounted for 252,000 (84%) of HIV-positive TB deaths globally in 2017, followed by South East Asia (SEAR) where 28,000 people died, (9%). The most impressive decrease is seen in SEAR with a 71% reduction, explained by India's 84% decrease. The Western Pacific region saw a 47% decrease, led by drops in Vietnam (73%) and Cambodia (68%). AFR saw a 36% drop driven by Kenya's 51% and South Africa's 31% reduction and 6 other high burden countries achieving over 50% reduction. In the Americas region (AMR/PAHO) deaths reduced by 9%, influenced by Brazil which saw a 24% reduction. Deaths in the European and Eastern Mediterranean (EMR) regions increased by 14% and 43%, attributable to increases in Russia and Pakistan. ART coverage in 2017 ranged from 18% in EMR to 66% in AMR/PAHO.

CONCLUSIONS: Regional burden and trends in HIV-associated TB mortality vary considerably. Global progress in meeting the UN target is shaped by progress in AFR but progress in most regions is inadequate. Aggressive scale-up of effective patient-centred prevention, early detection and treatment of HIV-associated TB with region-specific strategies is urgently needed to achieve the UN target globally.

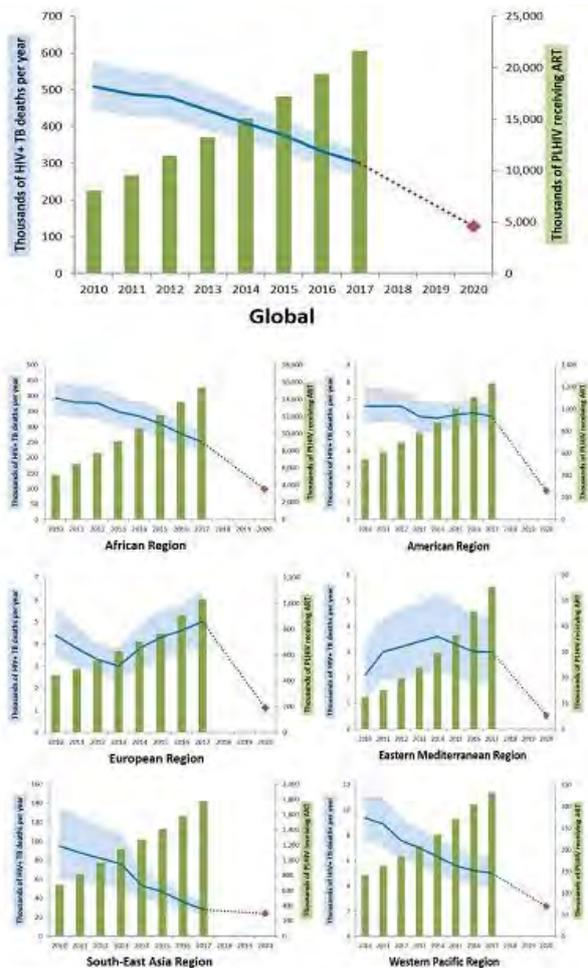


Figure 1 Trends in HIV+ TB deaths (2010-2017) and required trajectory to meet the 2020 UN declaration target (2018-2020) and numbers of PLHIV receiving ART (2010-2017)

Numbers of HIV+ TB deaths (2010-2017) are shown in blue, shaded areas represent uncertainty intervals. Red dotted lines represent required trajectory in HIV+ TB deaths to reach the 2020 target (red diamond) of 75% reduction compared with 2010. Number of PLHIV receiving ART are represented by green bars.

Regional data of PLHIV receiving ART are calculated based on data from 135 countries that gave approval to publish this data. 17 countries who only provided data for 2017 were also excluded.

[PLHIV on ART and HIV+ TB deaths (2010-2017) and required trajectory to meet the 2020 UN target]

Integration of HIV services with non-communicable disease programmes

TUPED646

Chronic HIV and Non-Communicable Diseases (NCD) care management in Uganda: An observation study to describe provision of basic services

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BACKGROUND: Africa faces a rising burden of NCD, alongside a high prevalence of HIV-infection. Health care for HIV-infection is available widely but systems for NCD are weak. We describe observations made during the implementation of a pilot study on integration of care for HIV and NCDs (Diabetes and Hypertension) in primary care health facilities in Uganda.

METHODS: Using facility assessment and observation guides, we compared the organisation of HIV care services and systems to those for NCD. We selected primary health facilities using the purposive sampling technique; 6 public and one (1) private facilities (The AIDS Support Organisation [TASO], a not-for-profit organisation). Of the public facilities, 3 were relatively large, health center (HC) IV led by a Medical Officer and providing in and out patient services, and the others were smaller HC III facilities providing outpatient and maternity services only. We conducted a thematic analysis of the observations made and identified common themes.

RESULTS: The larger facilities operated separate clinics for HIV and NCD management on different days. Smaller health facilities had dedicated HIV clinics but had no specific clinic for NCD patients, who were managed in a "general" outpatient clinic. Patients attending the HIV clinic had medical records but not patients with NCDs. Experienced patients supported health workers in the HIV clinic but were non-used for NCDs in any of the clinics. In the HIV clinics, all health workers and patients had access to reference and education materials on their desks and pinned on the walls but no such material was available in the NCD clinics. HIV drug supply was stable. NCD drugs were frequently reported out of stock; the 2 months' supply lasted only a month on less. HIV care teams appeared more knowledgeable and confident about HIV treatment guidelines. This was not the case for NCD care.

CONCLUSIONS: When compared to those of HIV, NCD management systems are weak and lacking some key elements for chronic care such as patient records. Drawing lessons from the HIV care systems used, simple improvements can be made as well as major deficiencies like drug supplies addressed for improved chronic care.

TUPED647

Community-based case finding for tuberculosis & HIV integrated with non-communicable diseases in KwaZulu-Natal, South Africa

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BACKGROUND: South Africa has a high burden of HIV and TB. Community-based Intensive Case Finding is a potential strategy for addressing the TB and HIV epidemics. Alcohol use is increasingly being recognized as a risk factor for acquiring HIV and tuberculosis. We sought to describe community-based case finding efforts at local shebeens integrating communicable and noncommunicable disease screening.

METHODS: From July-September 2018, an all-male community health worker team stationed outside shebeens offered health education, and engaged shebeen patrons for screening. HIV was tested using an RDT and confirmatory RDT. Participants that reported having any of these symptoms: coughing >2 weeks, blood-stained sputum, weight loss, night loss, fever, had sputum collected that was tested via GeneXpert. Hypertension was classified as systolic pressure greater than 140 mmHg and/or diastolic pressure greater than 90 mmHg.

RESULTS: Among 656 participants screened, 74% of the participants were male and the median age was 28 (IQR 21-39), and 73% were unemployed. The burden of HIV, symptoms for TB, hypertension, and hyperglycemia was found to be 10.4%, 13%, 18%, and 6% respectively. The mean age for those that were classified as hypertensive was 37.2 (IQR 34.1-40.3) and 71% of these hypertensive participants were male. Of those that were classified as hypertensive, 77.4% had no medical history of hypertension. Discordant couples had 10.1 (4.54, 22.36) times the odds of being HIV positive compared to those that did not have a partner that was HIV+. The mean length between HIV tests for incident HIV cases was 5.9 (4.4, 7.4) years compared to 1.9 (1.6, 2.0) years for those that tested negative.

CONCLUSIONS: Integrated HIV, TB, and noncommunicable disease screening in the community was feasible and of high yield. Community health workers can feasibly perform integrated screening for communicable and noncommunicable disease screening. A high burden of HIV, hypertension, hyperglycemia and TB symptoms were identified in this rural population.

TUPED648

Substance use services in HIV clinics: Data from the global leDEA consortium, 2014 and 2017

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BACKGROUND: Substance use is common among people living with HIV and associated with suboptimal HIV treatment outcomes. Integrating substance use services into HIV care is a strategy to improve both sets of outcomes. Little is known about the current availability or change of availability over time of substance use services across HIV clinics globally.

METHODS: We report on substance-use related patient education, screening, and referral practices from two waves of surveys among HIV treatment sites participating in the International epidemiology Databases to Evaluate AIDS (leDEA) consortium. Staff from 286 sites in 46 countries across Africa, Asia-Pacific, the Caribbean, Central and South America, and North America participated in the 2014 survey. Staff from 237 sites in 44 countries participated in the 2017 survey. We also compared changes in education, screening, and referral practices over time for 149 sites that participated in both surveys.

RESULTS: In both surveys, the majority of sites were in urban areas (n=104, 60% in 2014; n=158, 75% in 2017). In 2014, most sites (n=215, 75%) reported providing education on substance use behaviors or harm reduction on-site (at the HIV clinic or the same health facility), with half reporting on-site screening for alcohol or drug use disorder (n=148, 52%) or providing referrals for substance use treatment (n=146, 51%). In 2017,

84% (n=200) of sites reported providing on-site education, 68% (n=160) reported on-site screening for alcohol or drug use disorder, and 59% (n=139) reported providing referrals for substance use treatment (Table). Among sites participating in both surveys, on-site substance use screening was significantly more commonly reported in 2017 than 2014 (73% vs 63%, respectively, p=0.003)

	Central Africa n (%) n=19	East Africa n (%) n=58	Southern Africa n (%) n=38	West Africa n (%) n=14	Caribbean, Central and South America n (%) n=14	Asia-Pacific n (%) n=53	North America n (%) n=41	TOTAL N=(237) n (%)
On-site education on substance use behaviors and harm reduction practices	15 (79)	54 (93)	26 (68)	10 (71)	11 (79)	47 (89)	37 (90)	200 (84)
On-site screening for drug or alcohol use disorder	10 (53)	36 (62)	22 (58)	4 (29)	9 (64)	42 (79)	37 (90)	160 (68)
On-site referral for substance use treatment	8 (42)	29 (50)	18 (47)	4 (29)	6 (43)	41 (77)	33 (80)	139 (59)

[Availability of substance use services in in HIV clinic settings within the global leDEA consortium, overall and by geographic region, 2017]

CONCLUSIONS: Substantial gaps persist in the integration of substance use services into HIV care settings, particularly in relation to screening and referral. Greater investment into identifying and evaluating multi-level barriers and facilitators to care integration would lead to promising strategies to impact HIV program outcomes for people who use substances and improve the comprehensiveness of patient care.

Integration of HIV services with sexual and reproductive health and rights programmes

TUPED649

Modeling the cost-effectiveness of antenatal dual HIV/syphilis testing in Kenya

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BACKGROUND: Incorporating dual HIV/syphilis testing, using a single rapid test to test for both infections, into antenatal care may provide opportunities to move towards dual elimination of mother-to-child transmission (MTCT) of syphilis and HIV. We present here the public health and economic impact of dual testing in antenatal care in Kenya.

METHODS: We constructed a Markov decision-analytic cohort model for MTCT to assess the cost-effectiveness of using a dual HIV/syphilis rapid test in antenatal care in Kenya. Model parameters incorporate maternal HIV infection status and stage of seroconversion, pregnancy and postpartum status, maternal antiretroviral therapy (ART), infant antiretrovirals, viral suppression, syphilis prevalence, and receipt and timing of syphilis treatment. We estimated the potential impact of dual maternal testing versus independent tests for HIV (rapid tests) and syphilis (lab tests; RPR/TPHA) at the first antenatal care visit. We assumed syphilis testing coverage would increase from 73% under the independent testing model to 79% under the dual testing model; HIV test coverage was 79% under both models and incorporates test acceptance and stock-outs. Costs incorporate HIV testing costs, pediatric prophylaxis, and maternal treatment. Dual testing was considered cost-effective if the incremental cost-effectiveness ratio (ICER) is < \$500 per disability-adjusted life year (DALY) averted.

RESULTS: Assuming 1,601,353 pregnant women per year, more infants will have congenital syphilis under the independent testing approach (n=2090) than when a dual test is used (n=1658). Dual maternal testing would also avert an additional 833 infant deaths and 45,558 DALYs

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compared to independent testing. Dual testing was cost-saving, with \$15 saved per DALY averted and \$805 per infant death averted. Overall, 53,373 infant HIV infections will be averted under both the dual and independent maternal testing models.

CONCLUSIONS: Dual maternal HIV/syphilis testing is estimated to be cost-saving and likely to reduce the burden of congenital syphilis in Kenya. Since maternal HIV testing coverage was the same under independent and dual syphilis testing, dual testing averted the same number of infant HIV infections. Policy makers could consider incorporating dual testing into antenatal care in Kenya.

TUPED650

Evaluation of a dedicated postnatal contraception clinic for women living with HIV (WLWH): 5 years post-implementation

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BACKGROUND: Prevention of unplanned pregnancies is one of the WHO's four elements for perinatal HIV prevention. Selected studies suggest that 51-91% of pregnancies in women living with HIV (WLWH) are unplanned. The postnatal period is an opportune time for implementation of an effective contraceptive method. A dedicated postnatal contraception clinic (DPCC) was set up in July 2013 at our service and an initial review at two years found an increase in all contraception uptake with nearly a 50% increase in long-acting reversible contraception (LARC).

Aim: To evaluate the DPCC five and a half years following implementation to assess if this increase in uptake of contraception has been maintained
METHODS: Retrospective case note review of women attending an HIV antenatal clinic (ANC) in south London between January 2016 to December 2018. Data was obtained on planning of pregnancy, antenatal and postnatal advice on contraception and uptake of contraception methods, to be compared with a period prior to establishment of the clinic (September 2009 - July 2012) and after the establishment of the clinic (July 2013 - June 2015). Data was analysed with SPSS v16.

RESULTS: There were 94 pregnancies in 85 women. 77(91%) were of black ethnicity; median age 36 years; 69(81%) partner negative or of unknown HIV status; 29(34%) had a history of a termination of pregnancy. Of the pregnancies 48(51%) of pregnancies were unplanned. 74 of the 94 pregnancies had a live birth outcome at the hospital of which 58(74%) attended post-partum.

	Pre-intervention Sep 2009 - July 2012 (35 months)	Post-intervention July 2013 - June 2015 (24 months)	Jan 2016 - Dec 2018 (24 months)	p-value
Contraception discussion	60/140 (41%)	58/77 (75%)	60/74 (81%)	<0.0001
Uptake all contraception	44/123 (36%)	34/68 (50%)	45/58 (76%)	<0.0001
Uptake LARC	21/123 (17%)	22/68 (32%)	35/58 (60%)	<0.0001
Uptake IUD/IUS	11/123 (9%)	18/68 (26%)	27/58 (47%)	<0.0001

[Table .Comparison of contraception discussion and provision prior to setting up the clinic and two time periods following establishment of the clinic]

CONCLUSIONS: Women who attended the DPCC left with a contraceptive method, the majority (47%) with an intrauterine technique. This evaluation has demonstrated a sustained and significant increase in uptake of contraception. Just over 50% of pregnancies were unplanned; a dedicated service led by appropriately trained staff with an understanding of cART presents an excellent cost effective intervention to address contraception access and provision for WLWH.

TUPED651

Factors influencing potential adoption of PrEP services in title X-funded family planning clinics in the Southern United States

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BACKGROUND: PrEP is dramatically underutilized by women in the United States (US), particularly among women in the Southern US who are disproportionately affected by HIV. Improving PrEP access is a key component of increasing PrEP uptake among women. Publically-funded (e.g. Title X-funded) family planning (FP) clinics have been identified as potential PrEP delivery sites for women, yet few offer PrEP and little is known about how to increase PrEP delivery in these settings. We used an implementation science framework to assess factors that may influence adoption of PrEP services in Title X-funded FP clinics in the Southern US.

METHODS: We conducted a web-based, geographically-targeted survey from February-June 2018 among clinicians and administrators of Title X-funded clinics across 18 states that comprise the Southern US. Survey items were designed using the Consolidated Framework for Implementation Sciences Research (CFIR) to assess 20 constructs relevant to PrEP implementation. The primary outcome was the score on CFIR construct *Readiness for PrEP Implementation*. We used a multivariable linear mixed model to assess other CFIR constructs that influenced *Readiness for PrEP Implementation*, adjusting for respondent/clinic characteristics and regional sociodemographics from US census data.

RESULTS: Among 529 survey responses, 41% were physicians/advanced practice providers, 40% nurses/other medical staff, and 17% administrators. The majority worked in health departments (69%) or Federally Qualified Health Centers (11%). Only 109 (20%) reported currently providing PrEP in their clinics. Among 420 respondents who worked in clinics that were not providing PrEP, *Readiness for PrEP Implementation* was significantly associated with CFIR constructs *Available Resources*, *Implementation Climate*, and *Leadership Engagement* (all $p < 0.05$), but were not associated with PrEP knowledge and attitudes ($p = 0.33$).

CONCLUSIONS: Efforts to integrate PrEP into public FP services are urgently needed to improve PrEP delivery for women in the Southern US, a region heavily impacted by HIV. Our findings suggest that, in addition to addressing staff training needs, increasing PrEP services in Title X-funded FP clinics across the Southern US will require addressing resource concerns. This may positively impact implementation climate and engagement of clinic leadership to support PrEP delivery in these otherwise potentially ideal PrEP delivery sites for women.

TUPED652

Integrating family planning services into HIV care in Zambia: Baseline results

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BACKGROUND: Women living with HIV (WLHIV) in sub-Saharan Africa on average desire fewer children than HIV-negative women. An enhanced model of family planning and HIV (FP/HIV) service integration aimed at increasing uptake of effective contraception among WLHIV not desiring pregnancy is being implemented at six HIV clinics in Lusaka. This initial analysis presents demographic and FP uptake data among women attending these clinics prior to implementation of this enhanced model.

METHODS: From May-July 2018, 629 WLHIV were enrolled and interviewed about their fertility desires and contraceptive use. Information about their clinical status was abstracted from medical charts. Women

were classified as having an unmet FP need if they reported not wanting to get pregnant in the next two years and did not report current use of an effective contraceptive method. Multivariable logistic regression model, accounting for clustering by site, was used to identify factors associated with unmet FP need.

RESULTS: The majority of women were married (72%), had 3-5 children (50%), and were aged 35+ years (54%). Women had been on antiretroviral therapy for a median of 4.6 years (interquartile range=2.2, 8). One-third of women reported currently using an effective contraceptive method: injectables (14%), pills (10%), implants (5%), and intra-uterine devices (IUDs) (1%). Half of the participants reported condom use as a FP method, while 8% reported dual method use (condoms plus another effective method). Unmet FP need, reported by 38% of women, was associated with younger and older age [(15-19 years adjusted odds ratio [aOR]=12.1, 95% confidence interval [CI]=1.9-77.4); 40-49 years (aOR=3.2, 95% CI=1.6-6.5) compared to 25-29 years]; being divorced, separated or widowed [aOR=2.0, 95% CI=1.2-3.3] compared to married, and having ≥3 children compared to no children [aOR=4.8, 95% CI=1.3-18.2].

CONCLUSIONS: Results suggest a high unmet FP need among WLHIV in HIV care, particularly among younger (< 20 years) and older women (40-49 years). Dual method use was low, potentially placing WLHIV at risk for acquiring other sexually transmitted infections that could compromise their health and contribute to ongoing HIV transmission. These findings highlight the need to improve integration of FP/HIV services to improve WLHIV's access to effective contraception.

TUPED653

Effects of peer counseling intervention on access and use of sexual and reproductive health services in women living with HIV in Nepal: A prospective cohort study

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BACKGROUND: Women living with HIV experience inadequate access and treatment to sexual and reproductive health in resource-limited settings. Evidence is limited about the effects of peer counseling on access and use of contraceptive services, treatment of sexually transmitted infections, and unintended pregnancies in women with HIV. Therefore, this study aimed to examine the effect of HIV women led counseling to their peers on access and use of the sexual and reproductive health services in Nepal. **METHODS:** A prospective cohort study was performed among 630 HIV-positive women (Intervention: 315; Control: 315) of major six cities of Nepal between March and August 2018. Women were provided counseling on sexual and reproductive health problems and facility-based services. Women were interviewed using semi-structure questionnaires about access, barrier, stigma, and utilization of services. Generalized estimating equation examined the effects of intervention comparing with control groups after adjusting sociodemographic information.

RESULTS: Of 630 women living with HIV, 22.2% (n=140) reported to have Sexually Transmitted Infections. 46% (n=290) had felt stigma and 52% (n=328) women did not seek sexual and reproductive health services prior to the intervention. Women in the intervention had significantly lower level of stigma in accessing health facility compared to the control [Adjusted odds ratio (AOR): 2.8; 95% confidence interval (CI): 1.6-3.9]. Condom use during last sexual intercourse also significantly increased from baseline to at the end among women in intervention compared to control (AOR: 3.4; 95% CI: 2.1-5.3).

CONCLUSIONS: Counseling and support from HIV women peer was effective to reduce self-stigma and improve use of services for sexual transmitted infections and condom use. Access and utilization of services can be improved by providing tailor made training to peers. Existing health system services can be improved through the community-based peer counseling approaches integrating in existing health system.

TUPED654

Examining early postpartum uptake of contraceptives among women with HIV in the context of family planning and HIV services integration in South Africa

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BACKGROUND: Reproductive age women are heavily burdened with the HIV epidemic in South Africa. Integration of family planning and HIV services in the country was considered as a cost-effective strategy with potential to impact on unplanned pregnancy rate and elimination of mother-to-child transmission of HIV. However, the impact of this strategy on early post-partum utilisation of contraceptive methods remains unclear. This study examined early uptake of family services among parturient women living with HIV in the Eastern Cape, South Africa.

METHODS: Drawing from the baseline data of the multicentre, prospective cohort study which enrolled a total of 1709 HIV-infected mother/infant pairs in the Eastern Cape between 2015 and 2016, demographic, lifestyle behaviours, clinical characteristics and immediate postpartum contraceptive choices were analysed. Descriptive statistics and multinomial regression were used to determine prevalence of early contraceptive use and determinants of uptakes of short acting, long active and permanent contraceptive methods.

RESULTS: Nearly all the women (93%) received one form of contraception. The analysis shows that age, place of residence, educational status, employment, parity and abortion history were not significantly associated with early postpartum contraceptive utilisation. Caesarean section delivery [AOR:0.62; CI:0.41-0.94] and having more than two children [AOR: 0.54; 0.34-0.85] were associated with a lower likelihood of using short-acting contraceptive method while pre-conception awareness of HIV serostatus [AOR:2.91; CI: 1.48-5.72] and never used alcohol [AOR:1.57; CI:1.04-2.36] were associated with a higher likelihood of using short-acting contraceptive method. Caesarean section delivery [AOR: 7.59; CI: 3.95-14.59], and pre-conception awareness of HIV serostatus [AOR: 3.75; CI: 1.31-10.75] were significantly associated with a higher likelihood of using long-acting contraceptive method. Older Age (>30 years) [AOR:5.41; CI:2.63-11.10], Caesarean section delivery [AOR:5.41; CI:2.93-10.01], having more than two children [AOR:4.45; CI:2.32-8.55], ever terminated pregnancy [AOR:2.11; CI:1.05-4.25] and pre-conception awareness of HIV serostatus [AOR: 5.80; CI: 1.40-23.97] were significantly associated with a higher likelihood of permanent contraceptive method.

CONCLUSIONS: Integration of family planning services into HIV care has significantly improved access to early postpartum contraceptive among women living with HIV in the Eastern Cape, South Africa. Long-term follow up will elucidate on the postpartum contraceptive discontinuation and incidence of unplanned pregnancy in the cohort.

Integration of HIV services with other health programmes

TUPED655

Community intervention partners (CIPs), an innovative cost effective model to promote behavioral change among HIV positive drug abusers in Wakiso District, Uganda

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BACKGROUND: Globally, about 3.0 million (range 0.8-6.6 million) people who use drugs might be HIV positive (Mathers BM, Degenhardt L. et al). Illicit drugs who are also living with HIV are less likely to be accessing ART

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than non-drug users (Avert, 2016). Response and rehabilitation programs among HIV positive drug abusers are associated with better HIV treatment outcomes (Berg KM et al). In Wakiso district the prevalence of HIV among people who report use of illicit drugs is 7.5% (PHS data 2018) We describe a model, inventively used to provide low cost interpersonal rehabilitation services aimed at behavioral change among HIV positive drug abusers Wakiso district.

METHODS: Using the ecological model and social behavioral change theories, between March to December, 2018, we designed a community based drug rehabilitation program among peri-urban and urban communities. With support of local leaders, we selected 9 communally approved volunteers (CIPs) from the already existing structure of the Village Health Teams. The selected CIPs were taken through a 3 module training whereby each module was covered in 3 days to provide basic para counseling skills in the field HIV/AIDS and drug abuse. The CIPs would then schedule counseling therapy coupled with follow up in form of scheduled and un scheduled home visitations with a monthly transport facilitation of less than \$3. **RESULTS:** CIPs identified 45 drug abusers within walking distances from their areas of residence and enrolled them onto the program. Six (6) clients were HIV positive and were referred and started on HIV treatment. Within the intervention period, 73.3% (35) of the total clients enrolled, reduced their drug abuse patterns. The HIV positive drug users have all reduced their drug consumption.

	Kazo		Nansana		Total	Percentage (%)
	male	female	male	female		
Stagnation	3	0	5	0	8	17.7
Increment	1	0	2	1	4	8.8
Decrement	5	5	18	5	33	73.3
Total enrolled clients					45	100%

[The table above shows the status of the enrolled clients in the year 2017]

CONCLUSIONS: The CIPs' model is a cost effective. With a small number of volunteers yet within a short period of time, the program was able to reach out to a big number of HIV positive drug users with interpersonal counseling messages and improving their HIV treatment behaviors.

TUPED656

Implementation of integrated patient-centered care for women presenting late with advanced HIV disease in Nigeria

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BACKGROUND: Poor HIV treatment outcomes are being reported among increasing, vulnerable populations of women who present late with advanced HIV disease in Nigeria. HIV treatment outcomes for these women can be enhanced through cost-efficient, patient-centered care designed for their multiple health needs. The study evaluated integrated patient-centered care provided by HIV Programs, for women presenting late with advanced HIV disease in Nigeria.

METHODS: The cohort study was done in 10 randomly-selected HIV treatment facilities in Nigeria. Integrated Patient-Centered Care Model (IPCCM) was partially developed from the World Health Organization (WHO) Integrated People-Centered Care Plan. Healthcare workers (HCWs) were trained to implement IPCCM. Women (≥ 18 years), presenting with advanced HIV disease (CD4 cell count < 200 cells/mm³ or WHO Stage 3 or 4 event), were enrolled into IPCCM. Health education/self-care plans were provided for the women. Therapeutic goals were set collectively by HCWs and the women. Private-Public partnerships ensured provision of quality anti-retroviral, anti-bacterial and anti-hypertensive drugs to the women, without user fees. Safer/alternative drugs were provided for pregnant women and/or women experiencing severe Adverse Drug Reactions (ADRs). Women who were transferred out of the facilities were excluded from the study. Data obtained from Patients' Care Cards were utilized for pre- and post-intervention assessments of IPCCM, in November 2014 and November 2018 respectively. Chi-square was applied as inferential statistics; $P < 0.05$ indicated statistical significance.

RESULTS: Women ($n=2,267$), who presented with advanced HIV disease were 18-72 years; 51% of them were 29-39 years. The percentage of women who adhered to their anti-retroviral and other medications (missed ≤ 3 doses per month), increased from 40% pre-intervention, to 88% post-intervention. This was attributed to health education/self-care plans, and provision of safer/alternative medications as required. Percentage of women with CD4 cell counts ≥ 350 cells/mm³, increased from 0% (pre-intervention), to 62% (post-intervention). Percentages of women with normal blood pressure (120/80 mmHg), increased from 41% (pre-intervention) to 78% (post-intervention). Incidences of opportunistic infections decreased from 53% (pre-intervention) to 19% (post-intervention).

CONCLUSIONS: The Integrated Patient-Centered Care Model (IPCCM) significantly improved HIV treatment and overall health outcomes. It is recommended for women presenting late with advanced HIV disease in Nigeria and other resource-constrained settings.

TUPED657

In the aftermath of AIDS denialism era in South Africa: Perspectives and outcomes of integrated PMTCT services at primary health care level

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BACKGROUND: PMTCT reduces HIV transmission by more than 95% during pregnancy, labor, delivery and breastfeeding. In South Africa, PMTCT now integrated into the existing services at primary health care (PHC) level, played a tremendous to improve maternal health and reduce child mortality in the fight against AIDS. We explored the perspectives of health care leaders versus frontline health workers on PMTCT integration and outcomes at PHC in the aftermath of 1999-2008 AIDS denialism in South Africa.

METHODS: Convergent mixed methods and triangulation design were used. Two PMTCT related policy documents in Western Cape, a province with the first large PMTCT pilot site, were analysed and synthesized. Raw monthly data on PMTCT services from the Western Cape department of health of 2012 to 2017 were analyzed to complement policy documents analysis. 30 semi-structured interviews with HIV policy makers and researchers or the key informants (KI), the frontline health care professionals (FHCP) or clinic managers, nurses and midwives and HIV-infected women who delivered under PMTCT were conducted and analysed.

RESULTS: Policy documents have emphasised on comprehensive and integrated PHC including HIV counselling and testing, treatment initiation and PMTCT cascades, leading to successful implementation and huge reduction of mother-to-child transmission in the changing South African HIV landscape. Women who tested for HIV steadily increased every year [median of 738, interquartile range (IQR) = 220-1666] between 2014 and 2016. HIV positivity rate among pregnant women was reduced at 4.09% [95% interval confidence (CI): 4.07-4.12] by 2017 due to PMTCT integration. Having most of women delivering under PMTCT has also substantially reduced pediatric HIV. All the KI and FHCP agreed on the importance of integrated PMTCT services and attitudes change at PHC in the aftermath of AIDS denialism period. Women also expressed their satisfaction for integrated PMTCT services. Trained community health actors help to deal with few cases of loss to follow-up of women and their babies, through PCR testing and immunisation enforcement.

CONCLUSIONS: Policy and attitudes have improved but the shadow of AIDS denialism still affect the progress of PMTCT integration at PHC level in South Africa. These results will enhance the operationalisation of PMTCT integration at PHC.

TUPED658

Tracking integrated malnutrition and HIV outcomes: Cohort analysis of integrated service provision, Gweru district, Zimbabwe

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BACKGROUND: With a mother-to-child HIV transmission rate of 6.7% and 2.1% of children under five years in urgent need of therapeutic treatment for Severe Acute Malnutrition (SAM) in Zimbabwe, effective integration of HIV/TB and malnutrition services is a national priority. UNICEF and OPHID implemented a program to strengthen integrated services in 11 Districts of Zimbabwe.

Our objective was to trace uptake of integrated HIV/Nutrition services and treatment outcomes among children under 5 newly diagnosed with SAM and HIV

METHODS: We conducted a retrospective cohort analysis of all children under 5 years admitted to the Gweru Provincial Hospital malnutrition stabilising treatment centre for SAM treatment and/or diagnosed HIV positive from Jan-Oct 2018. Individual case review was conducted to document malnutrition screening, HIV testing, TB investigation and malnutrition services received and final outcome status. Data were entered into MS Excel and analysed descriptively to generate service cascades starting from HIV diagnosis and SAM treatment for children under 5.

RESULTS: From January-October 2018, a total of 40 children were admitted for SAM treatment and 35 children diagnosed HIV positive at Gweru Provincial Hospital (N=75). The majority were older than 12 months of age at the time of diagnosis (84%; 63/75). All children newly diagnosed with HIV were screened for malnutrition, and vice versa, with an HIV test yield among children with SAM of 5% (2/40), and diagnosis of malnutrition among 11.4% of HIV positive children (4/35). While 100% of children diagnosed with HIV were TB screened (one positive case identified); only 47.5% of children with SAM were screened for TB (19/40). Child death was documented in 4% (3/75) of children recently diagnosed with HIV or SAM at the time of data collection.

CONCLUSIONS: We document strong service integration and yields for diagnosis of co-morbidities among children under 5. Late HIV diagnosis and high mortality indicate missed opportunities for early diagnosis and treatment. While integration of TB screening was strong in HIV services, fewer than half of all children with SAM had documented TB screening. Future research is required to understand the interaction of social and biological risk factors for HIV, malnutrition and TB among young children.

TUPED659

Integrating health services provision - Improving HIV testing and treatment for children under five years referred to rural health facilities with severe acute malnutrition

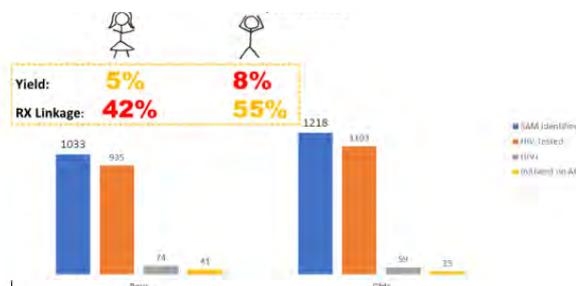
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BACKGROUND: With an HIV prevalence of 3.5% in children under five years, Zimbabwe is committed to the UNAIDS 90-90-90 targets. Children living with HIV being treated for severe acute malnutrition (SAM) have a significantly higher risk of dying than those uninfected. Yet the baseline revealed only 65% of children referred to rural health centre (RHC) with SAM were being tested for HIV and only 35% of those testing positive were being initiated on ARVs. Our UNICEF funded project in 11 districts of Zimbabwe focussed on integrating service provision for these vulnerable children.

METHODS: We provide an analysis of routine facility data at 253 health facilities in 11 Districts of Zimbabwe from January-September 2018. Age and sex disaggregated data on rates of SAM diagnosis, HIV tests and yields and treatment outcomes were entered MS Excel and analysed using StataV13, with chi-square tests for differences in proportion

RESULTS: Between January-September 2018, a total of 2251 children under 5 years were diagnosed with SAM. The percentage of children with SAM tested for HIV in the 11 districts increased from 65% to 90.5%. ART initiation rates among children testing positive increased from 35% to 50%. The prevalence of children with SAM living with HIV among those tested was 6.5%. While girls represented had a greater absolute number of SAM diagnoses and HIV tests, boys had a significantly higher HIV test yield than girls (8% vs/ 5% respectively, $p < 0.0001$)



[Gender disparities among children U-59 months with severe acute malnutrition January to September 2018]

CONCLUSIONS: Integration of health service provision reduced missed opportunities for HIV testing and treatment of HIV infected children with SAM. Testing rates and linkage to ART among HIV positive children under 5 improved, however, ART initiation rates remain suboptimal. Gender disparity in HIV test yields requires further research to better understand transmission timing and mode of transmission (antenatal, delivery, feeding practices) as to inform evidence-based EMTCT efforts in Zimbabwe.

TUPED660

Intervention to reduce the Cervical Cancer Screening Gap in women with HIV from the Condesa Iztapalapa Specialized Clinic in Mexico City

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BACKGROUND: Screening for cervical cancer in women with HIV is essential because they have a higher prevalence of HPV infection; if these women have CD4 < 200 cells, they increase their risk of developing Cancer by eight times more than those without HIV. The Condesa Iztapalapa Specialized Clinic in Mexico City provides care for people with HIV without social security; from November 2015 to February 2018, 267 women were integrated into the Clinic for their care and treatment, however, not all of them had been screened for Cervical Cancer, and therefore, the presence of lesions associated with HPV was unknown, as well as the proportion of women in this situation. A participatory action intervention was carried out within the Clinic with the aim of reducing the proportion of women who had never been screened for cervical cancer, initiating its follow-up and treatment, if required.

METHODS: During March-June 2018 period, women who had not attended the gynecology service of the Clinic and without screening for cervical cancer were identified. The nominal list of these women was shared only with key services of the Clinic such as social work, nursing, doctors' offices, and pharmacy, with the purpose that they were referred to priority screening at the moment of having contact with them.

RESULTS: By March 2018, 92% (n = 245) of the women remained with an active file at the Clinic. Of these, 18.4% (n = 45, average 39 years, range 18-70) had not attended the gynecology service nor had they been screened for cervical cancer. By June 2018, it was possible to link and screening to eighteen of these women, 44% of them had intraepithelial neoplasia grade 1, 19% grade 2 or 3, and the rest without alterations. The main reasons for not having been screened were: an embarrassment to be reviewed, lack of money to attend appointments, and fear of receiving an unsatisfactory diagnosis.

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CONCLUSIONS: In three months, the gap for women from the Clinic without screening for cervical cancer was reduced by 40%, initiating follow-up and treatment to twelve women with HPV-associated lesions.

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Integration of HIV services with other development programmes

TUPED661

Understanding the financial lives of female sex workers in Addis Ababa, Ethiopia: Implications for economic strengthening interventions for HIV prevention

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BACKGROUND: Many women's decisions about whether and how to participate in sex work are driven by financial considerations, yet HIV prevention interventions rarely consider the economic rationale or financial practices of female sex workers (FSWs) when designing programs for this group. Understanding the financial context of FSWs' lives is essential for providing programming that addresses relevant structural drivers of HIV.

METHODS: To inform development of a curriculum on economic strengthening for FSWs, we collected quantitative financial diary data from a stratified purposive sample (n=35) of FSWs in Addis Ababa, Ethiopia. Women kept financial diaries daily for six weeks, meeting each week with researchers to systematically discuss and record eight data points per financial transaction. Women also reported experiences of gender-based violence and condom use, to facilitate assessments of HIV-risks relative to financial status. At exit, women were qualitatively interviewed about their financial service needs. Data from financial diaries were descriptively analyzed in R, disaggregated by workplace. Exit interview data were coded and analyzed in NVivo.

RESULTS: All women reported sex work as their primary source of income, accounting for, on average, 85% of weekly income. Food, housing, and clothing represented the largest expenditures. Around 19% of expenses were reported as costs of sex work (e.g., chat/tobacco, alcohol, room rental). Street-based sex workers reported the least income but high condom use; bar/brothel-based sex workers reported the highest incomes and lowest level of consistent condom use. FSWs described saving money in their homes, formal accounts, or equibs (social savings). Qualitatively, FSWs described barriers to inclusion in the formal financial system, including banks and regulated markets, that prevented them from saving or starting new businesses to reduce or leave sex work. Women proposed peer-led financial literacy and savings activities to build their capacity to pursue new livelihoods.

CONCLUSIONS: Economic strengthening interventions have potential to lower FSWs' risks of HIV by lessening the financial drivers of sex work. Our findings offer a rare glimpse into the earning, spending, saving, and borrowing practices of FSWs, providing evidence on which to base decisions about how best to design and implement economic strengthening elements of HIV prevention for FSWs.

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HIV services for migrant and mobile populations

TUPED662

Mobile client driven DSD: Strategies employed to support continuity of HIV treatment among mobile clients

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BACKGROUND: Mobility is a known risk factor for disengagement from HIV care. There is need for evidence-based differentiated service delivery (DSD) models for mobile populations to support enhanced HIV service access and sustained ART.

Our objective was to document existing gaps and opportunities to provide differentiated client-centred HIV care in facilities providing HIV services to mobile clients in Zimbabwe.

METHODS: The assessment employed a mixed methods approach. A standardized questionnaire was administered to document healthcare worker perspectives on dynamics of HIV care and treatment among mobile populations. Seven Zimbabwean health facilities were purposively selected based on their location bordering with Botswana, Mozambique and South Africa. Routine patient data on service uptake from January 2017-September 2018 was abstracted. Data were entered into MS Excel and analysed using STATAv13. Qualitative data were analysed thematically.

RESULTS: We identify two dominant informal systems employed by mobile clients to obtain ART resupplies while travelling: 1) Use of Omalayitshas (cross-border transporters) and 2) Family Cross-Border Refill. Among 2507 clients attending HIV care at cross border facilities from Jan17-Sept18, men had a greater overall proportion of antiretroviral (ARV) collection by a treatment supporter or relative (25%;172/701) as compared to women (23%; 372/1597), though this difference was not significant. The median age of those accessing ART refills through a treatment supporter was significantly higher (40yrs; IQR:38-41yrs) years as compared to those collecting their medications in person (35yrs; IQR:32-37) years.

The average amount of ARVs dispensed to clients with medications collected by a treatment supporter was 167 pills/per month (approx.6 months). Among clients for which the past 4 pickups were done by a treatment supporter, 99% (510/515) were past due for viral load monitoring.

CONCLUSIONS: With increasing numbers of clients on lifelong ART, tailored differentiated service delivery strategies for mobile clients require standardization, including guidance on eligibility, client follow-up, and documentation procedures. Priority program actions include need to ensure timely treatment monitoring for VL-based determination of continued eligibility for DSD among mobile clients. Future research to understand the HIV care and treatment needs and preferences of mobile clients is required.

TUPED663

Increased rate of antiretroviral-resistance associated mutations in Human Immunodeficiency Virus infecting Mexicans with a background of stay in a foreign country

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BACKGROUND: Migrants are less likely to be fully adherent to antiretroviral treatment (ART) and face multiple barriers for accessing health services and ART, compared with non-migrants. We hypothesize that HIV-infected Mexicans with a background of stay in a foreign country (M) have a higher rate of viral variants harboring drug-resistance associated

mutations (RAM) versus HIV-infected Mexicans without such an antecedent (non-M). The aim of this study was to compare the prevalence of RAM in the reverse transcriptase and protease viral genes between 2 groups of ART-experienced individuals: M and non-M.

METHODS: This was a cross-sectional study in which viral genotypic resistance tests obtained from 336 HIV-infected Mexican patients throughout the country were analyzed for the presence of nucleos(t)ide reverse transcriptase inhibitors and protease inhibitors (PI)-RAM. The rate of RAM was compared between two groups according to their migratory BACKGROUND: 84 Mexicans who had lived at least 3 months in the U.S.A. (M group; cases) and 252 without this background (non-M group; controls). Each case was matched with three controls according to time on ART. We used multivariate logistic regressions to estimate the association of ≥ 3 thymidine analogue associated mutations (TAM), ≥ 3 PI-major RAM, and ≥ 3 darunavir (DRV)-RAM with M versus non-MI status, adjusting for potential confounders. The enrollment period of the study sample was from November 5, 2008, to March 28, 2018.

RESULTS: It was more likely to find ≥ 3 PI-major RAM [aOR=2.07; 95% CI=1.00-4.30; $p < 0.05$] and ≥ 3 DRV-RAM [aOR=6.53; 95% CI=2.67-15.96; $p < 0.05$] in M compared with non-MI. The result was independent of age, gender, time of HIV-infection diagnosis, number of prior ART regimens, level of viremia, and T-CD4+ blood cell count. No association was found with TAM.

CONCLUSIONS: Migration background seems to be correlated with an increase in the emergence of HIV variants harboring RAM compromising the antiviral efficacy of several viral protease inhibitors. Lack of consistency in the use of these drugs may explain this phenomenon, leading to the urgent need to implement actions aimed at regular health care and uninterrupted access to ART throughout the entire migratory process.

Integration of prevention interventions with care/treatment

TUPED664

Factors associated with increased social deprivation among older people living with HIV (PLHIV)

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BACKGROUND: While getting older, PLHIV accumulate health problems, such as comorbidities, altered physical, psycho-social and mental health functioning. We have assessed prevalence of social deprivation and its relationship with HIV and other health indicators in older PLHIV.

METHODS: During 2013-2014, we have conducted an 18-months multicenter cross-sectional study focusing on PLHIV ≥ 50 years old, followed-up in HIV-dedicated hospital units. Social deprivation was measured with the EPICES score (ES). ES explores material and social conditions, from 11 binary questions and ranks the individuals in five classes, from the least deprived (Q1) to the most deprived (Q5). Others data were collected from electronic medical records, self-administered questionnaires or measured using physical tests. Logistic multinomial regression analysis was performed to determine the variables associated to deprivation.

RESULTS: A total of 494 PLHIV ≥ 50 -years old were included, 72.9% male, and a quarter in the AIDS stage. Last CD4/mm³ were 653 \pm 324 and the great majority had an undetectable viral load. Two-thirds had ≥ 2 comorbidities. Prevalences of frailty and social deprivation (Q4 and Q5) were 8.3% and 49.0%, respectively. The most deprived (Q5) majority reported that they didn't own their home, were in real financial difficulty and didn't see a social worker. The independent predictors of highest social deprivation (Q5) were: risk of depression (OR: 14.0, 95%CI: 4.9-39.8), alcohol

consumption (OR: 3.3, 95%CI: 1.1-10.4), have ≥ 2 comorbidities (OR: 2.7, 95%CI: 1.2-5.9), be a woman (OR: 2.6, 95%CI: 1.1-6.6) and smoke tobacco (OR: 2.5, 95%CI: 1.1-5.9). Depression was observed transversely from Q3 to Q5 ($p < 0.05$), with a progressive increase in OR, and the number of comorbidities for Q2, Q4 and Q5 ($p < 0.05$). Social deprivation was not related to HIV status.

CONCLUSIONS: Despite a well-controlled HIV infection, older PLHIV experience high levels of social deprivation, worsened in particular by depression, multiple comorbidities and smoking. As some of these factors emerge before the deprivation stage and can affect the QOL and effectiveness of medical care, it seems essential to assess and prevent deprivation more routinely and to provide psychosocial support as soon as possible, as part of a comprehensive care pathway, especially for women and those who use alcohol and tobacco.

TUPED665

The prevalence of current alcohol use and risky drinking among patients receiving antiretroviral therapy in Dar es Salaam, Tanzania

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BACKGROUND: Risky alcohol use is a significant public health problem responsible for 6% of global morbidity and mortality. Alcohol use is a structural driver of HIV transmission and poor prognosis. We report on the prevalence of alcohol use and risky drinking among patients on antiretroviral therapy (ART) who enrolled into a randomized pragmatic trial in Dar es Salaam, Tanzania.

METHODS: We analyzed the data of 771 ART patients in 48 healthcare facilities in Dar es Salaam between March 2016 and January 2017. Patients responded to the AUDIT-C screening questionnaire. We computed the proportion of current alcohol use (monthly alcohol consumption or less) and report the median and interquartile range (IQR) of the AUDIT-C score for male and females, and the proportion of risky drinking (AUDIT-C score > 4). We used logistic regression to determine factors associated with current alcohol use.

RESULTS: 636 females and 135 males responded to AUDIT-C alcohol screening questionnaire. Overall, 242 (31.4%) patients (190 (29.9%) females, and 52 (38.5%) males) reported current alcohol use. 11.5% of patients reported to consume alcohol 2-4 times monthly. The median AUDIT-C score was 2 (IQR: 1 - 4) among all patients and 2 (IQR: 1 - 4) among females and 3 (IQR: 2 - 5) among males. Overall, AUDIT-C categorized 22.7% of patients reporting current alcohol use as risky drinkers. Current alcohol use was **not** associated with HIV viral load suppression

CONCLUSIONS: Current alcohol use is common among patients receiving ART in Dar es Salaam, Tanzania. Nearly a quarter of current alcohol users reported risky drinking and therefore these findings call for urgent interventions to address harmful drinking among current alcohol users.

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22 July**Cross-collaborations: governmental/non-governmental and local/regional/national**

TUPED666

Community advisory boards role in accelerating optimal HIV treatmentS. Mustafa^{1,2,3}, Optimal ARV Group¹Muslim Men Living with HIV, Health, Eldoret, Kenya, ²Academic Model for Prevention and Treatment of HIV, Health, Eldoret, Kenya, ³Eldo Community Advisory Board, Health, Eldoret, Kenya

BACKGROUND: Despite the significant progress made in the past decade to increase access in HIV care, accelerating availability of new optimal HIV treatment options is major priority for the global HIV community. There is need to accelerate access for patients in low and middle income countries to new products that are tolerable, accessible, available and easy to take.

METHODS: An Optimal ARV community advisory board with membership from the ten sub counties in Eldoret was constituted, represented by three persons that include-youths, women and men. Making a total of 30 members.

They were to train the community the importance of adherence and why need to have an optimized HIV treatment in Sub Sahara Africa now than ever. They were also to engage with policy makers that will change the enable a switch from the previous regimens in stock to placing orders to new optimal ARVs in Market. Advocacy was done with scientific backing by the board members from all level starting from the ministry of Health, development partners, policy makers to the community. Latest data on new optimal antiretroviral were shared on social media more than one million Kenyans living of affected with HIV.

RESULTS: Under the Academic Model for Prevention and Treatment of HIV, twenty seven thousand (27,000) patients who were on 3TC/NVP/TDF are now switched to 3TC/TDF/DTG, including more than five thousand (5,000) women.

The facility has less defaulters since many are now happy for the once a day dose, with less pills. Health of many patients on Dolutegravir based regimens have greatly improved due to rapid viral suppression. The facilities are not over worked compared to few years back, resulting to increased follow ups.

CONCLUSIONS: Dolutegravir the standard of care drug in many developing Nations poised to transform the ARV market in low and middle income countries.

The community advisory boards are a vital link between the global HIV community and the community of people living with HIV, they advocating for optimal HIV treatment, they create demand for optimal products available and drive uptake towards improved quality of life of people living with HIV in low and middle income countries thus contributing to the global target to reduce the burden of HIV and AIDS deaths.

TUPED667

The grantees as catalysts for collaborative governance in HIV/AIDS care and treatment in the U.S.: The EMAs' experienceJ. Agbodzakey

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BACKGROUND: The enactment of the Ryan White Comprehensive AIDS Resources Emergency Act in 1990 enables establishment of HIV/AIDS Health Services Planning Councils in areas disproportionately impacted termed Eligible Metropolitan Areas (EMAs) to provide care and treatment to those infected and affected. These Councils use collaborative governance with Grantees who are usually designated public servants in a local government bureaucracy in each EMA serving as key facilitators of multi-stakeholder engagements to foster various category of services to target populations.

This research focuses on efforts of Grantees in the twenty-four (24) EMAs across the U.S. (including Puerto Rico) to relate their contributions to care and treatment to target populations over the years.

METHODS: This ongoing study uses qualitative methodology, specifically extensive review of documents and interviews of Grantees, Health Services Planning Council Members and Staff across all 24 EMAs in the U.S. Documents such as allocation priorities, comprehensive plans, integrated plans, needs assessment reports, minutes on each EMA are reviewed for evidence of Grantees contributions in collaborative governance for care and treatment. The interviews consist of seventy-two (72) participants (3 per EMA) for in-depth perspectives on the work of the Grantees. The data is subjected to analysis of categories and themes in compliance with qualitative research expectations for interpretation purposes.

RESULTS: This preliminary results which is based mostly on review of documents suggest the Grantees are essential to meeting core and support services category mandates for care and treatment, building and sustaining collaborative capacity of the Councils, ensuring compliance to service delivery standards, facilitating strategic engagement of cross sector agencies/organizations, steering local systems response to federal care and treatment mandates in outputs, outcomes, and impact terms.

CONCLUSIONS: The findings highlight the catalytic role of these Grantees in HIV/AIDS care and treatment across the U.S. as it relates to the efforts of all EMAs within the context of national and strategic response to the epidemic. The fairly acceptable success of U.S. government's response as exemplified by the number of People Living with AIDS (PLWA) on treatment and the attendant viral suppression is partly attributed to the relentless efforts of these Grantees at the various EMAs.

Feasibility and acceptability of emerging technologies

TUPED668

Leveraging a novel HIV/Syphilis Duo assay to increase diagnoses among female sex workers at drop-in centres in CameroonA. Rao¹, A. Bowring², I. Mfochive Njindam^{2,3}, G. Fako³, J. Bennett¹, J. Dje Bi Irie⁴, F. Ndonko⁴, G. Fouda⁴, C. Angumua⁴, S. Georges⁴, D. Levitt⁵, U. Tamoufe⁶, S. Billong⁶, A.-C. Bissek⁷, O. Njoga⁸, S. Baral¹¹Johns Hopkins Bloomberg School of Public Health, Epidemiology, Baltimore, United States, ²Johns Hopkins Bloomberg School of Public Health, Epidemiology, Yaounde, Cameroon, ³Metabiota, Yaounde, Cameroon, ⁴CARE Cameroon, Yaounde, Cameroon, ⁵CARE USA, New York, United States, ⁶Groupe Technique Central (CNLS), Yaounde, Cameroon, ⁷Ministry of Health - Cameroon, Department of Operational Research, Yaounde, Cameroon, ⁸Yaounde University Hospital Center, Department of Internal Medicine, Yaounde, Cameroon

BACKGROUND: In resource-limited, high-HIV burden settings, HIV testing is often provided through community-based settings. Despite shared risks for syphilis, syphilis testing is often limited due to complexity and costs of accurate diagnosis. Given high pregnancy rates among female sex workers (FSW) in Cameroon and the high burden of both HIV and syphilis, this USAID- and PEPFAR- supported LINKAGES project aimed to evaluate the utility of a rapid HIV/syphilis test to support additional diagnoses among FSW at a community-based drop-in center (DIC) in Yaounde.

METHODS: Between 02/18-04/18, 400 FSW indicated to receive HIV testing at the DIC were tested for HIV and syphilis using SD Bioline HIV/Syphilis Duo tests. Active syphilis was defined as a positive HIV/Syphilis Duo result, a positive confirmatory treponemal test, and no history of treated syphilis. Participants completed a sociobehavioral questionnaire covering demographics, sexual practices, and testing history.

RESULTS: In total, 32(8%) FSW were diagnosed with HIV, 14(3.5%) were newly diagnosed with active syphilis, including 1 co-infected with HIV, and 11(2.8%) confirmed managed cases of syphilis. Main reasons for testing included engaging in higher-risk behavior (80/400) and as part of regular testing (171/400). Overall 331(83%) women reported STI symptoms in the past 12 months, with over 35% going untreated. Participants testing positive for syphilis were older ($p < 0.001$) and less likely to have future pregnancy intentions ($p < 0.001$). Notably, there were no differences by age in testing and treatment history. 24(6%) participants being currently pregnant, one of them being newly diagnosed with HIV.

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CONCLUSIONS: While the majority of FSW reported STI symptoms, many had gone untreated even in the context of high pregnancy intentions. Given ongoing occupational risks, more regular syphilis testing may help detect infections earlier and have the potential to mitigate both vertical transmission of HIV and congenital syphilis. Considering limited health resources in Cameroon and challenges accessing marginalized populations, these data suggest the utility of a single rapid test to assess for both syphilis and HIV to facilitate linkages to sexual and reproductive health services.

Indicator	18-24 years old n=146	25-34 years old n=155	35+ years old n=99
HIV	4.8%	8.5%	12.1%
Active Syphilis	0.0%	1.3%	12.1%
Previously managed Syphilis	0.0%	1.3%	9.1%
Pregnancy intentions	97.3%	86.2%	36.5%

All significantly different by age at the $p < 0.001$ level

[Age-stratified prevalence of HIV, syphilis, and pregnancy intentions among FSW seeking HIV testing at a drop-in center in Yaoundé Cameroon]

TUPED669

Uptake and performance of blood-based self-testing versus oral fluid-based self-testing in Blantyre district, Malawi

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BACKGROUND: HIV self-testing (HIVST) can use either blood-based (BB) or oral fluid (OF) tests. Previous studies have shown strong preferences for self-testing compared to facility-based services. To date, HIVST has largely used OF self-tests, but with quality-assured BB kits now available, we investigated uptake and performance of OF and BB self-tests in Malawi.

METHODS: Individuals (age ≥ 16) with unknown HIV status seeking HIV testing were enrolled from primary care facilities in Blantyre district. Participants were offered HIV testing through provider-delivered testing at a facility or HIVST using OF self-test (OraQuick HIV Self-Test) or BB self-test (INSTI HIV Self-Test). Those opting for HIVST received the kit of their choice and a brief pre-test demonstration (INSTI ~5-8 minutes, OraQuick ~2 mins). Following home HIVST, self-testers returned to report their result and receive confirmatory testing using the national testing algorithm (Determine HIV-1/2, Uni-Gold). Sensitivity and specificity was calculated using the national algorithm as the reference standard.

RESULTS: 713 participants were enrolled in this study. Given the choice, 98.6% (703/713) participants selected HIVST over provider-delivered testing. Of 703 opting for HIVST, 278 (39.5%) chose INSTI, 425 (60.5%) chose OraQuick, and 97.4% returned to report their results. Preference for OraQuick among self-testers was more marked in rural (227/350, 64.9%) than urban (199/353, 56.4%) participants, $p=0.021$.

Among 275 reporting INSTI results, 12 (4.4%) were HIV-positive. INSTI had sensitivity of 100% (95%CI: 75.3-100%) and specificity of 99.6% (95%CI: 97.8-100%), with 15 (5.5%) invalid results. Among 410 reporting OraQuick results 13 (3.2%) were HIV-positive. OraQuick had sensitivity of 100% (95%CI: 75.3-100%) and specificity of 100% (95%CI: 99.1-100%), with no invalid results.

HIVST sensitivity and specificity did not significantly differ by site, however invalids with INSTI (rural: 9/123, 7.3% vs urban: 6/154, 3.9%) were more common in rural participants.

CONCLUSIONS: Offering both BB and OF self-tests resulted in high uptake compared with provider-delivered testing. Both self-tests achieved a high degree of accuracy in the hands of rural and urban users provided with a pre-test demonstration before HIVST at home. More work is needed to reduce the rate of invalid results with BB self-tests.

TUPED670

"Knowing One's Truth" - user and non-user experiences with HIV self-testing in Kenya: A qualitative study

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BACKGROUND: HIV self-tests (HIVST) were introduced to the Kenya private sector in early 2018. We conducted qualitative research with users and non-users of HIVST kits after product launch to better understand HIVST awareness, user experiences, and barriers to uptake.

METHODS: We conducted in-depth interviews (IDIs) and focus group discussions (FGDs) with consumers, including users and non-users of HIVST, as well as healthcare providers selling and not selling HIVST kits in Nairobi and Mombasa counties where selling of the kits was introduced. Consumers included adolescents 15-19 and adults ages 20-49. Consumer recruitment was done in the community using a snowball sampling approach. Respondents were interviewed by trained research assistants using a semi-structured interview guide. Data were analyzed using thematic analysis with phenomenology.

RESULTS: We conducted 44 interviews (32 IDIs and 12 FGDs) with consumers and 20 IDIs with providers. Interviews were split evenly between Nairobi and Mombasa. Relative to research done during the pre-launch period, awareness of HIVST was high among all respondent groups. Most of those who reported knowing of HIVST had heard of the kits on traditional television or radio stations, as well as the internet or by word of mouth. However, while awareness was high, inaccuracies and misconceptions about the tests still abound-this was also reported in the pre-launch research. This was especially true for non-users, adolescents, and young people (all groups targeted for self-testing). HIV risk perception was also notably low among these populations. The oral-fluid test was preferred by adolescents and women, whereas most older users expressed preferences for the blood-based kit. Among all groups, HIVST was seen as providing a sense of privacy, control, and empowerment for those who wanted to know their HIV status. However, cost was consistently seen as a major barrier to uptake of the kits.

CONCLUSIONS: Awareness of HIVST is growing in Kenya, though efforts to combat misinformation and misconceptions about the tests are still needed. Tools which support users in performing the tests, interpreting the results, and linking to preventive care or treatment after testing are needed which still ensure the benefits of HIVST, namely increased privacy, confidentiality, convenience, and autonomy.

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Index HIV self-testing among male partners in Malawi: Predictors of self-testing within a randomized controlled trial

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BACKGROUND: Men are underrepresented in HIV services. We conducted a randomized trial in Malawi to test the impact of index HIV self-testing (HIVST) compared to standard partner referral slips, whereby HIV-positive clients delivered either HIVST or referral slips to their partners. Index HIVST increased testing among men (66% versus 22%), with 26% HIV-positivity rate. However, male partners were less likely to test than female partners (88%; AOR:3.9; p-value:0.01). It is critical to identify characteristics of men who do not engage in innovative HIV services. We use trial survey data to assess predictors of HIVST use among male partners.

METHODS: ART clients in three high-burden hospitals were randomized to HIVST or referral slip arms. Inclusion criteria were: ART client; ³15 years of age; partner with unknown HIV-status; no interpersonal-violence; and partner living within catchment-area. Clients and a subset of partners completed baseline/follow-up surveys. Data were collected between March-June 2018. Female ART clients and their male partners randomized to HIVST were included in this analysis. Multivariate regressions were conducted for predictors of HIVST distribution by female ART clients and use of HIVST by male partners, adjusting for age and site.

RESULTS: 209 female clients were randomized to HIVST and 204 completed baseline/follow-up surveys. Median age was 34 years, 81% were married, and 92% disclosed to their partner. ART clients who were married (AOR:7.8, p-value:< 0.001), frequently talked to their partner (AOR:19.1, p-value:< 0.001), disclosed their HIV status (AOR:33.6, p-value:< 0.001), and made joint decisions regarding health services (AOR:6.2, p-value:0.02) were more likely to distribute HIVST to their male partners. Male partners who made joint decisions regarding health services (AOR:5.9, p-value:0.02) and used condoms within the prior 6-months (AOR:2.4, p-value:0.09) were more likely to use HIVST. Among male partners who completed a survey, (n=110/209; median age 39 years), men who perceived themselves at high-risk of HIV (AOR:0.3; p-value:0.03) were less likely to use HIVST.

CONCLUSIONS: Male partners in stable relationships, open communication, and joint decision-making were more likely to use HIVST. Additional strategies are needed for men in unstable and gender inequitable relationships, such as couples counseling, mass media campaigns, and home visits.

TUPED672

Complexity outside the box: Challenges faced by HIV rapid diagnostic tests in a non-profit testing program in Mexico

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BACKGROUND: Since 2004, Aids Healthcare Foundation (AHF) Mexico has conducted an HIV testing program (HTP) with HIV rapid diagnostic tests (HIVRDTs) as its cornerstone. In 2018, AHF Mexico and its allied NGOs alone did over 1200 diagnoses. Yet, even though HIVRDTs have extended the reach of diagnosis, numerous shortcomings remain. This paper aims to characterize the challenges that RDT-based HTPs face before, during, and after their implementation.

METHODS: This qualitative study was carried out from July to December 2017 to address the complexities and difficulties of HIV testing in 7 Mexican cities (Oaxaca, Pinotepa Nacional, Tijuana, Monterrey, Saltillo, Poza Rica, and Xalapa. Sampling was theoretical (n= 38) and included 15 gay or bisexual MSM, 7 non-self-identified as gay or bisexual MSM, 8 heterosexual men and 8 trans-women. 24 of them (63.16%) were HIV+. 11 were sex workers. Participant observation (PO) was carried out at HIV testing services (HTS) in non-clinical settings and at an HIV mobile clinic. Retrospective analysis was done in Atlas ti.8.

RESULTS: For men interviewed, HIV, as a condition moralized along the lines of a misogynistic understanding of sexuality, entailed a risk of social degradation that exceeded that of death. HIV RDTs not only diagnosed HIV; they diagnosed a failed masculinity as well. PO at HTS in non-clinical settings foregrounded complex logistical and relational infrastructures involved in RDTs' implementation. Interviews and PO at the HIV mobile clinic showed that, after diagnosis, people living with HIV (PLHIV) depend upon material and relational infrastructure built by a public-private partnership to receive anti-retroviral therapy and achieve and maintain viral load suppression.

CONCLUSIONS: While successful in meeting HIV diagnoses goals, RDT-based HTPs are far from being a perfect solution. Their simplicity breaks down in practice.

The real strength of RDT-based testing programs lies in their ability to build solid relations between, governments, international agencies, local organizations, and people involved in the HIV experience.

This does not suggest that RDTs must be abandoned, but that successful HIV diagnosis and care require as much investment in general health infrastructure as it does in new technologies.

TUPED673

Acceptability of Cepheid Xpert HIV-1 Qual assay (Xpert HIV) in early infant diagnosis

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BACKGROUND: There is an urgent need to improve uptake and completion of life saving early infant diagnosis (EID) among HIV infected infants in worst affected countries. In Malawi, 40,000 infants each year are exposed to HIV infection; however, 2-3 month turnaround times (TAT) arising from paucity of reference centres and the processing of dried blood spots (DBS), mean that 33% of those who test are lost to follow up hence need to explore point-of-care testing (POCT).

We investigated acceptability of POCT Cepheid Xpert HIV-1 Qual assay (Xpert HIV) whole blood (WB) protocol which uses 100ul of venous or capillary blood, run by laboratory technicians.

Objectives: To explore perceived barriers, enablers, motivations and acceptability of uptake of this novel POCT among caregivers and healthcare workers in Mulanje District Hospital, Malawi.

METHODS: Sixty in-depth interviews were conducted and recorded with female caregivers who brought their children for review in children's out-patients-department and 5 nurses. Caregivers were consecutively selected. Thematic approach was used to analyse data.

RESULTS: Caregivers motivation to access HIV testing services for their infants were diverse and included perceived risk due to exposure through an HIV-infected parent, carers or friends and validation of caregiver's own HIV sero-status through infants' results. Xpert HIV was accepted by both caregivers and healthcare providers because of quick results TAT, subsequent prospect of early treatment initiation and reduced number hospital visits and associated costs.

Half of the caregivers had no concerns regarding the blood taking process as they felt overall this benefitted their child's health however a minority of caregivers expressed worry when drawing blood samples stating that it was a painful procedure (6/60) while others (5/60) voiced concerns about the quantity of blood sample drawn from their small babies (1 ml). Caregivers and healthcare workers felt Xpert HIV WB should be scaled-up nationally because of its potential to break down barriers to access such testing by reducing the costs and distances caregivers need to travel.

CONCLUSIONS: Xpert HIV WB protocol has the potential to substantially improve EID and linkage to care. Our study suggests that its use is acceptable to both caregivers and healthcare providers in Malawi.

Scale up of viral load monitoring

TUPED674

Uptake and utilization of viral load test results for improved patient management in selected facilities in Central Uganda

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BACKGROUND: The achievement of the global treatment goals to help end of the AIDS epidemic by 2020 necessitates virologic suppression in 90% of the people receiving ART. In an effort to achieve this goal, In 2014 Uganda undertook Viral Load (VL) monitoring for all patients on antiretroviral therapy (ART) for at least 6 months in all health facilities that provide ART. There is limited information on the use of VL results. The study assessed the uptake and use of VL results for improved patient management in selected facilities in central Uganda.

METHODS: This was a retrospective cohort analysis of data abstracted from records of HIV infected patients on ART between September 2017 and April 2018 at 14 health facilities in 3 districts of the central region of Uganda. Uptake and utilization of VL results for improved patient management was determined by computing the following: (i) the proportion of clients who received a VL test; (ii) the proportion of non-suppressing (NS) patients who received the 1st intensive adherence counseling (IAC) within one month of receipt of results, (iii) the proportion of NS patients who completed IAC and (iii) the proportion of NS patients who had a repeat VL test after completion of IAC.

RESULTS: A total of 4,112 records of HIV infected patients were reviewed. The proportion eligible clients who received a VL test were only 1,675 (40.7%). Of these, 844 (50.4%) did not suppress. The proportion of NS clients who initiated IAC within one month of receipt of results was 289 (34.2%). Only 190 (22.5%) clients completed IAC and only 104 (12.3%) clients received a repeat VL test after completing IAC.

CONCLUSIONS: The findings of this study show that the uptake of VL testing and use of VL result for improved patient management is very low. Designing interventions to increase uptake of VL monitoring and use of VL test results for improved patient management should be made a priority. A cascade for VL monitoring could be adopted which will help to achieve the 4th 90-90-90 target "Quality of life". VL cascade will facilitate the scaling up of VL monitoring.

Scale up of point-of-care technologies

TUPED675

Low invalid rates observed with point-of-care CD4 testing in decentralized high HIV burden settings

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BACKGROUND: Point-of-care (POC) CD4 testing platforms have been introduced in both urban and rural settings to expand access to testing since 2010. We conducted a study of routinely collected CD4 testing data to determine the rate of invalid results associated with POC CD4 testing.

METHODS: We analyzed 1,294,638 CD4 testing records collected by 1,094 Alere Pima™ Analyzers between January 2011 and December 2016 across five countries (Cameroon, Ethiopia, Mozambique, Uganda, and Zimbabwe) in sub-Saharan Africa. Routinely collected data and programmatic records were used to determine the rate of invalid test results per month, by facility type, and by operator based on cumulative usage during the study period. In addition, frequency of invalid result types and utilization of control beads for internal control (IQC) were assessed. Quantile regressions with bootstrap standard errors for clustering effect of facilities within each country were applied and implemented using the R `quantreg` package.

RESULTS: 75,530 invalid results were yielded, resulting in an overall invalid rate of 7.70% (95% CI: 7.65 - 7.75%). The rate of invalid results by country ranged from 7.2% to 11.2%. Invalid rates were consistent across facility types and years and were inversely correlated with operator usage: over 70% of operators ran less than 50 tests each over the study period (n=58,307) yet had an invalid rate of 10.2% (95% CI: 10.0 - 10.5%), while high volume operators (>500 tests over study period) conducted 58.8% of tests (n=536,186) and had an invalid result rate of 5.5% (95% CI: 5.4 - 5.5%). Finally, control beads IQC were run on 74.7% of days on which a CD4 test was run.

CONCLUSIONS: Decentralization of POC CD4 testing to peripheral level health facilities, often performed by non-laboratory staff, did not compromise testing quality as invalid rates were relatively low. In fact, invalid rates were lower when conducted by high volume operators suggesting that consistent utilization improves assay performance. High quality POC CD4 testing, particularly to quickly identify patients with advanced HIV disease for follow-up testing and care, can be achieved in decentralized national testing programs. Adequate training, quality assurance, routine monitoring, and ongoing mentorship should be also be implemented for success.

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TUPED676

Feasibility of point-of-care viral load testing in postpartum HIV-positive women in South Africa: Interim results

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BACKGROUND: Elevated maternal viral load (VL) increases HIV transmission risk for infants during breastfeeding. Although VL testing should be done 6-monthly post-partum, feedback and action of results are frequently delayed. We describe early results from a non-blinded randomised controlled trial in Johannesburg comparing point-of-care (POC) testing (arm 2), to standard-of-care (SOC) laboratory-based VL testing (arm 1) in HIV-positive post-partum women on first-line antiretroviral treatment.

METHODS: Data from the enrolment visit (infant 6, 10, or 14 week clinic visit) was included for 150 mothers and 143 infants enrolled between 4 July 2018 and 23 October 2018. Using the Cepheid GeneXpert IV POC device, trained nurse clinicians and field workers conducted POC HIV-VL in arm 2 women and POC HIV-Qual infant polymerase chain reaction (PCR) testing in arm 1 and 2. Patient demographics, laboratory, and clinical data were captured in REDCap and analysed using STATA 13.1. Chi-square test was used for categorical and t-test for continuous variables.

RESULTS: There were no statistically significant differences in demographic and clinical characteristics between women in arm 1 and arm 2 at enrolment. Median infant age at enrolment was 10 weeks (IQR: 6.4-10.3). 39 (26%) women had previous VL available, 97% were virally suppressed (VL < 1000 copies/ml). At enrolment, 16 (10.7%) women had a VL ≥1000 copies/ml. 100% women in arm 2 received POC VL results on the same day as study visit. The median time for VL results available and returned to the mother was 2 days (IQR 2-4) and 45.5 days (IQR: 17-103) in arm 1. In arm 1, two women had appropriate management within one month and three were not contactable. In arm 2, one woman was not contactable to return for a repeat VL. All 143 enrolled infants tested POC PCR negative; 100% received POC PCR results on the same day as study visit.

CONCLUSIONS: Findings to date show that POC VL testing in postpartum women, conducted by field workers and nurses, is possible with same day results allowing immediate and tailored clinical management of HIV in maternal populations. This may reduce challenges experienced with feedback of laboratory-based results to the patient.

TUPED677

The acceptability of introducing rapid tests for HIV and sexually transmitted infections in the real-world: A systematic review of qualitative research

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BACKGROUND: The past decade has seen major advances in rapid diagnostic tests for HIV and syphilis, including dual tests, tests for recent infections as well as molecular tests for chlamydia, gonorrhoea and trichomonas, all of which can be performed to a high degree of accuracy by

trained health service staff. However, despite these advances, rapid tests during pregnancy have not been optimally adopted. We systematically synthesised qualitative evaluations of the acceptability of rapid tests for HIV and STIs among pregnant women, health workers and stakeholders, to inform strategies to better integrate HIV and STI POC testing.

METHODS: We searched six databases from 2004 to 2018, using PRISMA guidelines. Data were extracted from the direct quotes from participants. We used a deductive approach and applied an adopted comprehensive theoretical framework of acceptability, which assesses attitude, perceived understanding and usefulness, and modulating factors of implementing POC testing.

RESULTS: We identified a total of 3548 citations from 7 databases, of which 31 papers were eligible for inclusion (29 were from low-middle income countries, 2 high-income countries). The selected studies included 737 pregnant women, 802 health professionals and 84 stakeholders. Pregnant women were satisfied with their experience when they had a rapid test and believed a rapid test improved their health care. Conversely, women revealed the stigma associated with HIV and STIs which impeded them coming forward for a test on time and undertaking subsequent treatment. Health professionals found rapid tests easy to use and were able to incorporate them into their routine work, but key barriers included insufficient personnel, supply chain gaps and inadequate training. Stakeholders had concerns regarding funding, the accuracy, easy of use and the additional training that may be required to support the introduction of more complex tests.

CONCLUSIONS: The different issues expressed by the groups involved in the antenatal testing pathway indicate that a range of stakeholders need to be involved in the interventions to improve the mother-to-child transmission (MTCT) cascade of care, and initiatives may need to be multifaceted.

TUPED678

Acceptability of point-of-care viral load testing to facilitate differentiated HIV care: A qualitative study amongst people living with HIV and healthcare workers in South Africa

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BACKGROUND: HIV viral load (VL) testing remains a challenge in low and middle-income countries where antiretroviral therapy (ART) is expanding rapidly for people living with HIV (PLHIV). Point-of-care (POC) VL testing may improve the quality and efficiency of services, including differentiated models of care for PLHIV. We aimed to assess the acceptability of POC VL testing within a differentiated HIV care model that involved task-shifting from professional nurses to less highly trained enrolled nurses.

METHODS: We undertook a qualitative sub-study amongst PLHIV on ART and healthcare workers from the STREAM study, a randomized controlled trial of POC VL testing and task-shifting in Durban, South Africa. We conducted 33 semi-structured in-depth interviews (IDIs) with both PLHIV and healthcare providers and 4 focus group discussions (FGDs) with PLHIV. IDIs and FGDs were audio recorded, transcribed, translated and thematically analysed using NVIVO software.

RESULTS: Amongst 55 PLHIV on ART (median age 31, 56% women) and 8 healthcare workers (median age 39, 75% women), POC VL testing and task-shifting to enrolled nurses were acceptable. POC VL testing yielded practical benefits for PLHIV by reducing the number of clinic visits, saving time, travel costs and days off work. Receiving same-day POC VL results

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encouraged adherence amongst PLHIV, through enabling them to see immediately if they were 'good' or 'bad' adherers and enabled quick referrals to other differentiated care models involving community-based ART delivery at pharmacies and collection points for those with viral suppression. However, there was some concern regarding the impact of POC VL on clinic flows when implemented in busy public-sector clinics. With regards to task-shifting to enrolled nurses, healthcare workers felt that, with extra training, enrolled nurses could help decongest healthcare facilities by quickly issuing ART to stable PLHIV. PLHIV could not easily distinguish enrolled nurses from professional nurses, rather highlighting the importance of friendliness, respect, and good communication between PLHIV and healthcare providers.

CONCLUSIONS: We found that POC VL testing combined with task-shifting to enrolled nurses was acceptable to PLHIV and healthcare providers. Implementation of POC VL testing and task shifting within differentiated care models may help achieve the UNAIDS 90-90-90 targets.

TUPED679

Availability of HIV point-of-care diagnostic tests in rural Ghana's primary healthcare clinics: An audit of inventory management

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BACKGROUND: Compliance to inventory management guidelines for HIV-related diagnostics at all levels of the supply chain system is critical to meet demand and supply. To evaluate the availability of HIV POC diagnostic tests and causes of tests stock-outs in rural Ghana's primary healthcare (PHC) clinics, we conducted an audit of the inventory management for HIV POC diagnostic services in rural Upper East Region's (UER) PHC clinics.

METHODS: We assessed the availability and stock levels of HIV-related POC diagnostic tests in 100 PHC clinics in UER, from February to March 2018. We used an audit tool adopted from Management Science for Health guidelines for supply chain management of diagnostics for compliance. We determined a clinic's compliance with the stipulated guidelines, and a composite compliant score was defined as a percentage rating of 90 to 100%. We used logistic regression analysis in Stata 14 to determine the association between HIV POC test stock-out and the inventory management variables.

RESULTS: Of the 100 PHC clinics, HIV rapid test kits were available in 83% of the clinics. The mean HIV test kits stock level was 88 test kits (standard deviation SD) ±102). The composite compliant score of inventory management by the PHC clinics was 53.5% (95%CI: 49.5%-57.5%). Of the 17 PHC clinics, which recorded complete stock-out of HIV test on the day of the audit, 64.7% (11/17) were not aware of their current stock levels, 23.5% (4/17) associated it to the previous day's high clinic attendance, and 11.8% (2/17) had expired test kits. Inventory management components independently associated with complete stock-out of HIV test in the PHC clinics were lack of documentation of expiry date for test kits, no documentation of inventory level, no documentation of unexplained losses, and failure to monitor minimum and maximum stock level with all ($p < 0.05$).

CONCLUSIONS: There is poor inventory management of HIV POC diagnostic tests in UER's PHC clinics. We recommend an improvement of monitoring and supervision visits to PHC clinics by the district health authorities. An electronic connectivity to monitor HIV test stock levels may be beneficial to sustain HIV POC testing services in the UER.

National financing initiatives and country ownership

TUPED680

Economic analyses of hepatitis C responses: Charting the paths, costing the steps

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BACKGROUND: The hepatitis C virus (HCV) epidemic affects nearly 70 million individuals, 2.75 million of whom are estimated to be co-infected with HIV. In 2016, WHO member states agreed to a resolution that targets HCV elimination by 2030. However, the step from political commitments to corresponding policy implementation can be slowed by fiscal concerns. Economic analyses can reduce uncertainty related to the health system's capacity to scale up HCV services and/or the size of budget needs by providing a fiscal map for program aims.

To illustrate their value, Coalition PLUS has developed a guide explaining how economic analyses can identify and measure an elimination path in a step-by-step fashion that is tailored to a specific country's epidemiological and health system landscape.

METHODS: Coalition PLUS has developed a guide to understanding the key concepts and usefulness of HCV economic evaluations. The guide draws from selected economic analyses of HCV interventions in India, Indonesia, and Morocco. In reviewing these analyses, key themes were extracted to provide an overview document on HCV economic evaluations that would be accessible to a diverse audience of stakeholders that includes government officials, policy leaders, donors, and civil society.

RESULTS: The guide demonstrates that there are consistent themes that emerge from HCV economic analyses. These themes include: 1) the price of HCV treatment represents a principal cost driver and price reductions offer the potential for significant savings; 2) economic evaluations can facilitate programmatic planning, identify investment needed for capacity reinforcement, and provide corresponding visibility on resource allocation if targets are to be reached; 3) the strategic prioritization of populations at high risk of HCV (e.g. PWID)—many of whom face elevated risk of HIV infection or are PLHIV—can deliver greater efficiencies and health impact than HCV responses that do not prioritize such groups.

CONCLUSIONS: The HCV-specific guide aims to demonstrate the key concepts and uses of economic evaluations examining per-unit efficiency of interventions and fiscal/health impact of scaled-up responses. In highlighting HCV-specific factors shaping the costs and health impact of HCV program responses, the guide illustrates how economic evaluations can help policymakers navigate programmatic and fiscal considerations of a HCV response.

TUPED681

The journey to self-reliance: Sustainable economic empowerment in Namibia

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BACKGROUND: Namibia has a generalized HIV epidemic, with 12.6% of adults 15-64 years living with HIV (NAMPHIA 2017). The Ministry of Gender Equality and Child Welfare (MGECW) 2018, estimated that HIV contributes to 400,000 Orphans and Vulnerable Children (OVC) nationally. Social and Economic asset building has a protective effect for OVC and Adolescent Girls and Young Women (AGYW). The MGECW implemented cash Maintenance and Foster Care Grants to help OVC meet basic needs. However, access to the grants was difficult due to low awareness, lack of national identity documents and delays in approvals.

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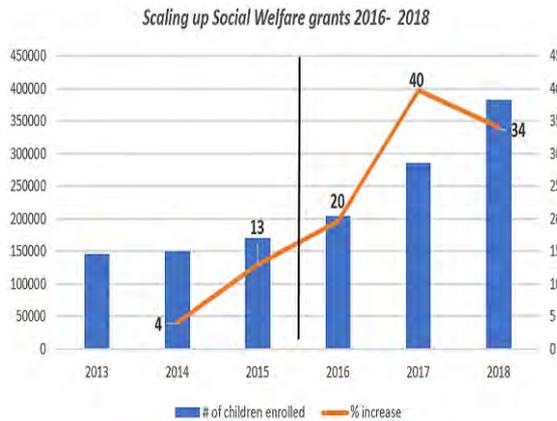
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METHODS: MGECW partnered with Project HOPE Namibia (PHN) with support from PEPFAR/ USAID to accelerate registration of OVCs on state grants and linkage to social asset building programs. The MGECW recruited 41 Child Care Workers (CCWs) to fast-track the registration of OVC on grants nationally. Eligible children were identified, and caregivers were guided on how to apply for the grants. Approved beneficiaries received monthly grants to cover basic needs such as food, education and health. Beneficiaries were also enrolled in Community based OVC programs implemented by Community Health Workers. Caregivers received parenting, Economic strengthening and health interventions.

RESULTS: Introduction of Child Care Workers reduced grant processing time from one year to three months. Grants coverage increased from 170,816 children in 2015 to 382,556 in 2018 exceeding the target of 125,000 children by 69%.

Analysis of 6,457 grant beneficiaries showed that 91% children aged 5-17 years were enrolled in school with 85% progression and 91% know their HIV status.

CONCLUSIONS: Partnership between PEPFAR/USAID, PHN and the MGECW has helped to place 382,556 children on welfare grants, the equivalent of US\$ 83,571,214.29 annually. A highly sustainable initiative in which PEPFAR/USAID leverage significant host country resources. Social and economic protection for OVC and AGYW has the potential to reduce vulnerability of children.



[Figure 1. Scaling up Social Welfare Grants in Namibia, 2016-2018]

TUPED682

Implementation of WHO plant to use integrase inhibitors in first-line HIV treatment: Middle-income setting experience

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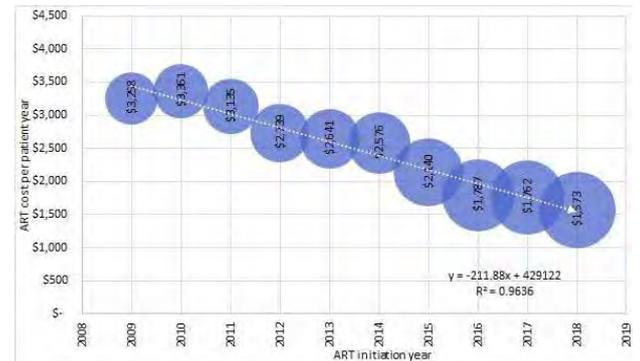
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BACKGROUND: Given the documented high PDR prevalence in Mexico, INSTI-based regimens have been included in the Mexican ART Guidelines as part of the preferred first-line ART options. The use of INSTI has been an alternative option for initiating treatment in Mexico since 2015. The objective of this study was to evaluate the economic impact of this intervention on the average annual cost of treatment initiation per patient.

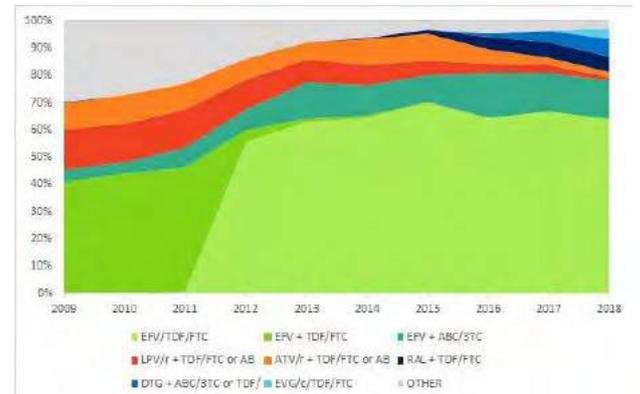
METHODS: We performed a cross-sectional analysis of 119,509 adult patients living with HIV, who initiated ART between 2009 and 2018, and who were registered at Mexico's "Antiretroviral Management, Logistic and Surveillance System" (SALVAR in Spanish).

RESULTS: An increase of 11% per year was observed in the number of people living with HIV who started antiretroviral treatment between 2009 and 2018, as well as an average decrease in the annual cost of starting ARV treatment of 5% per year. These important savings allowed in 2018 to start treating 112% more people with HIV than in 2009, and initiate with integrase inhibitors to 16% of adult patients, with only an increase of 2% of the resource required in 2009.

CONCLUSIONS: It was possible to maintain a decreasing trend in the average cost of starting ARV treatment, despite the expansion of the use of integrase inhibitors.



[Average cost of initial ARV treatment per year of initiation]



[Distribution of ARV drugs per year of initiation]

Transitional financing

TUPED683

Sustainability of mHealth interventions: Patients' preferences and willingness to pay user fees for mHealth ART adherence support tool in resource limited setting

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BACKGROUND: Increasing mobile phone penetration in Africa offers unique opportunities for mobile Health (mhealth) interventions. However, sustained scale-up of mHealth has not yet been achieved. Within a randomized controlled trial, we assessed participants' willingness to pay a fee for Call for life Uganda (C4LU) ART treatment support, a mobile-phone based pill reminder, appointment reminder and health tips tool.

METHODS: We randomized 600 participants (1:1 ratio) at an urban and peri-urban HIV clinic to either Standard of Care (SOC- face-to-face counsellor adherence support) or SOC plus C4LU. C4LU uses Interactive voice response or text messages delivered via MoTech™ based Connect for Life technology™, developed by Janssen the pharmaceutical company of Johnson & Johnson. At study visits 18 and 24 months, participants

were interviewed about desire to continue with adherence support and willingness to pay a fee for C4LU. The objective for the interviews was to assess sustainability of mHealth. Frequencies and odds ratio with 95% confidence level were calculated.

RESULTS: Of 600, 503(83.83%) were interviewed (89 did not complete study, 8 did not attend interview); 245(81.67%) on C4LU and 258(86.00%) on SOC arm. Overall, 478/503 (95.03%) wanted continued adherence support and 375 (74.45%) were willing to pay a fee. On the C4LU arm, 240 (97.96%) wanted to continue and 168/240 (70.00%) were willing to pay. On SOC arm, 238 (92.22%) wanted continued adherence support, and 157(65.97%) were willing to pay for C4LU. Persons living receiving care from a peri-urban clinic (OR 3.12, 95% CI 1.43-9.11.86) and those in the C4LU arm (OR 4.2, 95% CI 1.55-11.84) were more willing to continue and pay. Willing to continue or pay was not associated with education level, employment, ART duration, gender, age or marital status.

CONCLUSIONS: Willing to continue and pay for C4LU services were high especially in those with experience on C4LU. The increased need for adherence support at the peri-urban centre may be due to differences in care at the sites. Willingness to pay offers an opportunity for scale-up and sustainability of mHealth interventions in RLS.

TUPED684

Willingness to accept/willingness to pay ratios of prevention of mother-to-child transmission services in a Nigerian hospital: A cross-sectional contingent valuation study

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BACKGROUND: Prevention of mother-to-child transmission (PMTCT) services are provided at no cost to patients in Nigeria. With the global economic crisis affecting healthcare funding, the norm may not be sustainable. This contingent valuation study determined the willingness to accept (WTA), willingness to pay (WTP) and WTA/WTP ratios of PMTCT services in a Nigerian hospital.

METHODS: This was a cross-sectional questionnaire-based study conducted at Enugu State University Teaching Hospital in 2017. All 104 eligible adult (>18years) HIV-positive women who had never paid for any component of the services participated in the study. The questionnaire measured their WTP and WTA for primary prevention of HIV, prevention of unintended pregnancy in HIV-positive women, follow-up treatment and support, therapeutic interventions around delivery, PMTCT drugs and specialized clinical pharmacy services. Questions were posed using Naira (N) (\$1=N250, at the time of the study). Descriptive statistics were used to summarize the variables, while Chi-Square test and Pearson Correlation determined the association between patients' socioeconomic characteristics and their WTP and WTA responses. WTA/WTP ratios were determined by dividing WTA amounts by their respective WTP amounts. Income effects were determined by subtracting WTA/WTP ratios from 1. Income elasticity of demand coefficients were determined as ratios of changes in income to changes in the proportion of patients.

RESULTS: The mean amounts of WTA and WTP for primary prevention of HIV was N543,000 and N18,600 respectively, with income elasticity coefficients 0-2.8. Its WTA/WTP ratio and approximate income effect were 29.19 and -28.19 respectively. Similar results were obtained for other services. The following variables were associated with WTP for some services: level of education with PMTCT follow-up treatment and support ($p=0.046$), trimester of pregnancy with primary prevention of HIV ($p=0.002$), correspondent's residence with specialized clinical pharmacy services ($p=0.003$), and time spent to reach facility with primary prevention of HIV ($p=0.002$).

CONCLUSIONS: Majority of the respondents were willing to pay for the measured PMTCT services, with very few willing to accept compensation to forgo same. Their mean exact WTP and WTA amounts were highest for primary prevention of HIV. All services had large WTA/WTP ratios and income effects, but income inelastic.

Leveraging HIV funding to strengthen health systems beyond HIV programmes

TUPED685

Health systems effects of strengthening human resource for HIV service delivery in pre-service training institutions: Experience from a government-NGO-donor collaboration in Nigeria

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BACKGROUND: The pre-service training curricula for health workers in Nigeria is limited in scope in terms of HIV management, this hinders the delivery of comprehensive HIV services. Most of the tutors assessed had limited capacity to teach HIV management. Many pre-service schools had provisional or lost accreditation statuses. The project, funded by PEPFAR and implemented by Center for Integrated Health programs supported review and updates of comprehensive HIV management in the curricula of; 6 schools of nursing (SON), 5 schools of Midwifery (SOM) and 6 Colleges of Health technology (COHT) in 7 states of Nigeria.

METHODS: We collaborated with the Nursing and Midwifery Council of Nigeria and Community Health Practitioners Registration Board of Nigeria to review and update the HIV management component of their respective curricula. Through stakeholders' engagements and review meetings, we revised the HIV management curricula and developed a tutors' guide alongside training manuals. Revised curricula were used in training tutors in an initial training of trainers and students through a mix of didactics on HIV management, e-learning platforms and a mandatory 2 week practicum in a PEPFAR supported HIV treatment health facility. We supplied teaching aids, computers, resources on HIV management and conducted minor infrastructural upgrades of lecture rooms.

RESULTS: From 2012 to 2016, a total of 2,331 students were trained on comprehensive HIV management: 1,025 (44%) from COHT; 780 (33.5%) from SON and 526 (22.5%) from SOM. Fifty four percent (660) of the first 1,244 graduates were employed and providing HIV related services within one year of graduation. 76% and 24% of the schools achieved provisional and full accreditation statuses respectively; compared to 59% with provisional accreditation and 41% with lost accreditation at baseline. Average performance at the national council examinations for the 3 schools all improved post intervention: 65% to 83% (SOM); 67% to 88% (SON) and 51% to 84% (COHT).

CONCLUSIONS: Institutionalization of HIV management in pre-service trainings enhanced new health providers' capacity in the provision of HIV care and could limit need for initial in-service trainings. The intervention also likely improved the students' overall performances in qualification exams and enhanced accreditation statuses of the study institutions.

Political economy of HIV

TUPED686

HIV funding in the Republic of Congo: Assessment of free care

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BACKGROUND: The year 2007 was the year of the announcement of free care for PLHIV in the Republic of Congo. Since the implementation of this health policy, no economic evaluation has been carried out to establish the average cost per patient / year of treatment. The lack of mastery of this cost is one of the causes of the repeated breaks in antiretrovirals and laboratory inputs and makes a significant part of the health expenditure related to the treatment of HIV still to be borne by HIV + patients. In turn,

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they are faced with the expenses which the ability to cope with is less obvious over time, especially in this context of major economic crisis. This present will contribute to strengthening the effectiveness of HIV funding policies.

METHODS: this is a cross-sectional and descriptive study conducted between May and November 2018 in 52 patients consulting CTA Brazzaville. The variables studied focused on the epidemiological, clinical, biological, psychological and monetary aspects. The data has been analyzed by the software Epi info 7. The monetary unit is the US dollar.

RESULTS: The average age of patients is 41.71 ± 10.08 years. At the initiation of treatment, 69% of our patients benefited on average from a complete biological assessment. However, they were 34/52 or 64.5% have achieved their balance sheet at the twelfth month of treatment according to the guidelines in force. Each patient received an average of 8.9 medical consultations and a psychological consultation. Biological monitoring was the component with the greatest burden, ie \$ 140.15 representing 53.30% of the cost covered by free medical treatment (\$ 262.95), followed by medication (\$ 108.74). The average overall cost of patient care at CTA is \$ 328.5 per year and 20% of this cost or \$ 65.55 remains the responsibility of patients.

CONCLUSIONS: The results of our study show that despite the efforts made by public authorities to take PLHIV free of charge, an important part of the order of 20% remains the responsibility of patients.

Keywords: Funding, HIV, care, free.

Innovative financing mechanisms (e-financing, partnerships, etc.)

TUPED687

Transitioning from international funding to domestic health financing to support key population-led health services in Thailand: The Songkhla model

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BACKGROUND: The key population-led health services (KPLHS) model has proven to be one key strategy for ending HIV in Thailand. The USAID- and PEPFAR-funded LINKAGES Thailand project has built the capacities of members of key populations (KPs) to provide HIV-related services as part of KPLHS in Bangkok, Chonburi, Chiang Mai, and Songkhla since 2015. It has also financially supported the delivery of these services by KP lay providers to men who have sex with men and transgender women during the same period. A significant decrease in international HIV funding to Thailand, an upper-middle income country, will soon be unavoidable. It is, therefore, critical for the country to seriously prepare for the transition from international aid to full domestic funding to support KPLHS.

METHODS: KPLHS operates the reach-recruit-test-treat-prevent-retain cascade according to national strategies for ending HIV. In 2017, the National Health Security Office (NHSO) allocated 200 million Thai Baht to directly fund community-based organizations (CBOs) who performed reach-recruit-retain. However, this funding did not cover these CBOs' test-treat-prevent activities. In 2017-2018, advocacy meetings among central and regional NHSO and Department of Disease Control offices, government hospitals, academia, and CBOs were conducted. These meetings sought to create mutual understanding of the need for KPLHS to end HIV, ensure KPLHS quality, and establish formal professional relationships between CBOs and government hospitals.

RESULTS: In May 2018, Hat Yai Hospital signed a memorandum of understanding with the Rainbow Sky Association of Thailand (RSAT) in Songkhla to allow RSAT to deliver HIV testing to populations the hospital considered

hard to reach. NHSO reimbursed RSAT's HIV testing costs through Hat Yai Hospital. From 2018 to 2019, the amount of NHSO funding commitment to RSAT Songkhla has increased significantly from US\$80,700 (in FY2018) to US\$130,900 (in FY2019).

CONCLUSIONS: The Songkhla model successfully established a domestic financing mechanism to cover the testing component of the reach-recruit-test-treat-prevent-retain cascade, which could be replicated. Efforts are ongoing to identify additional financing mechanisms and address regulatory barriers to allow domestic funding of the treat-prevent components of the cascade to fully and sustainably finance KPLHS in Thailand.

TUPED688

Pay-it-forward integrated HIV/STD testing for men who have sex men: A mixed methods pragmatic study

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BACKGROUND: One major challenge in low-and-middle income country settings is transitioning from internationally funded to domestically funded HIV and STD testing programs that are integrated with local health systems. We developed an innovative financing mechanism for men who have sex with men (MSM) to receive chlamydia/gonorrhea dual testing supported by a pay-it-forward strategy. In pay-it-forward, each participant was told that they could receive a free chlamydia/gonorrhea test donated from previous participants and could then choose to donate any amount toward testing for future participants. We implemented the pay-it-forward program at two HIV/syphilis testing sites run by MSM community-based organizations (CBOs). The purpose of this mixed methods study is to examine facilitators and barriers of a pay-it-forward financing mechanism.

METHODS: We collected survey data on socio-demographics and conducted descriptive and multivariate regression analyses of the pay-it-forward donation amount. We also conducted twelve semi-structured interviews with men who received pay-it-forward testing and donated various amounts (range: 0-150 RMB). Interviews were transcribed and coded drawing on Grounded Theory.

RESULTS: A total of 204 men were offered pay-it-forward chlamydia/gonorrhea testing. 109 (54.3%, 109/204) men received testing and 97 (89.0%, 97/109) donated money to future participants' testing (mean 64.84 RMB, SD 56.92 RMB). Facilitators of pay-it-forward included (1) flexible donation amounts, (2) bundled testing services, and (3) trusted CBO settings.

In multivariate analyses, higher pay-it-forward donations were associated with greater self-reported income (aOR = 6.34, 95% CI = 1.46-27.52). In interviews, participants felt that pay-it-forward was well-integrated into existing HIV testing pathways, making it convenient and acceptable to test for other STIs. Participants also pointed to trusted community-based sites as an important facilitator of credibility. Barriers to pay-it-forward included difficulty understanding the pay-it-forward model and limited prior knowledge of gonorrhea and chlamydia, which was only partially mitigated by study staff's introduction. The availability of free HIV/syphilis testing at the same site did not appear to be a barrier to the pay-it-forward testing for gonorrhea and chlamydia.

CONCLUSIONS: The pay-it-forward program was facilitated by flexible donation amounts, bundled testing, and trusted CBO settings. This model may be useful for financing part of HIV/STD service integration.

TUPED689

Increasing the efficiency and cost-effectiveness of HIV community outreach through pay-for-performance

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BACKGROUND: As in other developing economies, international funding for HIV has rapidly decreased in Vietnam in recent years. It is essential for the country to maximize the efficiency and cost-effectiveness of its HIV services, including outreach and prevention. A pay-for-performance (P4P) model in HIV community outreach has been piloted since 2013. This analysis investigates the effectiveness of P4P versus the extant model, which relied on fixed salaries for outreach workers by comparing unit cost (e.g. funding required to reach, counsel, and persuade a key population (KP) member to access HIV testing and counseling (HTC)) - as well as overall outreach and prevention performance under the two schemes.

METHODS: We compared expenditures and outreach service performance in Dien Bien province and Ho Chi Minh City for the year during which the traditional model was last used (October 2012 to September 2013) versus all available data on performance of the P4P scheme (October 2013 to September 2017). Analysis was carried out from the service providers' perspective.

RESULTS: In its first year, the unit cost to reach and successfully refer a KP to HTC under the P4P model was similar to or below that of the traditional model. Unit costs under P4P declined significantly and remained stable from the second year of implementation. The mean unit cost per KP reached by P4P was almost 50% lower than that for traditional outreach (US\$11.00 vs. \$20.30), and 72% lower per KP linked to HTC (US \$19.10 vs. \$67.60). The quantity and quality of outreach under P4P also strengthened over time.

By its fourth year, P4P had increased the annual number of KPs reached by 5.2 times over baseline (13,177 vs. 2,529) and more than doubled the proportion of successful referrals to HTC, from 30% to 67%.

CONCLUSIONS: The analysis found positive effects when applying P4P in HIV community outreach in Ho Chi Minh City and Dien Bien province. Results from this costing exercise are being used as evidence to advocate for local and national governments to adopt efficient HIV prevention outreach services with lowest feasible costs.

TUPED690

Determinants of willingness to participate in community-based health insurance among people living with HIV in a large tertiary hospital in South-east Nigeria

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BACKGROUND: Despite free antiretroviral treatment at designated facilities, many People Living with HIV (PLHIV) in Nigeria continue to face catastrophic health expenditures (CHE) due to direct non-medical and indirect costs of illness. Waning donor funding and poor country ownership of HIV care programs are challenges to the sustainability of care for PLHIV. Community-Based Health Insurance (CBHI) presents a viable alternative for funding of HIV care services. The aim of this study was to assess the determinants of Willingness To Participate (WTP) in CBHI among PLHIV in a large tertiary hospital in South-east Nigeria.

METHODS: A cross-sectional survey was conducted among 371 PLHIV on treatment at Federal Teaching Hospital Abakaliki Nigeria using an interviewer-administered questionnaire. Descriptive, bivariate and multivariate logistic regression analyses were conducted using SPSS version 20. Statistical tests were conducted at 5% level of significance.

RESULTS: Respondents were mostly males (51.8%) with mean age of 45.4±10.3. The mean monthly income of respondents was N26, 665.77±15,171.50 (\$74,070±42,14). Majority were willing to participate (82.5%) and to finance their participation in CBHI (65.2%). Major reasons given for unwillingness to participate in CBHI were poor understanding

on how the system works, lack of regular source of income, health insurance not needed and fear of poor management of resources. On bivariate analysis, WTP in CBHI was associated with gender (P< 0.001), marital status (P< 0.001), employment type (P=0.006), family size (P=0.001), educational level (P< 0.001), monthly and monthly income (P< 0.001). Predictors of WTP were female gender (AOR= 2.9; 95% CI: 1.6-5.7), being currently unmarried (AOR= 4.3; 95% CI: 2.3-7.8), self-employed (AOR= 2.2; 95% CI: 1.2-3.9), family size greater than 5 (AOR=3.1; 95% CI: 1.7-5.9) and having less than a secondary school education (AOR=4.3; 95% CI: 2.3-7.8).

CONCLUSIONS: Majority of the respondents were willing to participate and finance their participation in CBHI. The vulnerable subgroups (females, unmarried, self-employed, poorly educated and those with large family size) had higher odds of WTP. To reduce CHE, there is need to harness this high WTP among PLHIV in the design of subsidized and sustainable CBHI programs with special focus on the socially disadvantaged.

Changes in policy and practice

TUPED691

DTG or not to DTG? Health-system stakeholder perceptions on Dolutegravir to optimise guideline implementation in Zimbabwe

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BACKGROUND: High drug resistance threshold and clinical outcome benefits of Dolutegravir (DTG) have resulted in its proposed recommendation by WHO as part of a preferred first line ART regimen. With an adult HIV prevalence of 14.1%, DTG could have substantive benefits for first line treatment outcomes in Zimbabwe. Perspectives of health-system stakeholders are crucial for informing design of accurate information and clinical mentorship prior to changes in HIV care and treatment guidelines. Our objective was to describe health-system stakeholder perceptions regarding DTG in Zimbabwe.

METHODS: We utilised a stratified purposive sampling approach (urban/rural; primary/district/provincial; geographic region) of 20 health facilities supported through the PEPFAR/USAID-supported FACE-HIV Program in 5 Provinces of Zimbabwe. A standardized questionnaire was implemented among health system stakeholders involved in provision and management of HIV care and treatment services. Questionnaires documented health care worker perceptions regarding acceptability of prescribing DTG-based regimen among different groups of women of childbearing age were analysed descriptively.

RESULTS: A total of 82 health system stakeholders were interviewed including expert patients (n=17), health-care workers (n=54) and health-system managers (n=11). The majority (61%; 50/82) did not think DTG-based regimens should be given to HIV-infected women of childbearing potential who are currently tolerating an Efavirenz-based 1st-line regimen and 26.8% (22/82) felt women of childbearing potential should provide informed written consent prior to being prescribed DTG-based regimens.

	Switch: Should DTG-based regimens be given to HIV infected women of childbearing potential who are currently tolerating an Efavirenz-based 1st line regimen?	Short Term FP: If an HIV-infected woman opts for short-term family planning methods, should she be provided with a DTG-containing regimen?	Pregnancy Intention: If an HIV positive woman intends to get pregnant, should she be given DTG based first line regimens?	Informed Consent: Should an HIV infected woman who opts to take DTG be made to make an informed written consent, prior to receiving DTG?
No	50 (61.0)	30 (36.6)	43 (52.4)	38 (46.3)
Yes	14 (17.1)	26 (31.7)	20 (24.4)	22 (26.8)
Women should decide	16 (19.5)	17 (20.7)	17 (20.7)	1 (1.2)
Don't know/Not sure	1 (1.2)	7 (8.5)	1 (1.2)	15 (18.3)
No response	1 (1.2)	2 (2.4)	1 (1.2)	6 (7.3)

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[Health System Stakeholder Perceptions on DTG (N=82)]

Information requested for health-care workers and clients included explanation of benefits of DTG vs.EFV, side effects, and clear guidance regarding eligibility, dosage and transition to DTG among clients currently on ART. **CONCLUSIONS:** While support for use of DTG as the most efficacious first-line ART regimen was high (‘the what’), we document health-care worker concerns and information needs regarding implementation of new ART guidelines among women of childbearing potential (‘the how’) in Zimbabwe. Findings have been used to develop frequently asked questions for health-system stakeholders and will inform training and information provided to frontline health-care workers and PLHIV to optimise roll-out of DTG in Zimbabwe.

TUPED692

Changing sexual dynamics among young men in Mumbai, India - need for innovative prevention strategies

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BACKGROUND: HIV infection in young men is a global concern; the rate of reduction is lower compared with other age groups. Thus, the present study was conducted to compare the current sexual behaviors and practices in young men (18-25 years) with other age groups (>=26 years), and to study the factors associated with them in Mumbai, India.

METHODS: Data on sexual behaviors, substance use, and HIV were collected from 2295 men attending Integrated Counselling and Testing Centers. Logistic regression models were used to estimate odds ratios (OR) and 95% confidence intervals (CI) to identify the factors associated with HIV infection.

RESULTS: Of the 2295 men, 32% (732) were 18-25 years and 68% (1563) were >=26-year-old. Young men were significantly ($p < 0.05$) more likely to have anal sex (44% vs 25%) and oral sex (39% vs 31%), but less likely to have vaginal sex (69% vs 87%). Young men were more likely ($p < 0.05$) to report male (42% vs 25%) and male-to-female transgendered partners (8% vs 5%). Young men were more likely to have regular (35% vs 25%) and casual partners (64% vs 55%), but less likely to report commercial partners (17% vs 38%). Condom use was higher during vaginal sex (38% vs 25%), but significantly lower during anal sex (21% vs 26%). Young men were significantly more likely to find partners on the internet and in parties, and less likely at the physical cruising places (Table 1). HIV was significantly higher in young men who met partners through mobile phones (OR: 2.86, 95% CI: 1.41, 5.77; $p = 0.003$), and lower in those who met through cruising places (OR: 0.27, 95% CI: 0.12, 0.63; $p = 0.002$).

CONCLUSIONS: In young men, digital platforms are the preferred choice for finding sexual partners. Thus, the prevention programs must adapt to changing sexual dynamics and high-risk sexual practices in young men.

Variable	18-25 year old (n=732)	>=26 years (n=1563)	P value
Casual partner	466 (64%)	865 (55%)	0.001
Commercial partner	127 (17%)	598 (38%)	<0.001
Regular condom use during vaginal sex	191 (38%)	344 (25%)	<0.001
Regular condom use during anal sex	67 (21%)	101 (26%)	<0.001
Partner seeking through contacts	426 (58%)	917 (59%)	0.86
Partner seeking through mobile	152 (21%)	281 (18%)	0.09
Partner seeking through internet	128 (17%)	146 (9%)	<0.001
Partner seeking through physical cruising places	204 (28%)	506 (32%)	0.046
Partner seeking at parties	118 (16%)	179 (11%)	0.006

[Comparison of sexual behaviors among Young Men (18-25 years) and other age groups (>= 26 years)]

Capacity-building initiatives

TUPED693

Effectiveness of a 5-point modular training program for health providers in achieving holistic care for PLHIV who use drugs in the Philippines: A pilot study

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BACKGROUND: The war on drugs further aggravates the HIV epidemic in the Philippines by instilling fear and discrimination among PLHIV who use drugs leading to low engagement to antiretroviral treatment. In response, Sustained Health Initiatives of the Philippines (SHIP) conducted a 3-day capacity building to improve attitudes of HIV care and drug rehabilitation care providers in achieving holistic care for PLHIV who use drugs in the country.

METHODS: This investigation utilized a non-randomized, single group, pre- and post-test quasi experimental design in developing a 5-part modular training program which was administered to 40 medical and paramedical health providers working in HIV care and drug rehabilitation facilities. The training program included:

- (1) Basics on HIV & AIDS,
- (2) HIV Primary Care,
- (3) Co-Occurring Mental Health Issues & Counselling Skills,
- (4) Harm Reduction in Drug Use with Basic Pharmacology, and
- (5) Human Rights-Based Approach and Legal Issues on HIV & Drug Use administered from May 23 to 25, 2018.

Attitudes of participants were measured using a 5-point Likert scale and statistically analyzed using matching t-Test.

RESULTS: There is a statistically significant improvement in attitudes of healthcare providers before and after the capacity building program, with an overall t-test result of < 0.001 ($p = < 0.05$). Specific positive changes are noticed in the respondents' attitudes showing reduced stigma towards PLHIV who use drugs ($t = < 0.001$) and attitudes towards reporting drug users to authority ($t = < 0.001$). Moreover, a noticeable positive change in attitudes toward harm reduction is also noted after the capacity building ($t = 0.043$).

Therefore, the 5-part modular training program conducted by SHIP shows promising result in changing attitudes of HIV care and drug use care providers in the Philippines.

CONCLUSIONS: This investigation reflects that the 5-part modular training program positively changes the health providers' attitudes by utilizing a more pragmatic, collaborative, and holistic approach in looking at the intersecting issues of HIV and drugs as health threats rather than an issue of law and order. Therefore, replication of this study is recommended to be done with a larger group of health providers on a national level.

TUPED694

A cross-sectional study on levels of knowledge on provision of second-line antiretroviral therapy in Malawi in 2016

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BACKGROUND: Although Malawi is on track to achieve the UNAIDS 90-90-90 HIV targets, there is sub-optimal switching of patients to second-line antiretroviral treatment (ART) with first-line treatment failure. Challenges include unavailability of viral load (VL) results and low levels of knowledge on provision of second-line ART. We assessed in-service knowledge of different cadres of first-line ART providers on the management of second-line ART patients.

METHODS: In 2016, 754 first-line ART providers (medical doctors, clinical officers, medical assistants, registered nurses, nurse-midwife technicians and community nurses) from 26 districts in Malawi were trained

on second-line ART provision. After the training, a certification exam was administered to assess providers' ability to:

- 1) identify second-line regimens;
- 2) choose appropriate second-line ART based on first-line treatment failure scenarios;
- 3) interpret VL results; and
- 4) prescribe correct dosages for second-line ART. ART providers that scored $\geq 80\%$ were certified to prescribe second-line regimens. Proportions and chi-squared tests were used to analyze results of the exam by cadre and district.

RESULTS: Of the 754 ART providers assessed; 21(3%) were medical doctors, 241(32%) were clinical officers, 147(20%) were medical assistants, 44(6%) were registered nurses, 260(34%) were nurse-midwife technicians, and 41(5%) were community nurses. Overall, 290 (38.46%) were eligible to prescribe second-line regimens, with significant differences by both cadre and district ($p < 0.001$). Specifically, a higher proportion of medical doctors, clinical officers, and registered nurses (66.67%, 56.43%, and 36.64%, respectively) were eligible to prescribe when compared with medical assistants (24.49%), and nurse-midwife technicians (28.08%). Among all cadres, providers performed best in identifying ($n=518$, 68.70%) and correctly dosing ($n=588$, 77.98%) second-line ART. Few providers correctly chose second-line ART regimens ($n=71$, 9.42%) or interpreted VL results ($n=67$, 8.89%). Ability to both identify and correctly choose second-line ART differed significantly by cadre and district, while ability to correctly dose varied by district ($P < 0.001$) and ability to interpret VL varied by cadre ($p < 0.001$).

CONCLUSIONS: Overall performance in the second-line ART certification examination was sub-optimal. There is need for strengthening knowledge on second-line ART through intensive trainings. Ensuring workforce capacity for switching to second-line regimens is important to achieving the UNAIDS 90-90-90 goals.

Translation, incorporation and use of key implementation research findings into programmes and practice

TUPED695

An assessment of health care facilities compliance to environmental and social safeguards - a case study of HIV/AIDS programme development project II (HPDP II) Nigeria

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BACKGROUND: The World Bank and NACA implemented the HIV/AIDS Programme Development Project II (HPDP II) in 36 States and the FCT. An Environmental and Social Safeguards Audit was done to assess the compliance of the HPDP II project with Nigerian relevant environmental regulations and World Bank Safeguard policies

METHODS: Exploratory contacts was used to carry out an audit of 1,921 Health Care Facilities (HCFs) from March/ April 2014 in 36 States and the FCT. Primary Health Care 64.1%, Private 22% and Secondary facilities 12.4% were sampled. Information was collected using developed checklist and findings were analysed on state basis.

RESULTS:

- 50.0% of the HCFs have equipment that comply with workplace practice
- 62.5% of the HCFs confirmed that work environment was cleaned and disinfected after contact with blood and body fluids
- 67.8% of sampled respondents in the HCFs had adequate knowledge of medical and hazardous waste characterisation
- 41.2% of respondents had knowledge of how to identify infectious waste
- Only 22.2% of surveyed HCFs owned or had immediate access to incinerator facilities in the states. This implied that most wastes from Primary and Secondary HCFs were lumped together and disposed off together with other municipal wastes

- 65.6% of the HCFs had procedures in place to manage staff's exposure to work place hazards while 55.1% had instituted some form of accident prevention procedures in the facilities

- Poor compliance with emergency preparedness and response as only 25.5% of sampled HCFs had provisions for emergency preparedness and response plan

- Open air burning, burn and bury sites and poor access control to waste dump sites were observed.

CONCLUSIONS: The findings of the Environmental and Social Safeguards Audit revealed that greater number of HCFs visited did not comply with Environmental and Social Safeguards standards. There is need for NACA to develop an M&E plan, tracking tool, assessment checklist and logbook for recording safeguard events. Monitoring and supervising implementing HCFs and CSOs is vital to achieving sustained Environmental safety practices.

TUPED696

Improving HIV/AIDS response coordination in Nigeria through the use of the Geographic Information System (GIS)

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BACKGROUND: With the second highest HIV burden in the World and 1.2 million persons currently on treatment, Nigeria requires huge resources for its national response. The number of persons currently on treatment is still below what is required and the response is still heavily donor dependent. Due to donor fatigue, HIV resources have flattened out, necessitating increased efficiency in the utilization of scarce resources. This prompted the deployment of a public health database that tracks geographical distribution and variation of the epidemic, analyses spatial and temporal trends of the disease, identifies gaps in service provision, maps populations at risk, stratifies risk factors, health care needs.

METHODS: NACA trained and deployed officers to support 35+1 States in the collection of geo-referenced data for every category of HIV stakeholder in Nigeria. Prior to the field work, HIV stakeholders were categorised into State Agencies for the Control of AIDS (SACAs), relevant Line Ministries, Implementing Partners (IPs), Multilaterals and CSOs.

Also, validated HIV/AIDS programme data from the DHIS and the NARHSS were analysed in developing a heat map for the country. This was aimed at assessing the attainment of the second 90 of the UNAIDS 90:90:90 strategy.

RESULTS: A Geographic Information System (GIS) database was developed for all the HIV stakeholders in the country and the available resources, except for those in Yobe State, due to insurgency.

The heat map shows low treatment coverage for states along the northern border and the South-West, with the exception of Lagos, and some pockets of States in the South-South and South-East geo-zones, all with less 25% coverage. Other States with the exception of Edo, Benue and Taraba achieved between 25-74%. The three aforementioned states had a treatment coverage above 74%. No state in Nigeria had reached the second 90% based on the available dataset. The data was analysed using the Quantum GIS.

CONCLUSIONS: The GIS database developed for the national response provides the Agency with the geo spatial tool needed for improving planning, monitoring and evaluation of Nigeria's HIV response. There is a need for further research to determine reasons for low treatment coverage in the border and South-West States.

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TUPED697

What IF? Implementation fidelity (IF) for improving HIV program performance in Zimbabwe

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BACKGROUND: Implementation Fidelity (IF), the degree to which an intervention is delivered as intended, is critical to successful translation of evidence-based interventions into practice. Yet, IF has not been systematically used at scale as a strategy to improve program performance in large-scale HIV programs. Layered into a PEPFAR-supported HIV Care and Treatment program, OPHID has implemented an IF approach and documented early lessons and evidence of impact.

METHODS: From August-December 2018, 3 IF projects were initiated to strengthen program specific program activities of the HIV Care and Treatment Programs. IF projects were targeted to FACE-HIV Program-supported health facilities in 24 districts of Zimbabwe. The selected facilities represent high volume, high yield facilities that contributed to 80% of all newly identified HIV positive clients from Jul-Sept 2018. Scoping data were entered into MS Forms and analysed using MSEXcel, with program remediation adapted from existing MOHCC guidelines.

RESULTS: IF project matrix shows scoping assessments revealed low documented enrolment of clients on ART>6months into DSD models (12%; 5584/46176 clients); low rates of HIV self-testing and index-case testing at facilities, and only 90/302 (29.8%) facilities running weekly reports using electronic patient monitoring systems to identify appointment defaulters. Scoping findings were used to generate IF project dashboards with specific IF performance criteria to grade each indicator for all sites. Facility-level program remediation was implemented and good practices cascaded program-wide to 664 sites resulting in immediate improvements in implementation fidelity.

	STEP 1: Define IF Projects with Routine Data	STEP 2: Scoping to establish 'baseline' IF	STEP 3: IF Project Dashboards & Remediation SOPs	STEP 4: Remediation Plan Implementation STEP 5: IF Project Impact Routine Performance Monitoring
Integrated HIV Testing Services (IHVS)	Low use of targeted testing methods: 80% of facilities used HIV testing. Jul-Sept 2018 provider initiated.	IHVS scoping conducted at 121 health facilities Oct-Nov 2018 to establish IF for different HIV testing models.	- 38% (46/121) sites offering IHVS - 70.2% routinely offer index case testing to both newly diagnosed and ART clients	- Targeted expansion of IHVS - Index-case testing SOP - Repetitive Pediatric HIV/SB screening tool - Weekly monitoring of HIV testing rate to facility target
Differentiated Service Delivery (DSD)	Proportion of clients enrolled in DSD not routinely collected, but required for planning	DSD scoping conducted at 110 health facilities Oct-Nov 2018 to establish models offered and client documentation.	- 1/3 of facilities offering 3 or more DSD models - Variable documentation: 22% of sites demonstrated an ART-6 months recorded on ICD.	- DSD Registers introduced at 148 facilities to record enrolment and outcomes/mosai - 111/148 sites (75%) newly established Fast Track (Flow chart and register) - 108/148 facilities expanded family refill and CARGs.
Electronic Patient Monitoring System (EPMS)	Underutilization of EPMS resulting in missed opportunities	EPMS Scoping conducted at 302 facilities Oct-Nov 2018 to establish training, functionality and use of EPMS for patient management.	- 69.2% had Data Entry Clerks (DECs) - 29.8% using EPMS to generate weekly reports of apt defaulters	- Weekly work plan schedule for DECs - Facility data management checklist for managers to support supervision of DECs - SOPs with instructions for using EPMS generate daily/weekly/monthly reports and data entry

[OPHID Implementation Fidelity Project Matrix]

CONCLUSIONS: We demonstrate feasibility of standardized implementation fidelity monitoring and remediation in a large-scale HIV program. IF scoping confirmed achievements, as well as demonstrated suboptimal implementation of specific activity processes. Findings have been used to rapidly cascade targeted facility-level remediation and avoid inefficiency of 'one size fits all' HIV programming. Future research should explore cost-effectiveness and sustained impact of IF monitoring for achieving HIV program targets and quality of care.

TUPED698

Accelerating implementation of HIV-related stigma and discrimination reduction activities in healthcare settings: A learning network approach in Cambodia, Lao PDR, Thailand, and Vietnam

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BACKGROUND: HIV-related stigma and discrimination (S&D) in the healthcare setting remains a significant barrier to the full uptake of HIV care and treatment services in Southeast Asia. Globally validated tools now per-

mit routine assessment of facility HIV-related S&D, driving the need for strategies to accelerate implementation of data-driven stigma-reduction interventions at the facility level.

METHODS: UCSF-HEALTHQUAL implemented a multi-country learning network to accelerate implementation of national- and facility-level S&D reduction activities in Cambodia, Lao PDR, Thailand, and Vietnam. Healthcare facilities in participating countries routinely monitor levels of S&D and generate contextually appropriate stigma-reduction interventions using quality improvement (QI) methods to address results. Facility-level monitoring occurs on a quarterly basis, and involves reporting of patient feedback and validated measures of healthcare workers' attitudes, perceptions, and observed behaviors toward people living with HIV (PLWH). Teams from participating Ministries of Health are convened on a quarterly basis to identify implementation challenges and strategies.

RESULTS: As of January 2019, 79 healthcare facilities across the four countries have implemented S&D reduction activities. As part of these activities, >8,000 healthcare workers have completed surveys measuring levels of HIV-related S&D, with results showing particularly high levels of S&D directed toward pregnant women living with HIV, fears of HIV transmission by drawing blood of PLWH, and low awareness of facility non-discrimination policies. To date, four multi-country exchange meetings have been convened, where Ministry stakeholders have identified 7 common challenges, 6 common enabling factors, and 8 recommended strategies to accelerate implementation of S&D reduction activities.

Challenges	<ul style="list-style-type: none"> -Aligning S&D reduction activities with quality initiatives in other areas of the health sector -Translating national guidelines, standard operating procedures, and curricula into S&D reduction activities at the facility level -Determining the best approach for meaningfully involving PLWH in planning and implementation of S&D reduction activities -Engaging healthcare workers in service delivery areas other than the ART clinic (e.g., antenatal care) to participate in S&D reduction activities -Motivating healthcare workers to view measurement of S&D as part of routine activities 6. Designing diverse interventions that go beyond training and re-training
Enablers	<ul style="list-style-type: none"> -Early and active involvement of non-governmental organizations and PLWH groups in planning and implementation of S&D reduction activities -Commitment of national and provincial ministries of health to advocate, lead, and manage S&D reduction activities -Commitment of facility leadership to address S&D as a facility-wide effort rather than one that is limited to the ART clinic. -Strong national-, provincial-, and facility-level capacity to plan, implement, and monitor activities to improve quality -Presence of S&D reduction champions among healthcare workers to ensure sustainability of progress
Implementation strategies	<ul style="list-style-type: none"> -Standardized format and clear expectations for site-level documentation of S&D reduction activities -Regular measurement of S&D to evaluate effectiveness of interventions -Regular convening of regional and national workshops to share lessons learned from site-level implementation and inform scale-up of successful interventions -Linkage of S&D reduction activities to quality initiatives in other areas of the health sector to ensure sustainability -Development of national S&D reduction curricula -Continuous coaching support to mentor sites in application of QI methods to stigma reduction and integration of S&D reduction activities into routine practice -Regular reviews of data at national level to prioritize assistance to sites in need of intensified support

[Table 1. Common challenges, enablers, and implementation strategies]

CONCLUSIONS: Reduction of HIV-related S&D in the healthcare setting is a key strategy to improve the quality of HIV care and treatment services. Implementation of a learning network and application of QI methods constitute a scalable approach to accelerate the design, testing, and adoption of data-driven S&D reduction interventions through co-creation of implementation strategies.

TUPED699

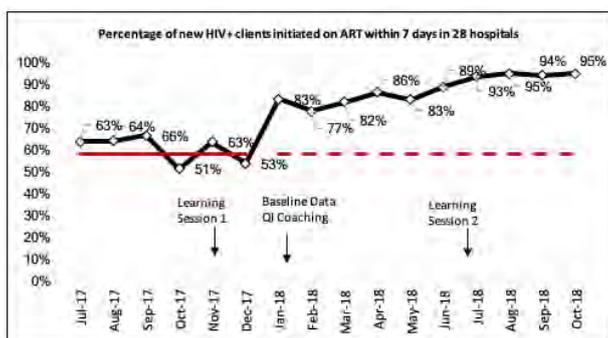
Improving rapid ART initiation in Blantyre, Malawi, through implementation of a quality improvement collaborative

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BACKGROUND: 14% of all people living with HIV (PLWH) in Malawi reside in Blantyre District, among whom only 55% are estimated to be receiving antiretroviral therapy (ART). In 2016, Malawi's Ministry of Health released new guidelines recommending the rapid initiation of ART within 7 days of diagnosis for all newly identified PLWH. To accelerate implementation of these guidelines, the Blantyre Early Treatment HIV Initiative (BETHI), a quality improvement collaborative (QIC), was launched in partnership with the Blantyre District Health Office (DHO).

METHODS: As part of BETHI, 28 facilities in Blantyre received intensive quality improvement (QI) coaching support and participated in three peer-to-peer exchange meetings to share implementation experiences. In addition, facility teams submitted monthly reports summarizing the proportion of newly diagnosed PLWH who rapidly initiated ART, and applied QI methods to address identified gaps in performance. Successfully implemented QI interventions were recorded by coaches and packaged for scale up and spread. Coordination among treatment partners was facilitated by UCSF-HEALTHQUAL and MaiKhanda Trust under the leadership of the DHO.

RESULTS: BETHI activities led to significant improvement in rapid ART initiation over 16 months.



[Rapid ART Initiation Rate]

Males had higher rapid initiation rates than females, although were fewer in number; rates among adult age groups were not significantly different. Teams implemented successful interventions based on short-cycle tests of change, including peer navigation, compressed counseling, timely access to ART providers for initiation, dedicated clinic space for counseling, new tools for documentation, and early clinic hours. Sharing of successes between sites was facilitated through a WhatsApp group and in-person exchange meetings.

CONCLUSIONS: Through strong district leadership, monthly data reporting, intensive QI coaching and rapid-cycle tests of change to identify successful interventions, Blantyre District achieved remarkable success in scale up of rapid ART initiation. QICs represent an important strategy for scale up of HIV treatment to achieve global targets for epidemic control.

TUPED700

Improved HIV testing efficiency in Zambia through enhanced real-time program surveillance

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BACKGROUND: To achieve UNAIDS goal of 95-95-95, a novel digital health surveillance application was implemented by EQUIP/Right to Care-Zambia to improve HIV testing yield in three northern Zambia provinces. As Zambia progresses towards epidemic control, identifying ART-naïve people living with HIV that do not know their status is becoming an increasingly rare event. Emphasis has shifted to increasing testing yield through more efficient testing modalities and well-supervised counselling staff. Real-time analysis of data and program efficiency in reaching targeted individuals is paramount to controlling the HIV epidemic.

METHODS: EQUIP implemented the Qode Lynx HIV testing application, an mHealth solution tailored for the Zambian context. The Lynx application provides real-time data through mobile data connections and is administered by local professional and lay counsellors on any Android compatible device with geolocation data. Variables collected include counsellor details, client demographics, HIV test and result, risk factors, screening questions for co-morbid conditions, and referrals for clients testing negative (PrEP and VMMC) or HIV-positive (ART clinic and index contacts). Data is uploaded in real-time (or when the device is connected to mobile data) and analyzed through interactive web-based dashboards by program and M&E managers.

RESULTS: Since implementation in August 2018, EQUIP has captured over 19,000 HIV tests (over 1,600 positive HIV tests and ART referrals) on the Lynx application. Coverage has grown from 70 active users at 6 rural health facilities to 250 active user at 30 rural health facilities in Northern, Luapula, and Muchinga provinces of Zambia through phased implementation.



[Figure 1: EQUIP Lynx Daily Activity Dashboard]

CONCLUSIONS: Real-time monitoring of data has allowed program managers to deliver more efficient HIV testing services. The overall yield captured in Lynx is 10% compared to 3% facility-reported yield across EQUIP-supported facilities in Zambia. EQUIP is rapidly moving ensure all supported HIV testing services are captured in Lynx to realize continued gains in efficiency.

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TUPED701

Ensuring real-world comparability in a pragmatic implementation trial of eHealth HIV prevention intervention for young men who have sex with men (YMSM)

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BACKGROUND: eHealth interventions have proven efficacious at reducing HIV risk, but little is known about how to scale-up these interventions given that they don't conform to traditional community-based organization's (CBO) HIV prevention service delivery. Pragmatic implementation trials can inform scale-up as they take place in settings where clients receive the intervention and compare different real-world alternatives. This talk will describe steps taken to ensure a pragmatic implementation of an evidence-based eHealth HIV prevention intervention for YMSM in CBO settings.

METHODS: The Keep It Up! (KIU!) study is a type III effectiveness-implementation hybrid design trial targeted to YMSM 18-29 years old that uses a cluster-RCT to compare two pragmatic implementation strategies: direct-to-consumer (DTC) vs. CBO-based. Formative research was conducted with CBOs, health departments, and the Centers for Disease Control and Prevention (CDC), to inform the CBO implementation strategy, including CBO selection process and integration of the intervention into standard practice. 66 counties with the largest YMSM populations were randomized 2:1 to either strategy, and 44 counties were selected for potential CBO implementation.

RESULTS: We took multiple steps to resemble real-world implementation. For CBO selection, we designed a Request for Proposal (RFP) process similar to that used by CDC and health departments to fund CBOs. We created an advisory board of CBOs and health department representatives to review the RFP and inform the CBO selection process to ensure similarity to standard practice. To broadly disseminate the RFP, we worked with CDC, national HIV organizations, and health departments to distribute to CBOs. We selected CBOs using an objective RFP review panel composed of people experienced in HIV funding and/or provision of HIV prevention services and modeled the review process after CDC and health department procedures. Training and capacity building assistance for CBO staff on use of the technology and integration into HIV testing was tailored after that provided by CDC capacity building providers.

CONCLUSIONS: Effective pragmatic implementation trials require that they closely resemble the conditions and environment of real implementation settings. Input and on-going involvement from stakeholders involved in real-world implementation, and a careful balance between research and implementation are essential to ensuring a pragmatic approach.

Reduction of socio-structural barriers and stigma discrimination

TUPED702

Using KP-MoH integrated service delivery approach to promote MSM comprehensive HIV service uptake among MSMs in Machakos County

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BACKGROUND: EMAC, a Key Population-Led-National NGO operating in Machakos County with funding from Global Fund through Kenya Redcross adopted a KP-MoH-integrated-service-delivery-approach to popularize and promote MSM-HIV-service uptake for MSM in Machakos County.

Unlike most common KP-programming-approaches in Kenya where stand-alone KP-clinics are popular among KP-Implementing-partners and development-partners in urban settings, little is known about the outcomes and impact of a KP-MoH-integrated-service-delivery-approach on uptake of Comprehensive-HIV-services among MSMs and other KPs in general.

This project aimed to assess and document the feasibility, cost effectiveness, outcomes, and sustainability of an integrated-MSM-Comprehensive-HIV-service delivery approach.

METHODS: 28 Peer Educators-PEs were selected, recruited, engaged on Peer Education upon equipping them with appropriate HIV/AIDS knowledge, skills and attitudes through basic training on Peer Education. The PEs were assigned each a peer cohort of 40 MSMs/MSWs/clients each. Ministry of Health provided health care workers on locum to provide HIV services to MSMs/MSWs at the hotspots and at the identified friendly Link facilities. Red-cross-Society provided Mobile Van during mobile-wellness-clinic- outreaches to reach out to the clients with comprehensive HIV services of the remote of rural areas.

RESULTS: 1,100 MSMs/MSWs were enrolled and retained in the program for the period 2018-1019 receiving health Education, Condoms and lubricants monthly. 28 positive clients were successfully linked, initiated & retained to care and treatment, recording 100% viral-load-suppression within six months and 100% adherence recorded. 1,072 clients received HIV testing services, STI screening & Treatment, TB & Alcohol and substance screening and treatment among other behavioral and structural support services quarterly. A sharp increase in MSM-self-health-seeking-behaviors was recorded. No reported incidence of sero-conversion during the period. STI incidences decreased by 70%.

Condom and Lubricant demand rose by 95%. Increase in MSM-HIV/AIDS knowledge, skills and attitudes was recorded as opposed to those recorded at the enrollment.

CONCLUSIONS: KP-MoH-Integrated-HIV comprehensive service delivery model seems to yield high return and could be effectively used to reduce structural barriers & increase uptake of HIV-comprehensive-services among the MSMs with adequate resources, good-will and unwavering-support from the various stakeholders. However there is need for continued assessment to ascertain its effectiveness across different cultural settings in Kenya & globally beyond Machakos County.

TUPED703

Stigma and discrimination in key population in the health sector: The Mozambique experience

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BACKGROUND: In 2016, the Mozambican Ministry of Health approved national guidelines for the integration of HIV/AIDS prevention, care and treatment services for key population in the health sector. The guidelines promote access for quality health services, including the humanization of the health services to ensure services are provided without stigma and discrimination as well as the integration of friendly services for key populations in a large number of health facilities.

METHODS: In 2018, the Ministry of Health evaluated the guidelines. The evaluation used a desk review and a semi-structured questionnaire with closed and open questions, to interview 54 focal points (1 National Level, 11 Provincial Level, 21 District Level and 22 at Health Facilities) and was carried out at 22 health facilities. Stigma and the promotion of human rights by health professionals was a key component of the evaluation.

RESULTS: Out of the 22 Health Facilities visited, 36.3% of the Health facilities (8) reported cases of stigma and discrimination. In 50% of the Health Facilities, the cases were perpetrated by health service providers, 25% by the patients, 12.5% by providers and patients and in 12.5% by others (police, security). This same evaluation showed that the groups that experienced the most stigma were men who have sex with men (MSM) in 50% of the Health Facilities, followed by the female sex workers (SW) in 37.5% of the Health Facilities, and both MSM & SW in 12.5% of the Health Facilities

CONCLUSIONS: The majority of health facilities have shown that health providers are the drivers of stigma and discrimination, particularly for men who have sex with men. Patients and other health facility staff also play

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a role in perpetrating stigma and discrimination. Although the guidelines promoting friendly health services for KP in HFs are in place, additional interventions are needed to change the attitude of health professionals as well as patients and other supporting staff in the health facilities.

TUPED704

Factors promoting uptake of drop-in center services by female sex workers in Thika, Kenya

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BACKGROUND: In Kenya, key populations are disproportionately affected by HIV and have limited access to health care services due to stigma and discrimination. Though drop-in centers (DICs) provide safe spaces and access to comprehensive HIV prevention services for key populations in a stigma-free environment, they remain underutilized. The LINKAGES Kenya project, a USAID- and PEPFAR-supported program, aimed to identify factors promoting uptake of HIV prevention services among female sex workers (FSWs) at Thika DIC in Kiambu county, Kenya.

METHODS: Peer educators from the National Organization of Peer Educators (NOPE) enrolled FSWs into the program from hot spots in Thika town. At enrollment, FSWs were given the location of the DIC, informed of services available, and encouraged to access the DIC at least monthly for services. At the DIC, routine post-service questionnaires were administered to randomly selected FSWs and data were analyzed monthly. Descriptive statistics were used to summarize reasons for accessing services at the DIC.

RESULTS: From October 2017 through September 2018, 3,184 FSWs were enrolled into the project, 2,431 of whom (76%) accessed services at the DIC monthly. Of the 143 FSWs administered the questionnaire, reasons for continued monthly access of the DIC included good rapport with service providers (31%), availability of Wi-Fi (25%), availability of care and treatment services for HIV (22%), provision of entertainment through the television at the DIC (15%), and good hygiene and cleanliness at the DIC (5%). Nearly 3% of FSWs accessed the DIC monthly to network with other project stakeholders, such as police, Ministry of Health officials, and church leaders during community meetings held at the DIC.

CONCLUSIONS: Availability of health care services, Wi-Fi and relationship building with clinical care providers play key roles in motivating FSWs to access services at the DIC. HIV prevention programs for FSWs should invest in training health care workers to provide key-population-friendly services.

TUPED705

Male engagement - effective strategy towards Reduction of Socio-structural barriers to ART adherence and retention among females in North West Nigeria

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BACKGROUND: Gender-biased socio-cultural practices including harmful gender norms and gender based violence remain key barriers to accessing health care among women on ART in North West Nigeria. In 2016, only 22% - 44% of pregnant women living with HIV accessed antiretroviral medicines in Nigeria. Socio-cultural barriers including spousal denial of permission to attend clinic is a contributing factor to low ART coverage among women.

Punishment for defying spousal order not to attend clinic may include physical, emotional and sexual GBV and/or divorce. Thus, the need to engage with and involve men in interventions designed to improve females retention on ART.

METHODS: To improve adherence and retention among females on ART, USAID-funded Care and Treatment for Sustained Support (CaTSS) project implemented by Management Sciences for Health conducted a cross-sectional interventional study of 622 female defaulters and LTFU clients in 6 health facilities in Sokoto, Zamfara, and Kebbi states to ascertain drivers of high defaulter and LTFU rates among women. Lists of female defaulters and LTFU within the last 12 months were compiled by data clerks and submitted to trained adherence counselors who administered uniform questionnaires tailored to ascertain reasons for defaulting and LTFU. To address the findings, community specific gender norms interventions addressing harmful socio-cultural practices targeting men, social groups, religious and community leaders were implemented for a period of 12 months. These interventions were targeted and tailored to identify and address barriers to females' access to health care, education and other social services. Interventions were participatory, HIV related and lasted for a period of ten hours cumulatively.

RESULTS: 61% of respondents identified socio-cultural inhibitions including denial of permission to visit the clinic, lack of spousal support, GBV and fear of possible divorce as reasons for defaulting.

After a period of twelve months intervention addressing the identified socio-cultural barriers, 486 females out of 622 females, representing 78% of the study population were returned to ART.

CONCLUSIONS: To improve ART adherence and retention among females, deliberate efforts should be made to identify the underlying causes why females default. Interventions addressing the identified barriers should be tailored and targeted to the right people as to maximize the outcome.

TUPED706

Clinic-level factors influencing the decision to adopt trauma-informed care in HIV primary care settings

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BACKGROUND: The high prevalence of trauma and its negative impact on health among people living with HIV underscore the need for adopting trauma-informed care (TIC), an evidence-based approach to systematically address trauma and its sequelae to improve patient outcomes. However, TIC is a multi-component treatment framework which often requires clinic-level changes for successful adoption. Yet, virtually nothing is known about factors internal and external to the clinical setting that might influence adoption of TIC in HIV primary care clinics.

METHODS: Qualitative interviews (n=19) were conducted with providers and staff at a large urban HIV primary care center that serves a largely uninsured, low-socioeconomic population in the southern United States. We used the Consolidated Framework for Implementation Research (CFIR) to guide qualitative coding in order to ascertain factors related to adoption of TIC.

RESULTS: Among all CFIR constructs, inner setting factors were identified as the most predictive of the clinic's capacity to adopt TIC. Three inner setting factors related to implementation climate (i.e., tension for change, relative priority, and compatibility), and two factors related to readiness for implementation (i.e., available resources and access to knowledge) were identified as influencing TIC adoption. Participants identified a need (i.e., tension for change) to better address trauma in HIV primary care clinics and viewed TIC as a high priority because trauma is common among their patient population. Additionally, it was noted that TIC aligns with HIV primary care clinics' mission and values for patient care. Because HIV clinics already offer some TIC-related services (i.e. risk assessments and community referrals), participants believed TIC was compatible with their current practices, which would facilitate implementation. However, TIC's multi-component implementation would require additional resources, including time and patient support staff, as well as training and education for providers and staff.

CONCLUSIONS: Through the use of CFIR, our findings begin to fill knowledge gaps pertinent to the adoption of TIC in HIV care settings through the identification of key inner setting factors that might influence HIV primary care clinic's decision to adopt TIC, as well as point to clinic-level factors that may be important for successful TIC implementation.

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TUPED707

Caregivers' representations of and attitude towards people living with HIV/AIDSJ. Martinez¹, O. Epaulard^{2,3,4}¹Association Santé de Quartier, Lyon, France, ²Centre Hospitalier Universitaire Grenoble-Alpes, Service des Maladies Infectieuses, Grenoble, France, ³Fédération d'Infectiologie Multidisciplinaire de l'Arc Alpin, Grenoble, France, ⁴Université Grenoble Alpes, Grenoble, France

BACKGROUND: PLWHA health status has dramatically improved in countries where antiretroviral therapy is widely available; meanwhile, they still face high level of stigma, sometimes exerted by healthcare workers. There are no recent figures in France on caregivers' representation of and attitude towards PLWHA; we aimed to explore the representations of healthcare providers regarding PLWHA, their apprehension when taking care of such patients, and to what extent they witnessed inappropriate behaviors.

METHODS: We elaborated an anonymous online survey and diffused it to groups of caregivers (mainly nurses and nurse's aides) on social networks from November 16 to 24, 2018. The questionnaire focused on healthcare workers knowledge and apprehensions regarding PLWHA, and proposed participants to give example of misconduct they witnessed.

RESULTS: A total of 1759 participants completed the survey (92% women and 8% men); 64.2% were under 35 years of age. There were 41.7% nurses, 32% nurse's aides, and 12% nursing students. Regarding knowledge about HIV, 42% of respondents thought that even with a controlled viral load, PLWHA remain more or less contagious; conversely, 29.6% knew that when viral load is undetectable, the transmission risk is null. When asked about the precautions to be taken with PLWHA, 7% of them indicated that HIV-positive patients should always be in a single room, and 6.1% that droplets precautions should be applied. Regarding inappropriate behavior towards an HIV-positive patient, 29.1% of the participants reported having witnessed this from colleagues. The 469 testimonials featured denials of care and avoidance strategies (35.6%), unnecessary precautions (42.6%), and value judgment or even insults (25.2%). Regarding their own perception, 49.6% of participants declared having some apprehension with HIV-positive patients that they would not have with patients with another transmissible disease. The 498 testimonials on this subject featured the fear of an accidental blood exposure in 55.6%. Finally, only 39.2% of the participants considered that they were sufficiently informed.

CONCLUSIONS: This study shows that negative attitudes towards PLWHA still exist in France; these misconducts are possibly related in part to the fragmentary knowledge of some caregivers. They should receive an adequate formation not to participate in PLWHA stigmatization and to deliver better quality care.

TUPED708

Moral barriers for HIV/AIDS prevention and care among men who have sex with men: Challenges in times of conservatism in BrazilL.A. V. da Silva^{1,2}, F.M. Duarte¹, L. Magno³, I. Dourado¹¹Universidade Federal da Bahia, Instituto de Saúde Coletiva, Salvador, Brazil, ²Universidade Federal da Bahia, Instituto de Humanidades, Artes e Ciências Professor Milton Santos, Salvador, Brazil, ³Universidade do Estado da Bahia, Ciências da Vida, Salvador, Brazil

BACKGROUND: In Brazil, HIV prevalence continues to be disproportionately high among men who have sex with men (MSM). Recent surveys showed that HIV prevalence among MSM increased from 14.2% in 2009 to 18% in 2016. Optimism with new treatments and biomedical prevention strategies is also increasing along with decreasing public investments in health, reinforcement of stigmatization and discrimination and the resumption of a „moral“ discourse in HIV/AIDS prevention. We aimed to analyze narratives containing the „promiscuity“ discourse to justify HIV infection.

METHODS: Semi-structured interviews were used to assess processes, outcomes and meanings of HIV diagnosis among 10 young MSM 18 to 29 years of age in Salvador, the fourth largest city in Brazil. Interviews were conducted in a health service for diagnosis and treatment of HIV/AIDS. YMSM were recruited in the clinic waiting room for medical and psycho-

logical care. Based on a socio culturally-oriented approach, we analyzed narratives of „promiscuity“ recognizing that cultural and personal narratives are interconnected.

RESULTS: The narratives suggest that the discourse on „promiscuity“ seems to persist, or even are revitalized to explain the occurrence of HIV infection among MSM as well as emphasizing the choice of a more restrain sexual life style after the HIV diagnosis. Furthermore, feelings of fear of HIV transmission and guilt of HIV infection, barriers to new relationships including dilemmas on HIV transmission to a partner, are elements that stand out in the narratives. The promiscuity discourse may produce more stigma and discrimination, especially in the new wave of conservatism in Brazil that blame some people for the transmission of the virus and condemn practices and behaviors that do not conform to hegemonic heteronormativity.

CONCLUSIONS: The discourse of HIV prevention and health care practices needs to move beyond a moral discourse and needs to incorporate other non-biomedical strategies to reduce MSM vulnerabilities to HIV/AIDS, considering sociocultural aspects of everyday life, especially sexual stigma against MSM while at the same time open up a discussion on pleasure, eroticism, human rights and HIV in diverse interactive contexts especially in the education and health system.

Monitoring and evaluation of prevention

TUPED709

Police occupational health as an element of HIV risk environment: Factors predicting needle stick injury in the line of dutyL. Beletsky^{1,2}, D. Abramovitz², I. Artamonova², P. Baker^{2,3}, M.L. Mittal^{2,4},T. Rocha-Jimenez^{2,3}, M.G. Rangel Gomez⁵, J. Cepeda⁵, A. Banuelos⁶, P. Marotta⁷, M. Morales², E. Clairgue², T.L. Patterson², S.A. Strathdee²¹Northeastern University, School of Law and Bouvé College of Health Sciences, Boston, United States, ²University of California San Diego, Division of Infectious Disease and Global Public Health, San Diego, United States, ³San Diego State University, Graduate School of Public Health, San Diego, United States, ⁴Universidad Xochicalco, School of Medicine, Tijuana, Mexico, ⁵Mexican Ministry of Health, Mexico DF, Mexico, ⁶Secretaría de Seguridad Pública Municipal, Department of Planning and Special Projects, Tijuana, Mexico, ⁷Columbia University School of Social Work, Social Intervention Group, New York, United States

BACKGROUND: Amidst rising global prevalence of injection drug use, police officers report frequent contact with syringes in the line of duty. There is limited understanding of risks and protective factors for occupational needlestick injury (NSI) risk among police. Standardized tools are critical for effective prevention, monitoring, and response. By formulating and testing a set of risk and protective factors for NSI, we developed instrumentation, the Syringe Threat and Injury Correlates (STIC) Score, to measure officer vulnerability to occupational NSI.

METHODS: From February 2015-May 2016, Tijuana municipal police officers (N=1,788) received training on occupational NSI prevention as part of the SHIELD police education program and completed a survey regarding previous occupational NSI. We assessed frequencies of five self-reported syringe handling behaviors that constitute the STIC Score including:

1. overall syringe exposure,
2. experience transporting syringes,
3. experience breaking syringes,
4. experience discarding syringes in the trash, and
5. arresting suspects for syringe possession.

Measures of central tendency and dispersion were generated to assess the distribution of the STIC Score. Cronbach's alpha was calculated to assess internal consistency. Multivariable logistic regression via Generalized Estimating Equations was used to assess associations between the STIC score and NSI.

RESULTS: Among officers who indicated frequent or occasional exposure to syringes (n=1541), 1.5% (n=23) reported an occupational NSI in the past 6 months, of whom female officers reported NSIs more than male officers (3.8% vs. 1.2%; p=0.007). The STIC score demonstrated high inter-

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nal consistency (Cronbach alpha=0.84) with an overall distribution (scale of 1-4) that skewed towards less risk with a mean (sd) of 2.0 (0.8) and a median (IQR) of 2.0 (1.2-2.6). The STIC Score was significantly associated with recent NSI, with the odds of NSI being 2.4 times higher for each point increase in the score (p-value< 0.0001).

CONCLUSIONS: Syringe handling and arrest behaviors are associated with NSI report among police, constituting both an occupational safety and public health detriment. The STIC score represents an objective measure for evaluating interventions to reduce NSI among police.

Monitoring and evaluation of testing

TUPED710

The cost-effectiveness of evidence-based HIV testing interventions in six US cities

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BACKGROUND: HIV testing is the critical entry point for all HIV prevention, care and treatment interventions; however, testing levels remain suboptimal. We aimed to determine the incremental cost-effectiveness of four evidence-based HIV testing strategies in six US cities with differing rates of HIV testing.

METHODS: Built off a systematic evidence synthesis, we adapted and extended an HIV transmission model to replicate HIV microepidemics in Atlanta, Baltimore, Los Angeles, Miami, New York City and Seattle. We projected outcomes at the population-level and across a range of demographic groups over 25 years, holding HIV care at levels consistent with the latest available evidence and matching official population growth projections. Four HIV testing interventions in healthcare settings were identified in the US CDC's Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention and from recently published literature: opt-out routine testing in primary care, EMR testing offer reminders in hospital emergency departments, nurse-initiated testing in primary care, and opioid treatment program (OTP)-based integrated testing. For each intervention delivered over a 5-year sustainment period at a 50% scale of delivery (defined as the proportion of a target population who are provided with the intervention), we estimated incremental costs (2018 USD; including testing, implementation and other healthcare costs), quality-adjusted life years (QALYs) gained, and HIV infections averted for each intervention compared to the status quo, holding calibrated testing rates at 2015 levels.

RESULTS: Calibrated testing rates ranged from 11,017 per 100,000 population in Baltimore to 32,010/100,000 in New York City. We estimated HIV testing interventions delivered over a 5-year period to 50% of their respective target populations would result in total incremental cost savings ranging from \$0.06 million for OTP-based integrated testing in Atlanta, to \$1.10 billion saved for nurse-initiated testing in Miami by 2040. Outcomes ranged from 10 QALYs gained and five HIV infections averted for OTP-integrated testing in Seattle, to 16,243 QALYs gained and 6,153 HIV infections averted for nurse-initiated testing in Los Angeles.

CONCLUSIONS: Evidence-based HIV testing strategies were cost saving across all six cities, regardless of current testing rates. Efforts to increase HIV testing should remain a key component of HIV prevention strategies.

Monitoring and evaluation of treatment and care

TUPED711

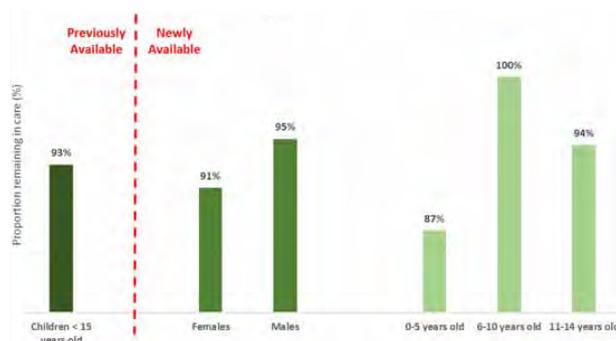
Expanded access to patient-level TB/HIV (big) data opens doors to enhance data utilization and improve data quality

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BACKGROUND: Longitudinal patient-level TB/HIV data in South Africa is largely located at the sub-district level. At this level, data is aggregated and uploaded to the country's routine health information system. This does not allow for more complex, nuanced analyses of these data at the provincial and national levels. This also prevents broader tracking of patient movement. Infrastructural and process constraints have made movement of the data above the sub-district challenging.

METHODS: The National Ministry of Health (MoH) has embarked on a data centralization initiative to create a national, patient-level TB/HIV data repository. While the broader, national centralization process is still underway, it has been done in select high-burden districts. The early results from these districts demonstrate the utility of a centralized, de-duplicated dataset.

RESULTS: This centralized data has allowed analysis of variables around gender (male/female) and age (e.g. < 5, 5-9; 10-14 years of age) and what proportion remain on treatment. This is illustrated in Figure 1. Centralization will continue to support further, more nuanced analyses - including more detailed disaggregations of critical indicators such as proportion remaining on treatment and lost to follow-up, as well as viral load completion and suppression. These analyses were not previously possible and allow the MoH to strategically target limited resources in support of improved patient retention and outcomes.



[Figure 1. Proportion of children (<15 years old) starting treatment in 2016 and remaining in care at 12 month duration*]

* Based on a subset of 6 randomly selected high-volume facilities in an un-named high-burden district]

Centralization of this data has also enabled a patient linkage exercise where individual records can be matched based on multiple variables, including national identification number, first name, surname, and date of birth comparisons. These linkage exercises are the foundational element of a patient de-duplication process, which will drive an improved understanding of ART patient retention and attrition.

CONCLUSIONS: Additional detail made available through centralizing these data, as well as consistent utilization of that detail, will support South Africa in achieving its 90-90-90 goals by 2020.

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TUPED712

Quality improvement approach to influence quality health care services for children and adolescents in wakiso district health facilities

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BACKGROUND: Children and adolescents are a special group of our population as they have special health needs especially in HIV Chronic Care. Quality of care for this age group has remained a challenge despite the efforts in place. Quality improvement approaches such as setting up quality improvement projects is another innovative strategy to address quality issues in care and treatment. Mildmay Uganda through the unfinished business project identified over 3000 children and 2500 adolescents between October 2015 and December 2017 and linked up to 71% to care however retaining them in care while virally suppressed has remained a challenge.

The main aim of setting up quality improvement projects was to improve viral suppression and retention among children and adolescents living with HIV in six health facilities in Wakiso district, Uganda.

METHODS: Twenty five Health care workers from six health facilities were trained in quality improvement (QI) approaches and methodologies, formed QI teams, came up with QI projects to improve viral suppression and retention into chronic care. Among the activities carried out to improve viral load suppression was viral load camps and intensified adherence counseling. Care takers of children in care were also grouped into economic support groups where they received health messages during the meetings. Mentorships and coaching were done to support the teams follow up on proposed changes. Projects were monitored monthly for six months and findings documented in a QI journal.

RESULTS: After 6 months of implementing QI projects there was significant improvement in viral suppression and retention of children and adolescents. The number of children and adolescents with suppressed Viral load increased from 64% to 100% in Kira Health center III, 68 to 91% in Nabweru HCIII, 37% to 60% in Kajjansi HCIII, 68% to 69% in Namayumba HCIV. While retention improved from 52% to 69% in Kasangati HCIV and 75% to 87% in Entebbe general Hospital.

CONCLUSIONS: Quality improvement approach is a key strategy for improving viral suppression and retention for children and adolescents living with HIV. It should be adopted to improve care along the continuum.

Monitoring and evaluation of HIV cascade

TUPED713

Harmonizing community prevention data in the National Prevention Database (NPD) system in CambodiaP.S. Ly¹, C. Rin², V.S. Lan¹, S. Samreth¹, S. Mam¹, S. Tep¹, C. Lanh¹, V. Bou¹, C. Rang², D. Nhim², S. Sokhan³, C. Im²¹NCHADS, Phnom Penh, Cambodia, ²FHI 360, LINKAGES, Phnom Penh, Cambodia, ³FHI, LINKAGES, Phnom Penh, Cambodia

BACKGROUND: Cambodia is committed to reaching UNAIDS 90-90-90 targets and ensuring that key populations (KPs) including female entertainment workers (FEW), men who have sex with men (MSM), transgender women (TG) and people who inject/use drugs (PWID) - are not left behind. Initiatives including outreach, risk tracing snowball (PDI+) and information communication technology (ICT) approaches hope to increase access to testing and treatment services for KPs. The National Center for HIV, AIDS, Dermatology, and STDs (NCHADS), with LINKAGES support, has developed a NPD to use real-time data to identify gaps and to improve management.

We report uptake and gaps of HIV interventions among key population using the program data generated from NPD.

METHODS: The NPD collect data on HIV and STI testing; HIV treatment, case management, and viral load testing. A unique universal identifier code (UUIIC) eliminates duplication. Meetings with implementing partners,

NCHADS, and other stakeholders were held to finalize prevention indicators and data collection tools. Program data from the harmonized NPD generates the HIV cascade including:

- (1) Number of KP reached;
- (2) Number of KPs tested for HIV;
- (3) Number of HIV reactive and confirmed; and
- (4) Number of HIV positive KPs enrolled in ART care.

The UUIIC allows linkage to the viral load DB. The NPD contains data on education activities, HIV testing, confirmatory testing, and training from 18 cities and provinces at this juncture. The open-source District Health Information Software Version 2 (DHIS2) serves as the NPD platform.

RESULTS: Between April and September 2018, 50,193 KP members were reached in the 18 cities and provinces; 25,607 were tested for HIV; 341 had reactive tests; 285 received confirmatory test results; and 240 were enrolled in HIV treatment.

CONCLUSIONS: The web-based, open source, NPD provides real-time prevention data that can be linked to care to better understand the uptake and gaps in HIV cascade among KPs by intervention approaches and by geographical coverage of each IPs. This data is crucial for national program and IPs to improve their interventions among KPs and provides an evidence-base for discussion/meetings for program improvement and help guide NCHADS responses to ensure continued epidemic control.

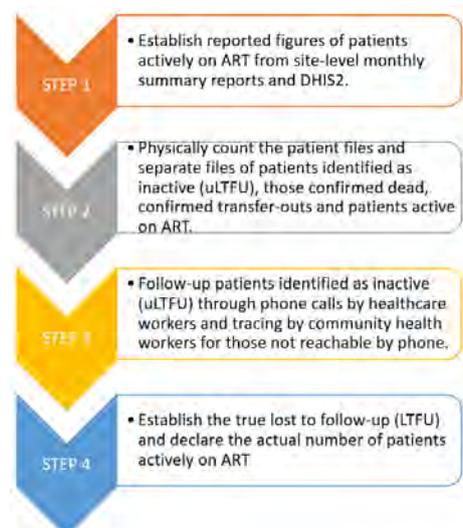
Monitoring and evaluation of health systems

TUPED714

Data actualization: A methodology to periodically monitor and update the reported number of patients active on ARTB. Kamangira¹, M. Deda¹, C. Marisa¹, T. Tapera¹, P. Nesara¹, T.T. Chinyanga², P. Mbetu², FACE-HIV Consortium¹OPHID, Strategic Information and Evaluation, Harare, Zimbabwe, ²OPHID, Executive Management, Harare, Zimbabwe

BACKGROUND: Over the years, the ART programme in Zimbabwe has expanded to see 86.8% of people living with HIV/AIDS being on treatment. This increase in the number of people on ART was met with an increased burden on health management information systems. As a result, the actual number of clients actively on ART has been fraught with data quality errors due to the systems inability to accurately discount deaths, losses to follow-up, and tracking of client movement between health facilities. It is against this background that we conceived the data actualization methodology to determine the actual number of patients actively receiving ART per given time.

METHODS: The process of conducting data actualization is outlined in figure 1.



[Figure 1: Data actualization process]

Data is collected by age-sex disaggregates. After step 4, agreement factors are calculated as the declared actual number of patients actively on ART divided by the facility's reported number of patients actively on ART. The actual number of patients actively on ART is then adopted by the health facility for reporting and programming.

RESULTS: We applied our proposed methodology at 602 health facilities across 24 districts supported by the FACE-HIV consortium in Zimbabwe. Overall, the number of patients actively on ART was being overreported by 11% by the facilities (agreement factor = 89%), with 41.7% of facilities having absolute differences of less than 5% between the reported and actualized figures. Of the 36,019 identified as inactive (uLTFU), 27.8% were able to be followed up and their ART status ascertained.

CONCLUSIONS: Our methodology provides a novel approach to periodically update reported ART figures for programme planning and monitoring, lending itself to general population censuses. We recommend institutionalizing the process at facility-level and have the process conducted semi-annually to minimize errors in reporting the number of patients active on ART as well as strengthen patient follow-up.

TUPED715

Determining the utilization of the electronic patient management system (EPMS) for patient management and care - an implementation fidelity approach to strengthening health systems

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BACKGROUND: More than 600 high volume ART sites are using EPMS to collate and manage patient-level data for ART clients. Investments in EPMS were aimed at ensuring effective management of HIV patients, minimize lack of follow-up with patients on treatment and improving the quality of HIV data reported by facilities. It is against this background that we conducted an EPMS scoping with a goal to determine the extent to which EPMS was being utilized in managing ART clients. Results were used to inform FACE-HIV program implementation for health systems strengthening.

METHODS: In December 2018, we assessed 302 health facilities with EPMS out of a total of 670 health facilities in 24 districts supported by the FACE-HIV consortium. The assessment focused on EPMS staffing, hardware and software, and EPMS reports generation. Data was captured using Microsoft forms and summary statistics produced using excel.

RESULTS: There were 69.2% of facilities with a data entry clerk (DEC). Of the 69.2% with DEC, 85.6% had DEC with formal training, 12% had DEC with informal training and 2.4% had DEC with no training at all. In terms of resources, 97% of facilities had a functional computer and 81.8% had a printer. Of those with printers, 96.8% had a functional printer and 55.6% had printer consumables. For patient management and care, only 36.4% and 46.4% of facilities generated Pre-ART and appointment lists respectively. For patient tracing, 41.7% generated lists of unconfirmed lost to follow up (90 days since last expected clinic visit) while 36.1% generated lists of defaulters (30 days since last expected clinic visit).

CONCLUSIONS: There is generally poor utilization of the EPMS as evidenced by low rates of reports generation by facilities. While this can be partly attributed to lack of resources and low staffing levels, there is need to strengthen DEC support and supervision at facility level. The FACE-HIV consortium, through the MOH district health executives (DHEs), proposed introduction of a weekly DEC schedule to assist the DEC with planning and organizing their work and a facility data management checklist to assist facility managers with management and supervision of DEC.

TUPED716

Impact of eHealth platforms and enhanced surveillance in strengthening, evaluating and improving performance in HIV programs: Evidence from the Zambian EQUIP program

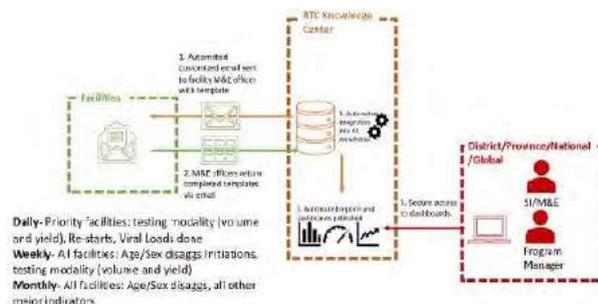
P. Pisa¹, M. Rennick¹, T. Muzvidzwa¹, F. Akpan¹, T. Maotoe¹, F. Chirwa², B. Chirwa², T. Xulu¹, C. Moyo², E. Sadoki², I. Sanne¹
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BACKGROUND: The requirement for more granular and frequent data in HIV service delivery is paramount as countries progress towards HIV epidemic control. A need for innovative eHealth platforms that cost-effectively provide on-going evaluations on key interventions against program performance are warranted. The EQUIP Zambia programme supports over 100 ministry of health ART facilities across three provinces. Initial ART initiation performance was lagging against expected targets. We explored the impact of enhanced surveillance through an eHealth platform coupled with evidence based technical and clinical activities as an intervention to improve program performance in Zambia.

METHODS: The EQUIP programme in Zambia implemented the Knowledge Center (KC) (figure 1) in Q2, an automated cloud-based eHealth platform that allows for real-time data collection, management, and analysis that enhances surveillance and action towards achieving program goals. Data was collected on a daily and weekly basis from priority facilities and reviewed in line with key technical and clinical interventions. Evidence based changes, and scale up of interventions were implemented specifically for each facility.

RESULTS: ART initiations increased 168% from 2,308 initiations in Q1 compared to 6,188 in Q4. This improvement is correlated with the introduction of enhanced surveillance techniques (figure 2).

CONCLUSIONS: The KC had a direct impact on significantly improving ART initiations and represents a low technology threshold to adopt in HIV programs. The KC represents a low technology threshold to adopt and can be integrated with other sources of data (like mHealth testing tools) to create an evidentiary view of program performance to drive targeted and tailored interventions.



[Figure 1: Process flow for EQUIP Zambia enhanced surveillance system]



[Figure 2: EQUIP Zambia new ART initiations, FY18]

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TUPED717

Improving data collection processes and reporting efficiencies in large HIV programsM. Lumpa¹, P. Kaumba¹, V. Kamanga¹, M. Walusiku¹, J. Mutale¹, C. Chitambi¹, L. Goma¹, K. Chiyenu¹, P. Somwe¹, T. Savory¹, M. Herce²¹Centre for Infectious Disease Research in Zambia, Strategic Information, Lusaka, Zambia, ²Centre for Infectious Disease Research in Zambia, Implementation Science, Lusaka, Zambia

BACKGROUND: Accurate, complete and good quality data are the fundamental drivers of programmatic decision-making and strategy formulation for achieving HIV/AIDS epidemic control. To collect, clean, verify, and aggregate data required for reporting in large HIV programs can be time and resource intensive. Web-based data capture tools, combined with simpler processes, can aid in improving data collection efficiency and data quality. Here, we report the experience of the Centre for Infectious Disease Research in Zambia (CIDRZ) in implementing a web-based data collection tool—Facility Information Management System (FIMS), based on DHIS2—for a large PEPFAR-funded HIV prevention, treatment, and care program in Zambia.

METHODS: FIMS is used by 150 data entry clerks, and supported by clinical staff, in 750 CIDRZ and PEPFAR-supported health facilities. We formulated several metrics to measure the efficiency and cost effectiveness of adopting FIMS, before and after implementation, including: length of time for data collection and reporting; steps involved in data collection; cost of man-hours using overtime pay; amount spent on other data collection related expenses; and number of data accuracy queries by the clinical team.

RESULTS: Data cleaning and verification duration was reduced by 67%. Previously, email, spreadsheets and other secure communication channels had been used to share de-identified aggregate data, this was significantly reduced. Overtime pay for data entry clerks was also reduced by 50%. Aggregation of data from multiple spreadsheets, on average 100 per indicator, were eliminated. Aggregated data from all 750 health facilities was reported to PEPFAR/ CDC using FIMS.

CONCLUSIONS: FIMS implementation was acceptable to end-users and resulted in a reduction of parallel data collection processes. Data verification no longer required multiple iterations of manual data reconciliation. Reductions in overhead from manual processes greatly improved the cost efficiency, the quality of data and reporting to the funder, with fewer reported data accuracy queries raised. Previous processes required a relatively high degree of technical know-how to compile data into a useable format, which was eliminated with the introduction of FIMS. In summary, using in-house resources and skills, implementing a web-based data collection tool was feasible, acceptable, and cost-efficient in the context of a large HIV program in Zambia.

Social and behavioural concepts and theories

TUPED718

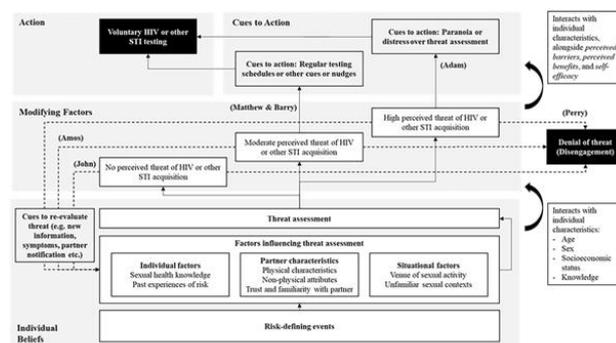
Factors influencing self-perceived threat of HIV and other STI acquisition and decision-making around voluntary testing among gay, bisexual and other men who have sex with men: A conceptual frameworkR.K.J. Tan¹, N. Kaur², M.I.-C. Chen^{1,2}, C.S. Wong²¹National University of Singapore, Saw Swee Hock School of Public Health, Singapore, Singapore, ²National Centre for Infectious Diseases, Singapore, Singapore

BACKGROUND: Gay, bisexual, and other men who have sex with men (GBMSM) are disproportionately affected by HIV and other STIs. While a low self-perceived risk of HIV or other STI acquisition is well-established as a factor that is negatively associated with HIV or other STI testing, less effort has been made to identify the processes through which GBMSM assess the perceived severity and susceptibility, or threat, of HIV or STI acquisition, and how they eventually relate to testing outcomes.

METHODS: We conducted a qualitative study exploring the factors influencing self-perceived threat, and the pathways that link threat assessment processes to HIV or other STI testing among GBMSM. Semi-structured interviews were conducted with 35 self-identified GBMSM in Singapore from October 2017 to June 2018, and the data was analyzed through thematic analysis borrowing techniques from the grounded theory approach.

RESULTS: Participants reported drawing on individual, interpersonal, and situational factors in determining their self-perceived threat of HIV or other STI acquisition. These include sexual health knowledge and past experiences of risk as individual factors, physical and non-physical attributes as well as trust and familiarity with sexual partners as interpersonal factors, and venues of sexual activity and familiarity of sexual contexts as situational factors. Participants also described four possible scenarios that followed threat assessment; these included a re-evaluation of, a denial of, assessing moderate levels of, or assessing high levels of self-perceived threat. These threat levels interact with individual attributes and other modifying factors to delineate various pathways to HIV or other STI testing among GBMSM.

CONCLUSIONS: The results of this study are framed through, and expand on the Health Belief Model, and have implications for HIV and other STI risk education and differentiated models of care for individuals who possess different levels of self-perceived risk.



[Figure 1. Conceptual framework and expanded Health Belief Model for strategies of threat assessment and pathways to HIV and other STI testing]

Strengthening social and behavioural data collection and analysis

TUPED719

Moving from 'it's impossible' to possible: Using REDCap to successfully manage studies using the multiphase optimization strategy (MOST) and other multicomponent intervention studiesA. Ritchie¹, C. Cleland^{2,3}, D. Sherpa¹, M. Gwadz^{1,3}, L. Collins^{4,5}, the HTH2 Collaborative Research Team¹New York University Silver School of Social Work, New York, United States,²New York University School of Medicine, Department of Population Health, New York, United States,³New York University, Center for Drug Use and HIV Research (CDUHR), New York, United States,⁴Pennsylvania State University, Methodology Center, State College, United States,⁵Pennsylvania State University, Department of Human Development and Family Studies, State College, United States

BACKGROUND: There is growing need for multicomponent interventions that address multiple, complex barriers to improving health outcomes for people living with HIV (PLWH). Studies examining the individual and combined effects of multiple interventions or components, such as those involving an optimization trial as part of the multiphase optimization strategy (MOST), present unique challenges for data management and study administration, because they often involve many more experimental con-

ditions than the standard randomized controlled trial. In this presentation we describe how the Research Electronic Data Capture (REDCap) secure web application can be used to manage longitudinal data collection and other research activities for these kinds of studies.

METHODS: In addition to study activities that are common across all participants, complex studies with multiple conditions require condition-specific data collection and intervention delivery, which pose significant project management challenges. We describe features of REDCap that address these challenges, and describe our direct experience using REDCap to manage a 16-condition optimization trial. The purpose of this trial was to examine five intervention components hypothesized to improve sustained HIV viral suppression among low-socioeconomic status African American/Black and Hispanic PLWH with poor adherence and detectable HIV viral load at baseline.

RESULTS: REDCap is a widely-used, secure web application for building data collection forms and managing research studies. To date, we have used REDCap to:

- 1) implement multistage eligibility screening for 3534 potential participants;
- 2) randomly assign 308 enrolled participants to one of 16 experimental conditions;
- 3) schedule and prompt for delivery the treatments corresponding to each experimental condition, that is, the different combinations of five intervention components; and
- 4) schedule and prompt for baseline and three follow-up interviews, as well as multiple laboratory tests.

In addition to facilitating the scheduling and delivery of common and condition-specific events over time, REDCap integrates data collection and study administration in a single web application, greatly increasing efficiency.

CONCLUSIONS: REDCap offers functionality that is well-suited to addressing project management challenges presented by multicomponent intervention studies such as those using MOST. By utilizing integrated data and research management platforms such as REDCap, researchers can efficiently implement complex intervention studies with multiple conditions.

TUPED720

Use of 'Design Thinking' tools to enhance the design process of user-centered interventions focused on HIV: A comparative case study

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BACKGROUND: There is scarce research that guides the design of interventions that target vulnerable populations like people living with HIV (PLWH) or healthcare services that provide care to PLWH. Design Thinking is a framework that has been mainly used in the business area and aims to find user-centered and innovative solutions to highly convoluted problems. This is a comparative case study that aims to analyze the contributions of a non-traditional and innovative framework in the design of two HIV interventions.

METHODS: This study compares two research projects that used qualitative methods and Design Thinking to develop two interventions that aimed at improving adherence to antiretroviral therapy among men who have sex with men living with HIV (MSM-LWH) (Project 1) and improving the performance of facilities that provide healthcare for PLWH in Mexico (Project 2). The target users were MSM-LWH and healthcare providers respectively. Through a matrix, we compared the analytical processes of each project and the result of incorporating Design Thinking and qualitative methods in the design phase.

RESULTS: In both projects, we collected data through interviews or focus group discussions, and in both, we conducted a team thematic analysis with a phenomenological approach. We then identified the main analytical categories and portrayed them into 'journey maps', a Design Thinking tool. This step allowed the identification of barriers, facilitators, and strategies across the patients' process towards their clinical care (Project 1) and across the healthcare delivery process of providers in healthcare facilities

(Project 2). This portrayal let us visualize and distinguish the main analytical categories towards the journey of each end-user, and further identify the key themes of each study that guided the focus of each intervention. While Project 1 ideated a habit-formation intervention, Project 2 identified two key areas to focus interventions that improve the facilities' performance: strengthening of facilities collaboration networks and reducing patients' abandonment to treatment.

CONCLUSIONS: Visualizing our end-users as the center of their process through the Design Thinking approach allowed a deeper understanding of their reality, enhanced the analytical process of theme identification, and led to the identification of the interventions' focus and design.

Mixed methods, integrated approaches and synergies in HIV research and intervention

TUPED721

'The woman gives': Exploring gender and relationship factors in HIV advance care planning among African American caregivers

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BACKGROUND: Advance care planning (ACP) is ongoing preparation of end-of-life health care preferences with family and healthcare providers to ensure mutual understanding. ACP rates are low among adults overall because these discussions are viewed as taboo. ACP rates are especially low among African Americans and persons living with HIV. Aspects of African American HIV informal caregiving relationship may affect ACP discussions.

METHODS: Data were from baseline surveys and semi-structured interviews with HIV caregivers of former or current drug using HIV patients in the AFFIRM Care study. Caregivers completed self-report surveys (N=311) and qualitative interviews (n=11) on caring for someone with HIV, whether they had discussed ACP, and potential facilitators of ACP discussion. Analyses used mixed methods. Poisson regression was conducted on quantitative survey data and findings were merged with grounded theory analyses of qualitative interview data.

RESULTS: Participants were mainly African American (96.1%). Approximately half were women (52.7%). Mean age was 51.4 years (SD = 11.1). Fewer than half of the quantitative sample had discussed ACP (41.2%). Surprisingly, among female caregivers, greater ACP knowledge predicted 76% lower likelihood of having discussed ACP with their care recipient (p<.001). Male caregivers who spent more time caregiving in a given week were nearly 3 times more likely to discuss ACP (p<.01). Greater caregiving mutual support (reciprocity) from care recipients was associated with having discussed ACP. The notion of "being a woman" was qualitatively discussed in relation to HIV caregiving by males and females, such that women were described as more likely to be caregivers and were expected to be caregivers more often.

CONCLUSIONS: The present research is one of few studies to explore ACP discussion among African American caregivers of a vulnerable, seriously ill population. Having discussed ACP with care recipients was uncommon, and findings suggest that caregivers' knowledge of ACP, was not a determinant of ACP discussions, rather, patient-caregiver relationship qualities (support reciprocity) were. The findings suggest the importance of interpersonal skill-building intervention may facilitate ACP in African American HIV caregiving relationships. Future research should ensure ACP and healthcare literacy and interpersonal skills to facilitate open, ongoing dialogue about ACP in African American communities.

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TUPED722

HIV prevention decisions by at-risk young women in South Africa: Proposing a novel Integrated behavioral journey framework using a mixed methods research approach

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BACKGROUND: In South Africa, HIV incidence rate of 1.51% among Adolescent Girls and Young Women (AGYW) is three times higher than men of similar age (0.49% incidence rate). Poor uptake of HIV prevention methods such as condoms is a key reason. The project objective was to understand behavioral drivers influencing adoption and adherence of HIV prevention methods among at-risk AGYW.

METHODS: Our research combines behavioral decision research, journey mapping and segmentation. The research was conducted over two sequential phases in high prevalence districts of South Africa. Phase One was a qualitative research with 240 AGYW split across 6 sub-groups based on their self-reported HIV prevention behaviors. The research focused on understanding decision-making contexts, journey pathways and behavioral drivers influencing AGYW prevention decisions. Phase Two was a quantitative field survey conducted with stratified random cluster sample of 2069 AGYW. Cluster modeling analysis was performed to identify distinguishing motivational factors and derive distinct behavioral segments.

RESULTS: AGYWs prevention decisions are moderated by their relationship and sexual health goals. HIV prevention is not the ultimate goal but may serve as a means to achieve the goals of AGYW. AGYWs who exhibited positive prevention behaviors had undergone a perspective change from focusing on pleasing their partners to protecting their sexual health as the path to achieve their goals. Three distinct segments as indicated in the table emerged from the quantitative research differentiated by relationship expectations, perceived control in relationships, perceived risk of acquiring HIV relative to other girls and emotions associated with HIV.

Segment Label	Relationship Expectations	Perceived control in relationships	Perceived risk of acquiring HIV relative to other girls	Emotions associated with HIV
Lifestyle Seeker	Materialistic Needs	Lowest	Higher	Fear and Hopeless
Affection Seeker	Safety/Desire	Relatively Moderate	Same	Hopeless, Anger and Confused
Respect Seeker	Self-Respect	Relatively higher	Lower	Fear, Confused and Anger

[Segmentation Output]

CONCLUSIONS: HIV prevention needs to be viewed in the context of AGYW's relationship and sexual health goals. We recommend an integrated behavioral journey framework that provides an understanding of sexual decisions of at-risk AGYW. The framework is comprised of four discrete decision milestones (opinion formed, new resolutions, internal reorientation and aligned lifestyle) that AGYW crosses in order to sustain safe sexual behaviors. Each of the segments have unique relationship and sexual health goals and crosses the decision milestones due to specific combination of behavioral drivers.

Qualitative and ethnographic methods in HIV research

TUPED723

Transactional sex and HIV risk among female university students in South Africa: A qualitative approach

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BACKGROUND: Transactional sex involves sexual relation in exchange for money and gifts. It has been associated with risky sexual behaviour and HIV infections.

AIM: The aim of this study was to explore dynamics of transactional sex relationship and HIV vulnerability among female university students.

METHODS: Using snowballing sampling, 10 female university students who are actively engaging in transactional sex relationships were individually interviewed using an unstructured interview guide. Data were analysed thematically.

RESULTS: Findings suggests the transactional sexual relationship among university female students is motivated by complex personal, social and economic reasons. Female students expressed that financial independence is their primary motivation for engaging in transactional relationships.

All of the participants expressed some level of agency concerning their choice of partner; however, there seems to be reduction in the level of agency as it relates to the inability negotiate safe sexual practices with the partners, as most of them are much older than the female students. Importantly, female students' inability to negotiate safe sex practices increases their risk for sexually transmitted infections, particularly HIV but is downplayed by their desire to get their 'financial wants' met by the men.

CONCLUSIONS: This research underscores the need to recognise that transactional sex is commonly practiced amongst the university community with major psychosocial and health implications that goes unrecognised.

Despite the educational background of these female student participants, they continue to expose themselves to risky behaviours in exchange for money and gifts.

Higher education institutions need to do more about HIV prevention education among students, to equip young people; especially, young female students with the tools, skills and knowledge to more successfully navigate safer sexual practices.

KEYWORDS: Transactional sex, sex exchange, university female, HIV, risky sexual behaviour

TUPED724

'Either you float or you drown:' Social ties, stigma, and lived experiences of the HIV care continuum in HPTN 065

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BACKGROUND: HPTN 065 evaluated the role of financial incentives (FI) in viral suppression. Qualitative exit interviews were conducted in a sub-study of 73 patients at 14 clinics in Washington, DC and Bronx, NY. Participants were categorized as "Low-Adherers" (n=13), in "Action" (n=29) or "Maintenance" (n=31) based on viral load clinic data.

This secondary analysis of substudy data explored the influences of social support and stigma across adherence and socio-demographic categories.

METHODS: After reviewing half of the original transcripts to identify thematic content related to social support and stigma, the first author conducted new queries using existing substudy codes and adherence categories.

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She developed memos and matrices to describe and track participants' descriptions of key constructs:

- (1) social ties mentioned;
- (2) supportiveness of ties;
- (3) HIV-related stigma experiences; and
- (4) perceived community awareness of O65.

The first and second authors discussed emerging insights and their relationship to original analyses.

RESULTS: Participants were mostly male (64%), African American (58%) with yearly income under \$10,000 (52%). Mean age was 44 years. Low-adherers identified fewer and sometimes combative social ties. Participants in Action were motivated by partners and family members who mostly provided emotional support (19/29). Maintainers also identified supportive ties but relied less on social ties for motivation (21/31). Low-adherers described current experiences of stigma related to HIV diagnosis more than other stages (7/13). Individuals in Action described stigma related to disclosing their status (15/29) while individuals in Maintenance stigmatized others engaging in "risky" behaviors more than other stages (10/31). Women may perceive greater HIV stigma of diagnosis than men and perceive social ties as less supportive. Women were the majority of Low-adherers and the minority in Maintenance. Women may also stigmatize others who engage in 'risky' behaviors more than men.

CONCLUSIONS: Fewer supportive ties and greater HIV stigma impede medication adherence. Future research will explore these relationships in the larger HPTN 065 participant sample. Low adherence is a stage during which programs must promote skill-building to foster supportive social relationships. Additionally, gender equity-based approaches can facilitate community de-stigmatization of HIV among African Americans, given that women may be at greater risk of negative HIV health outcomes.

Community engagement in research and research dissemination

TUPED725

The acceptability of Combined Community Engagement Strategies Study (ACCESS): Results of a novel pilot for extending community feedback on HIV clinical trials

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BACKGROUND: While community advisory boards (CABs) are an important and widely-used community engagement strategy, the UNAIDS/AVAC Good Participatory Practice (GPP) guidelines encourage the use of additional advisory mechanisms to extend feedback for HIV clinical trials. To date, there is a lack of research on how to combine community engagement strategies for HIV clinical trials, as well as whether and how community feedback varies by type of advisory mechanism. To address these gaps, we conducted a pilot called The Acceptability of Combined Community Engagement Strategies Study (ACCESS). The goal of ACCESS was to combine and compare two community engagement strategies in the context of a phase 1 HIV antibody trial (ClinicalTrials.gov identifier NCT03803605): CAB engagement and crowdsourcing. Crowdsourcing involves having community members attempt to solve a problem and then publicly sharing exceptional solutions.

METHODS: CAB and crowdsourced approaches were implemented in a series of three parallel engagement activities to collect feedback on informed consent, trial participation experiences, and fairness/reciprocity. CAB engagement was conducted through group discussions with mem-

bers of an HIV CAB. Crowdsourcing involved open community events using innovative tools for accessible participation, including guided discussions about an interactive video and animated vignettes, as well as a creative idea contest with online and in-person submission opportunities. Open coding and analysis of emergent themes were conducted to compare CAB and crowdsourced feedback.

RESULTS: Participants included nine CAB members and 38 attendees of crowdsourcing events; our crowdsourcing contest received 27 submissions. Demographic data revealed CAB members had higher levels of education and income compared to crowdsourcing participants. Similarities in CAB and crowdsourced feedback included recommendations for enhancing communication of trial information and supports for trial participants. Each community engagement strategy also resulted in unique concerns regarding HIV clinical trials. CAB feedback expressed concerns with institutional regulations and tailoring clinical research to individual participants' needs. Crowdsourced feedback revealed concerns with compensation, potential harms of trial procedures, and alternative methods for learning about HIV clinical trials.

CONCLUSIONS: Combining community engagement strategies can yield a broader range of stakeholder feedback to inform HIV clinical trials. Crowdsourcing can complement and extend community feedback on clinical HIV trials.

TUPED726

Community engagement in HIV key populations hotspots mapping and size estimation in Nigeria

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BACKGROUND: Nigeria has the second largest population of people living with HIV in the world. Despite having a generalized epidemic, HIV prevalence is higher among key populations (KP): men who have sex with men (MSM) (22.9%), brothel (19.4%) and non-brothel based (8.6%) female sex workers (FSW), and people who inject drugs (PWID) (3.4%). Engaging KP community members during formative assessment is essential to understand challenges and inform development of accurate hotspot (hotspots are places where KP congregate and conduct or negotiate the relevant KP behavior) maps in preparation for KP size estimations (KPSE) that will ultimately inform targeted HIV programming.

METHODS: In July 2018, we conducted advocacy visits, key informant interviews (KI) and focus group discussions (FGD) among KP stakeholders and community gatekeepers in seven PEPFAR-funded states to identify KP hotspots and prepare population size estimation using capture-recapture (CRC). Participants were asked about social networks and virtual social platforms, peak hotspot activity periods, service access, security issues (study staff may encounter), unique object preferences for CRC, and approaches for study staff selection. We selected and trained KP community members as enumerators for hotspots mapping and CRC.

RESULTS: We conducted 189 FGDs involving 2,079 KP participants and 112 KIIs were conducted. We identified 16,336 active hotspots across the seven PEPFAR-funded states: 11,770 for FSW, 1,667 for MSM, and 2,899 for PWID compared to 5,170 for FSW and 1,184 for PWID in 2015. Mapping and validation identified 570 net new hotspots. Consenting rate for CRC was very high, (range: 95.7% - 99.7%).

CONCLUSIONS: Engaging local KP community members revealed previously unknown hotspots and extended the reach of enumeration to districts in each state beyond metropolises and state capitals and to inner recesses of these hidden groups. This strategy enabled easy access into the communities, minimized security issues as study team was forewarned, improved study acceptance, and increased KP community mem-

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ber involvement and ownership. Additionally, relationships with the KP community were strengthened for future collaboration on targeted HIV program development and implementation.

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Role of social and behavioural science in biomedical responses

TUPED727

Young MSM and heterosexual men's high acceptability of long-acting implants and injections for HIV prevention in South Africa: Results of a discrete-choice experiment

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BACKGROUND: Long-acting (LA) pre-exposure prophylaxis (PrEP) such as implants and injections offer promising alternatives to existing prevention methods for their potential simplicity, discretion, and longer dose duration. Currently, PrEP implants are in preclinical development and PrEP injectables are in human trials. Assessment of preferences for LA PrEP among men provides insights for product development, thereby enhancing downstream male engagement in HIV prevention.

METHODS: A discrete choice experiment (DCE) survey was conducted with 408 heterosexual men and men-who-have-sex-with-men (MSM), aged 18-24 in Cape Town, South Africa, to assess acceptability and preferences for LA-PrEP. Heterosexual males (n=207) were recruited using representative, population-based sampling. MSM (n=201) were recruited through convenience sampling and social networks. The DCE evaluated five attributes of LA-PrEP (delivery form, effectiveness duration, insertion location, soreness, and availability), each with 2-4 pictorially-depicted levels. In randomly-allocated sequences, men were presented with nine choice sets, and chose two hypothetical LA products. Preference weights and relative importance (RI) scores were estimated using random parameters logit modelling, with interaction terms for sexuality.

RESULTS: Median age was 21 (IQR 19-22); 60% completed secondary school and 48% were currently in school. Two-thirds had a current primary partner, 45% reported >1 recent sexual partner, and 31% of MSM also have sex with women. Preference data indicated men's interest in LA PrEP: 96% of hypothetical product choices would be actually used if available. Product duration and form were the most important attributes, with longer duration significantly more important to MSM (RI 3.3 vs. 1.9, p=0.004). Insertion in the arm was preferred over bum. MSM had significantly less preference for an implant (p=0.007). However, when modelling trade-offs, an estimated majority of both groups would choose a 6-month implant (68%) over a bimonthly injection (32%), and most MSM (90%) and heterosexual males (83%) would choose a 12-month implant over a bimonthly injection.

CONCLUSIONS: Young South African men indicated high acceptability for LA PrEP, with preferences for longer duration and injectable, particularly among MSM. However, most were willing to trade their preferred delivery form for a longer-acting product. Men are an important end-user population for LA strategies and further research into their acceptability is a priority.

Positive health, dignity, psychological well-being, and mental health

TUPED728

Mental health and retention in HIV services among adults initiating antiretroviral therapy in Tanzania

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BACKGROUND: Depression is common among people living with HIV globally and has been associated with lower retention in HIV services and suboptimal antiretroviral therapy (ART) adherence. However, following implementation of "Treat All" guidance for rapid ART initiation after confirmed HIV positive diagnosis, there is limited knowledge about depression among newly diagnosed patients initiating ART. Measuring the prevalence and consequences of depression among present-day ART initiates is important for providing appropriate care and for achieving the UNAIDS "90-90-90" targets aimed at ending the AIDS epidemic.

METHODS: To address this gap, we evaluated depressive symptoms among 530 HIV-infected adults who had initiated ART within the last 30 days and who were participating in an economic intervention trial at four health facilities in Shinyanga region, Tanzania. Participants were assessed upon study enrollment (April to December 2018) using the Hopkins Symptoms Checklist (HSCL-25) to identify symptoms consistent with major depression.

We used generalized linear models adjusting for sociodemographic characteristics to determine the associations between: a) time since HIV diagnosis and depression; and b) depression and attendance at the subsequent clinical appointment, typically 14 to 30 days later.

RESULTS: The median participant age was 35 years, 62% were female, 92% had initiated ART within 1 month of HIV diagnosis, and 89% had conditions classified as WHO Clinical Stage 1 or 2. At the time of assessment, 16% of participants had been diagnosed HIV positive within the past week (median: 20 days). Nearly one in four participants had depressive symptoms (24%), with a higher prevalence among women (29%) compared to men (15%). HIV positive diagnosis within the past week was associated with depression after multivariable adjustment (Risk ratio = 1.49; 95% confidence interval: 1.10, 2.03). Depression was not associated with attending the subsequent clinical appointment (Risk ratio = 1.02; 95% confidence interval: 0.81, 1.28).

CONCLUSIONS: Depressive symptoms were common among ART initiates in this semi-rural region of Tanzania, particularly among those most recently diagnosed with HIV. These findings underscore the need for integrated mental health evaluation and treatment from the start of HIV care. Longer follow-up time may further elucidate the consequences of depression on treatment outcomes among ART initiates.

TUPED729

Mental health outcomes of an intervention to improve ART adherence among MSM living with HIV in Mexico

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BACKGROUND: Mental health problems are one of the most significant barriers to antiretroviral therapy (ART) adherence. In 2017, we combined qualitative methods with "design-thinking," a user-centered approach, to develop a habit-formation intervention to improve ART adherence among

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men who have sex with men (MSM) living with HIV in Mexico. Since November 2017 we have implemented a multicenter, parallel, randomized controlled trial of the intervention with 146 MSM.

METHODS: "FUERTES" (Spanish for "STRONG") is a four to six-month intervention with two main components: an adherence kit and a coach. The kit includes a habit-formation tool that can be accessed through a web platform, a mobile app or a booklet; information regarding living with HIV, and several gadgets that facilitate ART intake. The coach is a professional psychologist assigned to intervention arm patients with additional barriers such as depression, unemployment, substance abuse or lack of social support. Through one-on-one sessions outside the clinic, the coach teaches habit-formation techniques, provides emotional support and refers patients to relevant mental health services. The coach continuously communicates through text messages with the patient, who has the option to meet with an HIV-positive peer to share experiences in one session. We evaluated mental health outcomes: depression (PHQ-9 questionnaire), addiction to alcohol (AUDIT) and addiction to drugs (DAST-10) at four and ten months and analyzed the differences between groups.

RESULTS: 57% of the sample has completed their four-month follow-up (83 participants), 36 participants were designated to the control group and 38 to the intervention group. Mean age was 32 (CI 95%: 29.96 - 33.80), baseline characteristics, CD4 count and viral load were no different between groups. 27% of the control group participants reported having a moderate to severe depression compared to 7% of the intervention group ($p=0.038$). Also, 10% of the control group participants reported having a considerable high drug consumption compared to 0% of the intervention group ($p=0.017$).

CONCLUSIONS: Preliminary findings show that FUERTES has the potential to improve mental health and substance abuse outcomes of MSM living with HIV in Mexico. Results of the 10-month follow-up will help identify whether these outcomes associate with mid-term adherence.

TUPED730

Influence of stigma and discrimination on psychosocial health in children affected by AIDS in Nepal: A cross-sectional study

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BACKGROUND: Children Affected by AIDS (CABA) endure higher level of stigma and discrimination in the community and health facility. Such discrimination results into poor psychosocial condition. CABA comprise of children who have HIV-positive status either HIV positive; children with one or more HIV+ parents/caregivers; children who lost one or both parents to AIDS or children living in the house with one or more HIV+ person (s). Little is known about the influence of stigma in family, health facility, and among peers on psychosocial condition of CABA in resource-limited settings. Therefore, the study aimed to examine the influence of stigma and discrimination on psychosocial consequences in CABA.

METHODS: A cross-sectional study was conducted among 468 Children aged between 2 to 14 years who were affected by AIDS from March to April 2019 in Nepal. Children's psychosocial distress, fear of isolation, and care seeking support for the psychosocial problems were measured using questionnaires and scales developed by AIDS Psychosocial metrics. Stigma and discrimination perceived by children were measured using stigma, discrimination inventory for AIDS Affected Children. The associations between stigma and discrimination with psychosocial consequences were analyzed using multiple regression and logistic regression analysis.

RESULTS: Of 468 children, 38% reported that they experienced any form of stigma from the community. In addition, 44% experienced stigma from their peer at school or at their playgroup and society.

Those who experienced stigma were more likely to have fear of isolation compared to those who did not experience stigma (AOR: 2.48, 95% CI: 1.50, 4.11, $p < 0.001$). CABA were more likely to have lower score for support seeking for psychosocial support ($\beta = -0.55$, $p = 0.021$) when they experienced stigma. Additionally, children were more likely to have higher scores for psychological distress if they had stigma and discrimination ($\beta = 1.30$, $p = 0.005$).

CONCLUSIONS: CABA experienced higher forms of stigma and discrimination that resulted in poor psychosocial well being and fear of isolation in Nepal. The results highlight the need of psychosocial counselling and support services to children at their school and in the mutual support groups to improve their better mental health status.

TUPED731

How youth living with HIV in Uganda experience stigma: Results of a photovoice study

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BACKGROUND: As Youth Living With HIV/AIDS (YLWHA) continue to survive and live with HIV chronically due to effective Antiretroviral Therapy (ART), it is paramount to work toward addressing their psychosocial well-being and Quality of Life (QoL) in general. HIV-stigma has been identified as a significant stressor augmented by HIV-medication that affects their QoL. In this study we explored HIV-stigma as a potential stressor reducing QoL of YLWHA by answering the following research question: "how do YLWHA in Uganda experience stigma and its effects on their daily life?".

METHODS: Photovoice, a participatory action research method suitable for vulnerable and marginalized populations (Wang & Burris, 1997), was used to get insight on elicited experiences of stigma in 10 YLWHA (15-19 years), purposively selected from a hospital based peer support group. Data in form of interview transcripts, focus group transcript and photographs were subjected to inductive thematic coding (Braun & Clarke, 2006) and analysis was grounded in interpretive phenomenology.

RESULTS: We identified five interrelated themes in which dualities of internalized vs externalized stigma experiences were reported. These themes were: devalued humanity, isolation, fear, violation of rights and future perspectives. In each of these themes, stigma was mainly fueled by ignorance, myths and historical events.

CONCLUSIONS: These themes illustrate the multifaceted nature of HIV-stigma and its impact on QoL. The findings also bring to light an eminent need to address HIV-stigma by focusing on both the stigmatized and the "stigmatizers" through interdisciplinary interventions that appeal to different QoL domains.

TUPED732

Experienced stigma, mental health, and life outlook: Select data from a quality of life survey of PLHIV in five fast-track cities

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BACKGROUND:

The Fast-Track Cities (FTC) initiative, committed to attaining the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 targets, recognizes the importance of addressing the health-related quality of life (HR-QOL) of people living with HIV (PLHIV). The FTC Quality of Life Survey sought to assess HR-QOL for PLHIV, including stigma, mental health, and life outlook.

METHODS: A 45-question survey was fielded online across 29 Fast-Track Cities. The survey, which consists of validated HR-QOL questions, received an Independent Review Board (IRB) exemption from Pearl IRB (Indianapolis, IN, USA). A total of 4,493 PLHIV across 29 cities completed the survey (as of January 18, 2019), including 222 in Bangkok (Thailand), 520 in Durban (South Africa), 254 in Miami (USA), 111 in Madrid (Spain), and 419 in Salvador (Brazil).

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RESULTS: Reported stigma experienced within the community were relatively low in Salvador de Bahia and Bangkok, at 17% and 13%, respectively. However, the figure jumped for Durban, Miami, and Madrid with 52%, 50%, and 34% of respondents, respectively, saying they had felt stigmatized by their community in the past year.

Sizable percentages of PLHIV in Bangkok and Salvador reported feelings of anxiety or depression, at 70% and 54%, respectively. In Durban, 70% of respondents reported such feelings; 68% in Madrid, and 84% in Miami. Feelings of anxiety or depression were associated with age and gender in Durban (85% age <50; 67% men) as well as in Miami (69% age >50; 57% men) and gender in Salvador (69% men).

With regards to outlook on life and living with HIV, respondents in Bangkok (49%), Miami (46%), and Salvador (40%) most often reported a positive outlook.

Significant percentages of PLHIV who are on antiretroviral therapy (ART) in Bangkok (93%), Madrid (93%), and Salvador (91%) reported a positive life outlook. In Miami, only 46% of respondents consistently on ART reported a positive life outlook.

CONCLUSIONS: Attaining the UNAIDS 90-90-90 targets in Fast-Track Cities requires efforts to close gaps across the HIV care continuum. These efforts should include conducting periodic assessments of overall HR-QOL of PLHIV and engaging in a holistic approach to improve PLHIV's outlook on life and living with HIV.

Adaptation to living with HIV for individuals, families, and communities

TUPED733

Psychosocial variables related to serostatus disclosure to couples in Mexican people with HIV

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BACKGROUND: Serostatus disclosure to couples in people living with HIV (PLWH) has been associated with positive results in emotional adjustment to HIV infection as well as in self-care behaviors such as adherence to antiretroviral treatment, retention in care and consequently reduction of transmission risk. However, there are high percentages of non-disclosure due to barriers perceived by individuals as well as for negative consequences that affect their psychological well-being and mental health. The aim of this study was identified psychosocial variables related to non-disclosure of HIV diagnosis to couples (barriers).

METHODS: Cross-sectional study carried out at an HIV clinic in Mexico City between November 2012 and May 2013. We included PLWH under antiretroviral treatment, with a couple at the moment of data collection. Sex, age, employee or not, couple's type (stable, occasional and both), couple's sex, time since HIV diagnosis, depressive and anxious symptoms were the variables included in analysis. A structured questionnaire and validated psychometric tests were used to measure variables. Data analysis included descriptive, unadjusted and adjusted analysis through logistic regression.

RESULTS: Two hundred and seven PLWH were included, 89.4% (n=185) were males, with mean age 35.57 years (SD=8.43) and mean time since HIV diagnosis of 61.57 months (SD=58.33); 33.8% (n = 70) had not disclosed their diagnosis. In unadjusted analysis, variables associated with non-disclosure included being man (OR=3.6 95%CI 1.1-12.8, p=.034), having an occasional couple (OR=33.2 95%CI 5.5-199.4, p<.001), less time since diagnosis (less than 19 months OR=2.9 95%CI 1.2-7.4, p=.014; 19 to 40 months OR=3.8 95%CI 1.4-10.1, p=.004; 41 to 90 months OR=2.7 95%CI 1.1-7.0, p=.028; comparing with >90 months) moderate anxiety symptoms (OR=3.0 95%CI 1.3-7.0, p=.006) and severe depression symptoms (OR=3.8 95%CI 1.1-13.4, p=.022). In adjusted analysis, having occasional couples (aOR=44.7, 95%CI 8.9-223.0, p<.001) and severe depressive symptoms (aOR=32.2 95%CI 3.6-291.7, p=.002) were variables associated with non-disclosure, the model showed a good fit (R²=.448, p<.001).

CONCLUSIONS: Identifying related psychosocial variables for non-disclosure of HIV diagnosis to couples (barriers) could help to design psychological interventions aimed to promoting serostatus disclosure with beneficial results in psychological well-being and clinical outcomes in PLWH.

TUPED734

Real lived experiences of being LGBTI and HIV positive

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BACKGROUND: The evolving disease epidemiology in Zimbabwe and the Sub Saharan region shows that while HIV incidence is declining in many parts of Southern Africa, incidence patterns among KPs do not reflect this progress. Studies conducted in Southern Africa region have found HIV prevalence rates 10-20 times higher among SWs than among adults in the general population, with rates of HIV infection reaching 50% of all SWs tested, and HIV prevalence reaching 86% in one study from Zimbabwe. This large disparity in HIV incidence is largely due to the criminalization of key populations; Zimbabwean legislation criminalizes same sex sexual conduct. Key populations suffer pervasive negative attitudes, stigma and discrimination upon seeking health care services; HIV prevention measures such as condom use drop as a result, or become neglected due to contributory factors such as alcohol abuse and gender-based violence.

METHODS: Using a LOOKING IN AND LOOKING OUT (LILO) - a tool developed to explore experiences, challenges, fears and struggles of LGBT persons by allowing one to look into their lives so as to be able to look out into the future. LILO allowed for visualization, conceptualizing and storytelling then using videography and photography to explore the psychosocial baggage, explore experiences, challenges, fears and struggles for LGBT persons. The lived experiences of the cohort of LGBT persons engaged with the LILO concept were captured in stories, videography and photographs as tools for advocacy.

RESULTS: The engagement has resulted in a powerful group of 15 activists who bravely share their experiences , a collection of still photographs , a 15 minutes video speaking about the experiences of being HIV positive and finally a booklet that narrates these experiences have been the results of this engagement. All these seek to see the decrease in stigma and discrimination of HIV positive community members

CONCLUSIONS: We shall be engaging in advocacy dialogues with health care workers, policy makers, parliamentarians and civic society organizations to raise awareness around challenging stigma and discrimination targeted towards Key Populations and push for change in retrogressive policies that inhibit full access to HIV prevention and care services for Key Populations

Experiences and impacts of antiretroviral therapy

TUPED735

"Not a walking piece of meat with disease": Undetectability and quality of life among HIV-positive gay, bisexual and other men who have sex with men in the U=U era

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BACKGROUND: Gay, bisexual, and other men who have sex with men (GBMSM) are disproportionately represented in prevalent HIV infections. HIV remains heavily stigmatized globally, which may subsequently negatively impact the quality of life of people living with HIV. While past studies have investigated how people living with HIV have reconstituted, or

reconstructed their identities post-diagnosis, few have done so in the undetectable=untransmittable (U=U) era. This study attempts to interrogate the role and meanings of ‚undetectability‘ as a status achievement, and its subsequent impact on the quality of life among GBMSM living with HIV.

METHODS: We conducted 24 semi-structured in-depth interviews with a purposively recruited sample of GBMSM living with HIV in Singapore from October 2017 to July 2018. Topics explored included experiences surrounding their diagnosis of HIV, linkage to care, with formal and informal support systems, and with healthcare institutions and staff. Interviews were audio-recorded, transcribed, coded, and analyzed through thematic analysis adopting elements of the grounded theory approach.

RESULTS: Most participants learnt about ‚being undetectable‘ through their healthcare providers or their peers in the gay community. We found that being undetectable was an aspiration for many participants following their diagnosis with many viewing it as a “turning point”, and expressing a sense of achievement upon attaining the status. Participants shared that being undetectable was associated with several positive outcomes in the context of their identities; firstly, it meant that they were healthy, and it was “the best stage” that a person living with HIV could achieve; secondly, it meant that they were responsible to themselves and their loved ones, in contrast to the construction of HIV as a moral failing; thirdly, it meant that they could have romantic or sexual relationships with a sense of equity; finally, it meant that they were liberated from an illness experience, and that they would not “die ugly”.

CONCLUSIONS: The results of this study highlight the importance of undetectability in the U=U era as a status achievement for many GBMSM. We recommend that HIV prevention marketing focus on promoting the science underlying U=U, and treatment as prevention to empower GBMSM living with HIV.

Growing up with HIV: specific needs and interventions for children and adolescents

TUPED736

A grounded theory of HIV-Stigma among youth living with HIV in Western Uganda

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BACKGROUND: HIV-stigma undermines prevention, care, treatment and Quality of Life of people living with HIV but efforts to fight it in Uganda have yielded dismal results. Although all People Living With HIV experience stigma in various forms, the Youths Living With HIV/AIDS (YLWHA) suffer a disproportionately high burden especially in schools and particularly when it is perpetuated by school staff and peers who would otherwise support them. This has led many of these youths to shun treatment or to drop out of school in order to maintain secrecy of their HIV-positive serostatus. This study presents an explanatory theory for HIV-stigma among youths in secondary schools of western Uganda, on which the fight against HIV-stigma in schools can be rooted.

METHODS: This presentation utilizes data from a grounded theory study with 35 purposively selected YLWHA, aged 12-19 years, conducted between May 2018 and August 2018. Participants were selected from three Antiretroviral Therapy (ART) accredited health facilities in western Uganda using ART registers and interviewed at ART clinics on their clinic days following their medical appointment. Audio data was transcribed verbatim, coded inductively in NVIVO10 software and analyzed following grounded theory techniques (Charmz, 2006).

RESULTS: In the school context, stigma is experienced as rumors/gossiping, mistreatment, taunting/belittling, discrimination and bullying/teasing. Negative attitudes, fear and ignorance around HIV/AIDS cause it while

the physical health and medication of YLWHA as well as negative talks about HIV from others trigger it. Consequentially stigma leads to suicidal tendencies, unhappiness, isolation, school dropout and loss of friendship. Coping strategies, supportive networks and sensitization of YLWHA and others around them ameliorates the causes and consequences of HIV-stigma.

CONCLUSIONS: HIV-stigma is caused by ignorance, fear and negative attitudes around HIV/AIDS, factors that schools would intrinsically address indicating relegation of this role. Yet, consequences of stigma affect school attendance and psychosocial wellbeing of YLWHA at school. In order to improve the quality of life of YLWHA, de-stigmatizing HIV in all social spheres including schools is paramount. Contextual ongoing sensitization about HIV transmission, dangers of HIV-stigma, dispelling stigmatizing beliefs and empowering YLWHA to cope with and challenge stigma should be promoted in schools.

Ageing with HIV: evolving and additional needs and responses

TUPED737

“We should choose or decide. You know, we’re the ones that are here”: Selecting community-based research priorities in aging with HIV

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BACKGROUND: Palm Springs, California, is a retirement community with the highest prevalence of people living with HIV (PLWHIV) over age 50 in the United States. We conducted focus groups with multiple HIV and aging stakeholders to select priority topics for future comparative effectiveness research on HIV and aging.

METHODS: In early 2018, PLWHIV over 55 years of age, HIV health professionals and, CBO representatives were recruited to participate in focus groups. Following community-based participatory research (CBPR) principles, study materials including all focus group questions were created by a 10 person steering committee of PLWHIV, their caregivers, HIV care providers, CBO members, and researchers. The focus groups were facilitated by trained community members living with HIV. Systematic analysis of focus group data was conducted using the rigorous and accelerated data reduction (RADaR) technique.

RESULTS: Eighteen PLWHIV, eight health professionals and, eight CBO representatives participated in the focus groups. Most were non-Hispanic white (79.4%), 17.6% identified as Hispanic and 3% as Black. 85.3% of participants were male, with the remaining being women (cis and Trans). For future research, PLWHIV wanted to drive the topics. “We should choose or decide. You know, we’re the ones that are here”. The PLWHIV participants wanted research on the long term effects of HIV treatment. In addition, they reported a need to research mental health of people living with HIV, especially depression, social support, and isolation. The health professionals and CBO group echoed the priorities among those living with HIV “take it back to the community and say, what do you think?”, but also discussed drug interactions with HIV medications, and comorbidities. There was also robust discussion about the need for more behavior-based research around social determinants of health in HIV such as income, housing, healthy behaviors, and resiliencies.

CONCLUSIONS: PLWHIV, health professionals and CBO representatives agreed that research topics concerning those aging with HIV should be selected by community members aging with HIV. The patient perspective on priorities in future HIV and aging research is particularly important, and is in line with the Denver Principles. It is time we center research around patient interests and needs.

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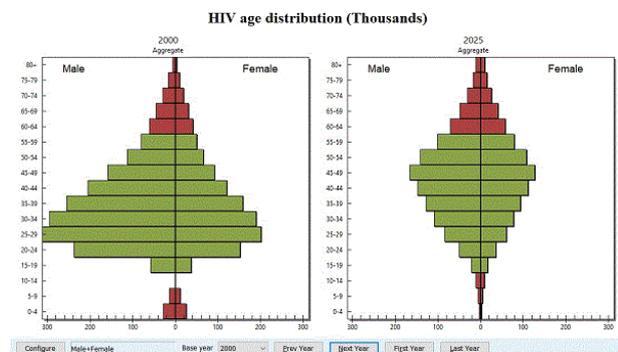
TUPED738

Ageing of HIV epidemic in India: Insights from HIV estimation modelling under National AIDS Control ProgrammeP. Kumar, A. Kumar, S. Rajan
National AIDS Control Organization, New Delhi, India

BACKGROUND: India undertakes HIV estimations exercise biennially to track the burden and characteristics of HIV Epidemic in India. As per HIV Estimations 2017, the latest round, India is estimated to have 2.14 million HIV positive population which is the third largest globally. Rapid expansion of antiretroviral therapy has increased survival for individuals living with HIV and the population infected with HIV is getting older. We aimed to quantify ageing of the HIV population in India.

METHODS: We examined results of Spectrum 5.63 based 2017 round of HIV Estimation and projection exercise in India to estimate the overall age profile as well as HIV prevalence and numbers of HIV infected population in higher age group for the period 2000 to 2025.

RESULTS: The mean age of HIV positive population increased from 37 years in 2000 to 45 years in 2025. HIV prevalence among the population aged 50+ hovered in the range of 0.26%-0.28% between 2010 and 2019 and then increased to 0.32% in 2025. Total size of HIV-infected population aged 50+ and their contribution in overall epidemic increased significantly by 2025 (Figure 1). In same period, proportion of 60+ HIV population in total HIV population increased from 9% to 16%. Proportion of non-AIDS death in total death to HIV population increased from 13% in 2000 to 42% in 2025. **CONCLUSIONS:** The age composition of HIV positive population in India is changing with increasing numbers of older population. A rapidly expanding treatment programme leading to better survival and subsequent ageing means that more and more of HIV positive population will die from other causes than from AIDS deaths in India. The policy makers and programme implementer need consider this as a focus area to ensure continuity of quality longevity of HIV infected positive people through strategic addition of wider range of clinical services under programme.



[Figure 1- HIV Age Distribution in year 2000 and 2025 (Thousands), HIV Estimations 2017]

TUPED739

Loneliness among older people living with HIV: Why the "older old" are less lonely than the "younger old"P. Mazonson¹, J. Berko¹, T. Loo¹, A. Zolopa², F. Spinelli², T. Evans², P. Grant³, M. Karris⁴

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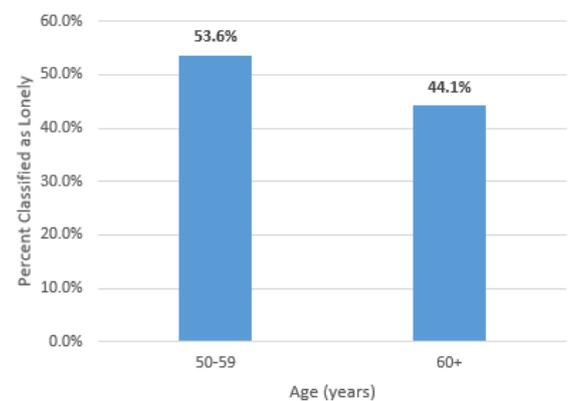
BACKGROUND: Loneliness is common among people living with HIV (PLWHIV), especially in older adults (age 50+). However, little is known about the prevalence of loneliness across subgroups of older PLWHIV, and the factors that impact loneliness.

METHODS: Participants used an online questionnaire to complete the Three-Item Loneliness Scale and to provide extensive additional self-reported sociodemographic information and patient-reported outcomes.

Bivariate risk ratios were performed to identify items that were most strongly associated with both age and loneliness. Covariates identified were incorporated into a multivariable logistic regression model.

RESULTS: Of 931 participants, 62% were 50-59 years old and 38% were 60 years or older. The majority were male (89%), gay or lesbian (79%), and white (68%). Fifty percent of participants were lonely. Loneliness was lower in the older age group (Figure 1). Five covariates were most strongly associated with loneliness: living alone, having more than four comorbid conditions, depression, anxiety, and feeling distant from friends (Table 1). The "older old" were more likely to live alone and have more than four comorbid conditions but were less likely to report depression, anxiety, and feeling distant from friends. Logistic regression showed the association between age and loneliness persisted after controlling for the effects of these five covariates (RR 0.77, 95% CI: 0.62-0.92).

CONCLUSIONS: In this cohort, the "older old" were less lonely than the "younger old." Among the "older old," the impact of factors associated with decreased loneliness (less depression, less anxiety, and feeling closer to friends), plus other factors we may not have identified, was greater than the impact of factors associated with increased loneliness such as living alone and having multiple comorbidities.



[Figure 1. Percent of older PLWH classified as lonely by age group, $t(929) = -2.81, p < 0.01$]

	RR for Loneliness	95% CI	RR for Older Age (60 or Older vs. Under 60)	95% CI
Living Alone	1.70	1.50-1.92	1.43	1.22-1.68
More than 4 Comorbid Conditions	1.71	1.41-2.08	1.30	1.06-1.61
Depression	2.23	2.02-2.48	0.76	0.60-0.95
Anxiety	1.85	1.66-2.08	0.79	0.62-0.98
Feeling "Distant from Friends"	2.78	2.38-3.13	0.87	0.78-0.96

[Table 1. Risk Ratios (RR) of Factors Most Strongly Associated with Loneliness and Age]

TUPED740

"There's no retirement plans for us": Re-analysis from a qualitative study of HIV-positive MSM who use substances

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BACKGROUND: Following the advent of ART, we have seen drastic decreases in morbidity and mortality rates among people living with HIV in the U.S., including men who have sex with men (MSM), who remain disproportionately affected by HIV. While people living with HIV are living longer healthier lives there is a growing body of evidence indicating severe degrees of loneliness and isolation among those in their senior-years.

METHODS: We conducted a secondary data analysis from a larger study, which aimed to assess perceptions of relationships between intersecting internalized stigmas related to sexual orientation, HIV-stigma, and substance use stigma and HIV self-care. Using 16 of the original 33 interviews, we used thematic analyses informed by grounded theory to investigate the relationships between aging, loneliness and social connections among participants who described aging related stress.

RESULTS: This sample of 16 people had a mean age of 54.4 years (SD 8.57) and a range of 30-68 years, with 88% being ≥50 years old. Additionally, 62.5% identified as African American, 25% White, and 13% as bi- or multi-racial. Over half identified as gay and 44% as bisexual. Nearly 95% reported annual incomes of ≤\$20,000 and 31% had ≤ high school education. Themes related to loneliness and isolation emerged involving coping with fear of rejection via avoidance and substance use. Participants described ageism, in the context of social connections, like dating and meeting sexual partners, worsening feelings of loneliness. Many people described depressive feelings related to feeling old and surprised to have reached their age.

CONCLUSIONS: Together, our results convey that ageism is an additional intersecting stigma affecting MSM living with HIV and problematic substance use that is associated with loneliness, isolation, and depressed mood. These results indicate the need for social and emotional support for aging HIV-positive MSM, to improve peer connectedness, and reduce social isolation and depressive symptoms. More research is needed to identify effective strategies for reducing loneliness among aging MSM living with HIV and problematic substance use.

Prevention interventions and their effects on the lives and relationships of people living with HIV

TUPED741

“Communication, compatibility, compromise, and commitment...we allow ourselves the room to grow and change”: Qualitative findings from Canadian gay, bisexual and men who have sex with men in current HIV-serodifferent relationships

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BACKGROUND: HIV-serodifferent couples, a key population for HIV prevention efforts, are increasingly common due to improvements in longevity and quality of life among people with HIV. We sought to understand the experiences of gay, bisexual and men who have sex with men (gbMSM) in current HIV-serodifferent relationships to learn how relationship satisfaction is developed and maintained while managing HIV transmission risks over time.

METHODS: The national Positive Plus One study, in partnership with 143 Canadian ASOs and clinics, recruited gbMSM and their HIV-negative partners to participate in online and telephone-based surveys. A sub-group were purposively selected to participate in private, in-depth interviews (English and French), March-November 2017. Interviews were recorded and transcribed. Drawing upon Framework Analysis methods, responses were compared and contrasted within and between couples to develop a comprehensive qualitative dyadic analysis.

RESULTS: The sample included 22 individual partners representing 11 couples. HIV-positive partners were 5 or more years post-diagnosis; the median relationship was 2 years (range: 7 months - 21 years). Four themes were included in the analytic framework: relationships/sex; prevention strategies; disclosure/social support; and social-structural factors. HIV-positive and negative partners independently emphasized the non-exceptional nature of HIV within their relationships, stressing the importance of communication in the service of sexual and emotional intimacy while

simultaneously managing HIV transmission risk. Disclosure of serodifference was often limited to selected friends and/or family; couples did not have social support networks focused on serodifference. HIV transmission risks were typically informed by HIV-positive partners with variable levels of support from healthcare providers. Discussions of viral load undetectability within relationships were common; pre-exposure prophylaxis was routinely discussed but seldom used given low assessments of risk. Partners identified a need for social, financial and HIV prevention support, especially for newer couples, couples with lower socio-economic status, or those practicing riskier sex.

CONCLUSIONS: gbMSM HIV-serodifferent couples were self-sufficient and minimally worried about HIV transmission within their relationships. Prevention conversations were heavily conditioned on strong communication and support within relationships. Variable levels of social support, limited disclosure of serodifference, socio-economic disparities, and inconsistent engagement around HIV prevention by healthcare providers were suggestive of unmet support needs for vulnerable couples.

TUPED742

I want to be like you: A case study of individual and group peer counseling for women in Mexico

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BACKGROUND: Although Mexico's is a concentrated epidemic, the masculinity ratio has decreased from 11 to 1 in 1985, to 5 to 1 in 2017. Considered one of Best Practices, HIV peer counselling has been mainly carried out in Mexico *by* and *for* men, but women's specific social conditions -lower education and income, burden of care work, structural impossibility of perception of risk, and gendered sexuality and relationships- require equally specific interventions. This paper presents a case study with a group of women peer counselors, and its role in assisting the relationship between biomedical paradigms and women's agency regarding their bodies, desires and lives.

METHODS: Following the principle of More Involvement of People Affected by HIV, since 2014 six women living with HIV from clinics in Oaxaca, Mexico City and Cuernavaca, have teamed up with social researchers in *Yantzín: women peer counseling in HIV*, an intervention between the detection and viral suppression components of the continuum of care, advising 398 female patients. By using Grounded Theory procedures, this study presents qualitative analyses of ethnographic records of 53 peer group sessions, 24 in-depth interviews with health staff, 16 biographical interviews with women advised, and 10 with peer advisors.

RESULTS: Qualitative results indicate that, by living with HIV *as women*, *Yantzín's* peer counselors function not only as cultural translators of medical prescriptions, lab results and HIV information and prevention, but as bodily and living proof that *a good life is possible*, since adherence is far more than medication intake and requires profound operations on bodies, relationships and identities. Also, preliminary results of a case/control study of medical outcomes show favorable tendencies for *Yantzín*, regarding viral suppression and mortality (Unpublished information).

CONCLUSIONS: *Yantzín's* findings show that, by using demedicalized language among other strategies, peer advisors emerge as crucial mediating agents between health institutions and patients, by demonstrating active processes of ownership of HIV chronicity, embodied forms of resistance to stigma and support networks based on solidarity and hope. These experiences have produced a set of Guidelines that are being piloted and can be reproduced in different contexts, as a valuable toolkit for WLHIV peer work.

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Monday
22 July**Sexual and reproductive health, fertility, family planning, pregnancy, and abortion**

TUPED743

The next generation: Pregnancy outcomes in adolescents and women living with perinatally acquired HIV in South AfricaK. Anderson¹, T. Mutemaringa^{1,2}, K. Technau³, L. Johnson¹, K. Braithwaite³, E. Mokotoane¹, A. Boule^{1,2}, M.-A. Davies¹¹Centre for Infectious Disease Epidemiology & Research, School of Public Health and Family Medicine, University of Cape Town, Cape Town, South Africa, ²Directorate of Health Impact Assessment, Western Cape Provincial Department of Health, Cape Town, South Africa, ³Empilweni Services and Research Unit, Department of Paediatrics and Child Health, Rahima Moosa Mother and Child Hospital, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa**BACKGROUND:** An increasing number of girls living with perinatally-acquired HIV (PHIV) are entering adolescence/adulthood and having pregnancies. There is limited data on pregnancy outcomes in adolescents living with perinatally-acquired HIV (ALPHIV) in resource-limited settings. They may have increased risk of adverse outcomes. We described characteristics of pregnant ALPHIV in South Africa and their pregnancy and neonatal outcomes.**METHODS:** We retrospectively identified pregnancies in ALPHIV diagnosed HIV-infected before age 12 (proxy for perinatal infection) from routinely collected data from several sites in South Africa (2007-2018). Characteristics of pregnant ALPHIV, pregnancy and neonatal outcomes were examined.**RESULTS:** We identified 258 pregnancies in 232 adolescents and women living with likely PHIV; 39% of pregnancies occurred in ALPHIV age ≤16 years, 39% at age 17-19 years and 22% in adults age ≥20 years. ART commenced before pregnancy in 85% of cases, antenatally in 7% and was not commenced by pregnancy end date in 9%. Among 229 (89%) pregnancies with documented outcomes, 80% were live births, 14% terminations, 3% miscarriages and 2% stillbirths. Mother-to-child transmission of HIV occurred in 2% of neonates, 75% were uninfected when last tested and 23% had unknown HIV status. Among pregnancies with CD4 counts available close to pregnancy end date (n=202), 37% had CD4 count ≥500 cells/μl, 43% had CD4 count 200-499 cells/μl and 20% had CD4 count < 200 cells/μl. Among those with VL available close to pregnancy end date (n=219), 28% had VL ≥1000 copies/ml. Among 186 known live births, 20% were preterm deliveries (< 37 weeks gestation). Among neonates with known birth weights (n=176), mean birth weight was 2900g (95% CI 2747 - 2935g) and 20% of neonates had low birth weight (< 2500g). There was 1 documented congenital malformation (musculoskeletal) and 2 cases of neonatal deaths.**CONCLUSIONS:** The high proportion of pregnancies electively terminated suggests reasonable access to this service. A large proportion of pregnancies occurred in ALPHIV age ≤16 years, although this may reflect that the bulk of South Africa's ALPHIV population are in this age category, with relatively fewer having aged into older age categories. The prevalence of elevated VL and poor immunologic status is concerning.

TUPED744

Are we covered? Family planning uptake and needs among women on ART in ZimbabweK. Webb¹, K. Masiye¹, V. Chitiyo¹, S. Page-Mtongwiza¹, D. Patel¹, P. Mbetu¹, R. Choto², T. Apollo²¹Organization for Public Health Interventions and Development, Harare, Zimbabwe, ²Ministry of Health and Child Care, Zimbabwe, AIDS & TB Unit, OI/ART Department, Harare, Zimbabwe**BACKGROUND:** Concerns around the safety of dolutegravir (DTG) use during periconception period have resulted in WHO recommendations to strengthen the integration of sexual and reproductive health services within HIV treatment programmes to ensure reliable and consistent access to contraception for women and adolescent girls living with HIV. With

an HIV prevalence of 16.1% among adult women, little is known about the family planning service uptake among women on antiretroviral treatment (ART) in Zimbabwe. Our objective was to quantify family planning (FP) methods used by women enrolled in HIV care.

METHODS: Retrospective cohort analysis of routine facility data of HIV positive women accessing HIV care from Jul-Sept 2018. We utilised a stratified purposive sampling approach (urban/rural; primary/district/provincial, geographic region) to select 20 health facilities supported through the PEPFAR/USAID-supported FACE HIV Program in 5 Provinces of Zimbabwe. De-identified data on documented HIV and FP services received was entered into MSeExcel and analyzed using StataV12 with differences in proportion compared using chi-square.**RESULTS:** Among 1833 women enrolled in HIV care, median age was 37yrs (IQR:30-43yrs), median time on ART 1776 days (IQR:899-2831d) with 97.4% (1785/1833; 96.5-98.0%) on first line ART, the majority on TDF+3TC+EFV regimen (1448/1785; 95%CI:79.2-82.9%). Overall, 38.6% (708/1833; 95%CI: 36.4-40.9%) of women were not using or had no documented FP method. Among those with a documented family planning method: 68% were using condoms only (767/1125; 95%CI: 65.4-70.8%), 6.1% (69/1125; 95%CI:4.9-7.7%) long acting methods and 4.5% (51/1125; 95%CI:3.4-6.0%) dual methods. Women aged 15-19yrs had the lowest proportion of any family planning method documented (20.9%;14/67, p< 0.0001).**CONCLUSIONS:** We observe low documented rates of family planning method use in HIV patient records of women of childbearing age on ART, with adolescents and young people having the lowest FP uptake. Strengthening integration of routine FP counselling, provision of reliable contraception, and documentation and surveillance of FP uptake among women on ART within HIV care environments are priority program actions. Future research to better understand the needs and preferences among sub-groups of women for integrated FP/HIV service uptake and FP method choice is required to strengthen quality, differentiated care for all women on ART.

TUPED745

Reasons for contraceptive discontinuation among HIV-infected Ugandan women on depo-provera and tenofovir-based ARTE. Isingel¹, R. Nakayima², P.E. Namuli¹, M. Namuganga¹, S.P. Sebina Kibira², E. Sseguja², N.L. Monica¹, P. Musoke^{1,2}, F. Matovu Kiweewa^{1,2}
¹Makerere University - Johns Hopkins University Research Collaboration, Kampala, Uganda, ²Makerere University College of Health Sciences, Kampala, Uganda**BACKGROUND:** HIV positive women of child bearing age are encouraged to consider their contraceptive needs and access family planning services alongside HIV care services. Most HIV Care Centers in Uganda have integrated modern contraceptive services together with antiretroviral therapy (ART) with most women choosing to use contraception at ART initiation.

However, high rates of contraceptive discontinuation are recorded suggesting high unmet family planning needs and associated consequences. Reasons for discontinuation of depo-provera among young HIV infected women on depo-provera and ART in Uganda are not well documented.

This study explored young HIV infected women's (aged 18 to 30 years) reasons for discontinuation of depo-provera while on TDF based ART.

METHODS: A qualitative descriptive study was done at MU-JHU Care Ltd from March to December 2018. Seven in-depth interviews and two focus group discussions were conducted among young women who had used or are currently using depo-provera and on TDF based ART. The participants were purposely selected from an ongoing "BONE: CARE" study.

We used pretested and translated guides, interviews were audio recorded, transcribed verbatim and translated into English before coding. Data were analyzed manually following thematic content analysis.

RESULTS: The study found that side effects from depo-provera like amenorrhea, prolonged menstruation, reported weight gain, weight loss, reduced libido and dizziness were the main reasons women on ART discontinued depo-provera contraception. Misconceptions related to amenorrhea was another important contributor to depo-provera discontinuation; with the belief that non released blood during amenorrhea causesTuesday
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fibroids, cancer, potential failure to conceive and/or birth defects. Other reasons included no need for contraception due to separation / no sexual partner as well as partner objection.

CONCLUSIONS: Side effects and misconceptions still influenced young HIV-infected women's adherence to depo-provera contraception calling for strengthened HIV and contraceptive services. In particular explanation of amenorrhea and allaying misconceptions and information about other possible side effects and their management should be further explored.

TUPED746

Adolescent hormonal contraception use and childbearing ideation in the era of HIV - Findings from a large community-based study in South Africa

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BACKGROUND: Adolescent parents and their children experience poorer health outcomes, especially in resource-limited settings. Sub-Saharan Africa is home to nearly 1.7 million adolescents living with HIV, with more than 7,000 new infections estimated weekly. Limited research exists on the impact of HIV on adolescent reproductive intentions and hormonal contraception use. This analysis examines factors associated with hormonal contraception and childbearing ideation alongside HIV status.

METHODS: N=1,566 youth (ages 10-23) in a province of South Africa were interviewed by trained research assistants, and n=1,454 respondents interviewed at follow-up (94% retention). N=1,053 had ever initiated ART in 52 public health facilities in the district. Ethics approval was obtained from universities and relevant provincial departments and health facilities. Adolescent voluntary informed consent and caregiver consent were obtained. Analyses included Chi-square tests for socio-demographic factors and multivariate logistic regression testing factors associated with childbearing ideation and hormonal contraception, using STATA15.

RESULTS: The sample was 72% HIV-positive, 57% female, 25% lived in rural areas, and 14% had ever been pregnant. Nearly three-quarters of the participants (n=1040, 72%) desired to have multiple children. Older adolescents (aged 15-19 years OR2.01, 95%CI1.55-2.61, p<0.000), youth 20-23 years (OR2.43 95%CI1.50-3.94, p=0.001), and male participants were more likely to want multiple children (OR1.49 95%CI1.15-1.92, p=0.002). HIV status, prior pregnancy history, rural residence, poverty, school enrolment were not significantly associated with the desire for multiple children. Moderation analyses suggests that ALHIV residing in rural areas were less likely to want multiple children (OR0.40, 95%CI0.21-0.76, p=0.005).

Among sexually-active female participants (N=403), 53% used one of three types of hormonal contraception. Older adolescents were more likely to use hormonal contraception, as were adolescent girls who had been pregnant prior to interviews (OR2.13, 95%CI1.33-3.34, p=0.002) and those residing in rural areas (OR1.99 95%CI1.22-3.25, p=0.006). HIV-positive status and childbearing ideation were not associated with hormonal contraception use.

CONCLUSIONS: Adolescents in sub-Saharan Africa aspire to become parents, independent of their HIV status. Access to hormonal contraception is shaped by key sociodemographic factors and prior reproductive history, though not HIV status. ALHIV who choose to have children need support to ensure safe conception and parenting while maintaining access to treatment.

Living with HIV and co-infections and/or co-morbidities

TUPED747

High daily tobacco smoking participation among Australian HIV-positive gay and bisexual men

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BACKGROUND: While Australia is well-known for its tobacco control efforts, (prevalence of daily smoking among adults declining to approximately 14% in 2016), some populations groups have higher tobacco use and therefore higher risk for tobacco-related morbidity and mortality. Little consideration has been given to tobacco use among gay and bisexual men (GBM) and smoking prevalence among Australian GBM is largely unknown. We provide estimates of smoking participation among Australian GBM and describe factors associated with smoking.

METHODS: As part of an online cohort study of Australian GBM, new questions on tobacco smoking were included in the 2018 survey. The primary outcome was daily smoking of tailor-made cigarettes, cigars, pipes or 'any other tobacco products'. Correlates included self-reported HIV-status, age, proportion of friends who are gay, hazardous alcohol use, and illicit drug use. Ordinal logistic regression estimated associations with current smoking, adjusted for all correlates.

RESULTS: 337 men gave valid responses to the questions included in the analysis. Median age was 36 years (interquartile range 29 to 49), 12.8% identified as HIV-positive and over one-third (38.1%) reported 'most' friends were gay. Approximately three-quarters of men did not smoke at all, 10.4% smoked daily, 4.7% at least weekly and 7.7% less often than weekly (overall smoking 23.1%). Daily smoking was higher among HIV-positive men (27.9%) compared to HIV-negative men (7.8%). Being HIV-positive was associated with approximately a three-fold increase in the odds of daily smoking (adjusted odds ratio 2.98; 95% confidence interval: 1.40-6.32).

CONCLUSIONS: Daily smoking participation among HIV-positive men was double the general population prevalence and three-times that of HIV-negative men, increasing their risk of poor health outcomes. These data support concerns regarding the association between modifiable lifestyle factors and onset of non-AIDS-related morbidities in people living with HIV and support the role of smoking cessations programs as part of HIV-related care.

Variables	aOR	95% CI
HIV-positive	2.98	1.40, 6.32
Age	0.99	0.96, 1.01
How many of your friends are gay or bisexual	1.01	0.75, 1.37
AUDIT-C? (ref: Score 0 to 3)		
Score 4 and above	2.23	1.08, 4.60
Ever used cannabis	2.03	1.17, 3.53
Ever used other illicit drugs drugs*	1.61	0.78, 3.29

* Other drugs includes amyl nitrate, cocaine, ecstasy, GHB, methamphetamine, crystal methamphetamine or ketamine. aOR; adjusted odds ratio. CI; confidence interval. GBM; gay and bisexual men.

[Correlates of smoking daily, at least weekly, and less often than weekly (ordinal regression) among 337 GBM, Victoria, Australian, 2018.]

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TUPED748

Cognitive functioning and driving ability in HIV-infected professional driversH. Gouse¹, R. Robbins², C.J. Masson¹, A. Munsami¹, M. Henry¹, L. London¹, G. Kew¹, J. Joska¹, T. Marcotte³¹University of Cape Town, Cape Town, South Africa, ²Columbia University, New York, United States, ³University of California San Diego, San Diego, United States

BACKGROUND: Today, people living with HIV (PLWH) live near-normal life-spans but HIV-associated cognitive impairment remains prevalent. With PLWH retained in the workplace, understanding the effects of cognitive impairment on workplace functioning is essential. Driving ability in professional drivers (e.g., truck/delivery drivers) is an important workplace function with significant safety consequences. Previous research reported impaired driving in a subsample of HIV+ lay-drivers with HIV-associated cognitive impairment. Less is known about how HIV and cognitive impairment affect professional drivers. We examined the relationship between HIV, cognition and driving ability in professional drivers.

METHODS: In this cross-sectional pilot study, 11 HIV+ and 11 HIV- (mean age=40.81±6.84) male professional drivers from South Africa and Zimbabwe, matched on age and education, completed a comprehensive neuropsychological battery and driving simulator assessment. Analysis: Two tailed Mann-Whitney U Exact tests and Spearman's rho.

RESULTS: HIV+ drivers performed significantly worse than HIV- drivers on: a test of verbal learning ($p < 0.001$) and verbal memory/delayed recall ($p < 0.015$); three tests of processing speed (all p 's < 0.001); a test of attention/working memory ($p < 0.018$); a test of motor skills ($p < 0.034$); and a test of visuospatial functioning ($p < 0.038$). On driving simulator tasks HIV+ drivers were more likely to exceed the speed limit ($p < 0.013$) and do so over longer distances ($p < 0.002$) than HIV- drivers; and to cross the centre line ($p < 0.010$). Worse performance on all three processing speed tests and visuospatial functioning were correlated with increased simulator speeding; while worse performance on the test of attention/working memory, verbal learning, and verbal memory/delayed recall most strongly correlated with centre line crossings, all p 's < 0.05 .

CONCLUSIONS: In this small pilot study, HIV+ professional drivers performed significantly worse on cognitive testing and on some simulator driving tasks compared to HIV- drivers. Decreased cognitive functioning and increased driving risk behavior were associated.

While findings are preliminary and need to be replicated with larger samples, they indicate that professional drivers living with HIV may benefit from interventions that can improve cognition, or other factors that can impact cognition (e.g., adherence to antiretroviral therapy). Future research is also needed to validate cognitive testing for identifying individuals at risk for impaired driving behavior.

TUPED749

HIV-infected women: Medical co-morbidities and rates of virologic suppressionT. Magel, J. Holeksa, A. Thiam, L. Chu, R. Yung, D. Truong, B. Conway
Vancouver Infectious Diseases Centre, Vancouver, Canada

BACKGROUND: According to the WHO, 17.4 million HIV-infected individuals worldwide are HIV positive. These women have unique medical and non-medical needs and often face different forms of stigma associated with their seropositive status.

In order to achieve the UNAIDS 90-90-90 goals for HIV control, identifying female-specific barriers to HIV diagnosis, treatment, and long-term engagement in care are of critical importance. Initiatives to identify and address these barriers are urgently needed.

METHODS: A retrospective cohort evaluation was conducted among HIV-positive females receiving care at our centre, specializing in the development and evaluation of systems of care for vulnerable inner city populations. All were enrolled in a multidisciplinary program of care to address medical, social, psychological, and addiction-related needs. In this analysis, we compared demographic and disease outcome variables between women and men. The primary outcome of interest was the ability to achieve maximal virologic suppression (HIV RNA < 40 copies/ml).

RESULTS: A total of 59 women were included in this analysis: median age 54 (31-79) years, 63% active/recent drug users, 24% active alcohol use, 37% on opiate substitution therapy (OST), 44% with psychiatric issues, 66% co-infected with HCV, 5% homeless. Of these, 41/59 (69%) achieved undetectable HIV RNA. Median CD4 cell counts at baseline were 429 (70-880)/ μ L and 542 (70-1379)/ μ L after viral suppression. Among 371 HIV-infected males treated at our centre, we note: median age 54 (23-85) years, 57% active/recent drug users, 33% active alcohol use, 20% on OST, 50% with psychiatric issues, 46% co-infected with HCV, 10% homeless. Of these, 307/371 (82%) achieved undetectable HIV RNA. Median CD4 levels at baseline were 553 (18-1800)/ μ L and 634 (30-1850)/ μ L at viral suppression. Based on the primary outcome of virologic suppression, women were less likely to achieve virologic suppression ($p = 0.016$).

CONCLUSIONS: Within a multi-disciplinary program catering to inner city populations, demographic and disease-based characteristics of HIV-infected women and men appear comparable, as does immunologic recovery after successful HIV treatment. A statistically lower rate of virologic suppression is observed in women, suggesting the need for additional strategies to maintain long-term engagement in care and adherence to HIV treatment among vulnerable HIV-infected women.

Pain management and palliative care

TUPED750

Acceptability of a smartphone-based music intervention for chronic pain and problematic opioid use among patients living with HIVS.W. Taylor¹, P.R. Chai², K.L. Schreiber³, G. Goodman⁴, C. O'Cleirigh⁵, E.W. Boyer²¹Boston University, School of Social Work, Boston, United States, ²Brigham and Women's Hospital, Department of Emergency Medicine, Boston, United States, ³Brigham and Women's Hospital, Department of Anesthesia, Boston, United States, ⁴The Fenway Institute, Boston, United States, ⁵Harvard Medical School, Department of Psychiatry, Boston, United States

BACKGROUND: Chronic pain is common among patients living with HIV and is often associated with substance use disorders, including problematic opioid use, which may affect antiretroviral adherence and engagement in care. Music may be an alternative treatment for chronic pain; pleasurable music increases affective state, decreases the subjective response to pain and may upregulate endogenous opioid expression. This study gathered qualitative and pre/post-test data on the acceptability of a novel smartphone-based music intervention, *Unwind*, to address negative affect and chronic pain among HIV-infected patients with problematic opioid use.

METHODS: We enrolled (N=14) participants living with HIV who self-reported chronic pain for the past three months and endorsed problematic opioid use. Participants completed a demographic survey and a qualitative interview, then used *Unwind* alone comfortably for 10 minutes without potential distractions. A repeated-measures t-test compared pre/post-test scores for negative affect using the Profile of Mood State and for pain catastrophizing using the Situational Pain Catastrophizing scales. Qualitative data were analyzed by two independent coders using within-case, across-case analysis.

RESULTS: All participants self-identified as male. Mean age was 57.79 (SD=7.25), eight participants identified as Black/African American, six as White, and one as Hispanic/Latino. Participants reported their average pain was 6.71/10 (SD=0.99). In the past three months, eleven participants took prescribed opioids to manage pain, ten took more opioids than prescribed, and ten took illicit drugs to manage pain. After using *Unwind*, there were significant score differences (a 56% reduction) for negative affect (M=5.71, SD=5.53); $t(13)=3.87$, $p=.002$, and (a 69% reduction) for pain catastrophizing (M=5.86, SD=4.38); $t(13)=5.00$, $p=.000$. Emerging qualitative themes were: (1) chronic pain affects mental and physical health; (2) participants used illicit substances for pain; (3) the music app distracted thoughts about current pain; and, (4) the music intervention might be more effective than opioids.

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CONCLUSIONS: This investigation demonstrates that an innovative smartphone music intervention is acceptable among individuals living with HIV who misuse opioids. Even short episodes of music may decrease negative affect and pain catastrophizing. Future work should determine the feasibility of music use among this population in a pragmatic trial to determine effects on pain, opioid misuse and engagement in care.

Conceptualizing social and structural factors and their impacts

TUPED751

HIV struggles: Conceptualizing human rights (HR) and how to implement them

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BACKGROUND: Human rights violations like stigmatization, denying access to prevention materials, and over-priced medications were recognized early (by Jonathan Mann) as being a driver of the HIV epidemic and as hurting the AIDS response. Although HR are usually conceptualized as lawful rights or abstractions, it is useful to conceptualize HR struggles as involving a mix of “defiant activism from below” and of negotiations/legal cases “from above.” HR implementation usually involves struggles over economic and political interests and values. Some case studies of HIV-related HR struggles have been presented, but few rigorous critical syntheses have been conducted (although Chan [2015] provides a model synthesis on price-related treatment access rights). We analyze the logic of HR struggles to help clarify how to implement HR.

METHODS: Global historical review of how human rights were defined and codified; and of HIV-related HR struggles. Theoretical analysis of HR implementation.

RESULTS: HR were originally codified in France and the USA circa 1790 during periods of popular mobilization from below. UN-based HR treaties were enacted from above after World War II atrocities by elites confronted with lingering WWII resistance movements, widespread labor mobilization, and rising anti-colonial struggles. HIV-related struggles for treatment access, lower antiretroviral prices, syringe access and the rights of gays, sex workers, people who use drugs, and poor people have involved a mix of activism from below, legal cases, and negotiations. HR struggles have been most successful when activism has preceded, accompanied, and strengthened legal cases and negotiations, as with the South African Treatment Action Campaign or syringe exchanges in New York. Tendencies for HR struggles to “mature” towards less activism and more negotiation and legal action have been encouraged (and funded) by international organizations and national AIDS councils—but have led to bureaucratization of grass roots organizations (e.g., Indian sex workers) and restricted progress in many HR struggles.

CONCLUSIONS: In a period when many governments and political parties are attacking HR, we need more research and careful social theorization to determine the best ways to meld law, negotiations, and defiant activism to defend the needs of people living with or at risk for HIV (and their communities).

TUPED752

Temporal trends in HIV-related self-reported stigma in the African Cohort Study, 2013-2018

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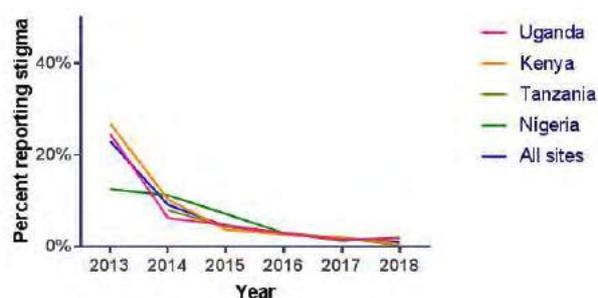
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BACKGROUND: HIV stigma can present a major barrier at all stages of the HIV care continuum. Expansion of antiretroviral therapy may reduce HIV-related stigma by reducing the symptom burden and allowing HIV-infected individuals to remain in their social networks, placing HIV infection in the group of other chronic diseases. Therefore, our objective was to examine trends in HIV stigma from 2013-2018 in four African countries.

METHODS: We used data from the African Cohort Study (AFRICOS), an ongoing cohort enrolling HIV-infected participants in 12 clinics in Uganda, Kenya, Tanzania, and Nigeria. Participants were asked if they had experienced social isolation, broken family relationships, or physical violence stemming from HIV-associated stigma, and classified as experiencing stigma if they responded yes to any question. Generalized estimating equations were used to estimate the association of year with prevalence of HIV stigma. We used 2016 as the reference category based on WHO guideline changes recommending test and treat.

RESULTS: As of September 1, 2018, 2,845 HIV-infected participants were enrolled in AFRICOS contributing a median of four visits (IQR 2-6). The majority of participants were female (59%). In 2013, 23% reported HIV stigma, ranging from 12% in Nigeria to 27% in Kenya (Figure). By 2018, the prevalence of HIV stigma decreased to 1% overall. Adjusting for country, gender, age and enrolment duration, the odds of HIV stigma in 2013 were 3.86 times the odds of reporting stigma in 2016 (95% CI: 2.64, 5.64). In contrast, in 2018, participants were 50% less likely to report HIV stigma compared to 2016 (95% CI: 0.31, 0.82).

CONCLUSIONS: We found that from 2013-2018 there was a significant decrease in the prevalence of self-reported HIV stigma across all four AFRICOS countries. To better understand these trends, future analyses will examine reduction in stigma on a country level and include site level characteristics into the model.



[Percent of participants reporting any HIV stigma by site, 2013-2018]

TUPED753

Educational attainment and HIV risk among young adults, Rakai, Uganda 1996 - 2013

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BACKGROUND: Young people in Sub-Saharan Africa remain at risk of HIV infection. Evidence for the impact of educational attainment on HIV risk has been mixed. This paper examines the impact of educational attainment on risk factors of HIV acquisition for young adults living in Uganda.

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METHODS: Data came from the Rakai Community Cohort Study, a population-based cohort from 30 communities in southwestern Uganda. Multivariate logistic regression examined the association between educational attainment and risk factors (age at first sex, condom use, number of sexual partners, sex with partners from outside the community, concurrent partnerships, and knowledge of partners HIV status) for HIV infection for young adults ages 20 - 24 years. Analyses were stratified by gender and limited to sexually-experienced males and females (n=31,696) between 1996 - 2013.

RESULTS: The HIV incidence rate was 0.60/100 PY for males and 0.68/100 PY for females. Educational attainment was protective against several risk factors for HIV. Compared to no education, females with at least a secondary education were less likely to have their first sexual encounter before the age of 18. Females with higher educational attainment were more likely to use family planning methods and had less sexual partners. Educational attainment was also correlated with riskier behaviors. Females with higher education were more likely to report inconsistent condom use, concurrent sexual partners, and were less likely to know the HIV status of their partners. Similar results were seen in males. Compared to no education, males with any education were more likely to use family planning methods. Males with higher education were more likely to report concurrent sexual partners. Educational attainment was not significantly associated with HIV incidence in males or females.

CONCLUSIONS: The associations between educational attainment and risk factors for HIV are varied. Higher educational attainment is associated with delayed initiation of sexual activity and use of family planning methods; it is also associated with inconsistent condom use and concurrent sexual partners. Associations between education and HIV risk factors differ between males and females; future research should focus on how education may influence decision-making within relationships, as well as the quality, content, and context of education.

TUPED754

Social capital needs of young Black gay, bisexual and other men who have sex with men living with HIV in Atlanta, USA

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BACKGROUND: Emerging research has documented associations between social capital - the sum of an individual's resource-containing, reciprocal, and trustworthy social network connections - and key HIV outcomes including uptake of pre-exposure prophylaxis among high-risk individuals, and viral suppression among people living with HIV (PLWH). The mechanisms underlying these protective associations remain understudied to date.

METHODS: To improve our understanding of the nature and functions of social capital in the lives of PLWH, we conducted 28 qualitative in-depth interviews with YB-GBMSM living with HIV in Atlanta, a city with high HIV incidence and prevalence. We asked participants about bonding capital (relationships between individuals with similar demographic characteristics), bridging capital (relationships with individuals with different demographic backgrounds), and the strengths and weaknesses of their social networks. Interview transcripts were coded thematically and analyzed using an iterative, team-based approach.

RESULTS: Mean age was 24 years (SD = 2.9 range 18-29); 83% were virally suppressed by self-report. Participants were generally satisfied with their social networks in terms of being able to access support for their basic needs (i.e. food, shelter, etc.) from friends, family, and romantic/sexual partners. However, several key gaps in social capital were noted. First, very few participants described accessing bridging capital from mentors or others outside of their immediate family and friend circles. Second, participants described having to "compartmentalize" their networks. Specifically, they were unable to access HIV-specific or sexuality-related support from family members who were otherwise (i.e., emotionally and/or financially) supportive, due to limited communication around these sensitive issues. Third, some participants described their connections to others as sufficient in quantity but not quality - wanting "more genuine" non-sexual with other YB-GBMSM living with HIV.

CONCLUSIONS: Our study sheds light on the mechanistic processes of how social capital operates in the lives of YB-GBMSM. Given the importance of social capital for HIV prevention and care, future interventions should:

- (1) build upon strong existing social network structures; and
- (2) help build skills to ameliorate some of the key network gaps - namely, lack of bridging capital, desire for more open communication with family, and desires for non-sexual connections to other YB-GBMSM living with HIV.

TUPED755

The social-structural syndemic in Nepal: Cross-border movement, incarceration, and poor access to harm reduction programs fuel the HIV and hepatitis C epidemic among people who inject drugs

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BACKGROUND: People who inject drugs (PWIDs) are experiencing the double burden of hepatitis C virus (HCV) and HIV, and recent estimates suggest that globally, 18% (11%-25%) and 52% (42%-62%) of all PWIDs have antibodies against HIV and HCV, respectively. Nepal with a concentrated HIV epidemic, recently initiated an assessment of the prevalence of HIV, hepatitis B virus (HBV), HCV in relation to social structural factors among PWIDs.

METHODS: A total of 1345 male PWIDs at least 16 years of age were enrolled in the study between March 2017 and June 2017 carried out in the Valley and Terai highway covering 14 districts of Nepal. To enroll PWIDs, respondent driven sampling was used in the Valley, whereas two-stage cluster sampling was used in the Terai highway, a geographically vast area sharing an open border with India. Serum samples were analysed for antibodies against HCV, HBV surface antigen and HIV. Interviews were conducted to collect behavioral information.

Multivariable logistic regression was performed to assess any associations between social structural factors (cross-border movement, incarceration) and prevalence of HCV.

RESULTS: The prevalence of HCV, HIV, HBV and HIV-HCV co-infection were 26.5%, 5.6%, 1.7% and 4.3% respectively among male PWIDs in Nepal. The prevalence of unsafe injection behavior in the past week (front-loading/back-loading/sharing) was 8.8%, and only 49% had access to needle and syringe program. About 14% of PWIDs had been detained or incarcerated at least once in the last 12 months whereas 52% of PWID crossed the Indian-Nepalese border for the purpose of injecting drug use at least once in the last 12 months.

Cross-border movement for injecting drug use was significantly associated with HCV seropositivity [1.58 adjusted odds ratio (AOR); 95% confidence interval (CI)=1.22-2.05] even after controlling for confounders (age, education level).

The likelihood HCV seropositivity increased in a dose-response manner with increased frequency of cross-border movements: Sometimes= 1.53 AOR; 95% CI=1.14-2.05; Most of the time= 1.59 AOR; 95% CI=1.10-2.29; Always= 1.85 AOR; 95% CI=1.10-3.11.

CONCLUSIONS: Study findings support the development of cross-border harm reduction services and the need to address structural risks to minimize the burden of HIV and HCV among Nepalese PWIDs.

TUPED756

Correlates of antiretroviral adherence among people living with HIV engaged in peer-to-peer HIV counseling in Myanmar

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BACKGROUND: Based on our recent research, peer-to-peer HIV counseling (PC) has been linked to improved antiretroviral therapy (ART) adherence and reduced stigma compared to standard counseling. Examining correlates of ART adherence among individuals who completed PC is imperative in optimizing this counseling system.

METHODS: A cross-sectional study utilizing questionnaires was administered to a convenience sample of (N=500) people living with HIV (PLHIV) in Myanmar who completed mandatory HIV counseling via the PC method prior to survey administration. Participants were recruited from two agencies (Myanmar Positive Group and National AIDS Programme) across three cities (Yangon, Patheingyi, and Pyaw) during scheduled ART retrieval days. We examined correlates of ART adherence including HIV related stigma, demographics (age, gender, education level, and duration of illness), counseling agency, and city.

RESULTS: Sixty percent of participants completed counseling through Myanmar Positive Group (MPG) and 40.0% with the National AIDS Programme (NAP); 60.0% were from Yangon, 20.0% from Patheingyi, and 20.0% from Pyaw. Lower ART adherence was significantly associated with stigma as follows: enacted stigma index (OR 0.78, 95% CI 0.71-0.85), internalized stigma index (OR 0.87, 95% CI 0.77-0.98), and internalized stigma severity (OR 0.92; 95% CI 0.89-0.95). Additionally, counseling through NAP (OR 0.32, 95% CI 0.20-0.49), ART retrieval from Pyaw (OR 5.15, 95% CI 2.19-12.12), and duration of illness (OR 0.88, 95% CI 0.84-0.93) were associated with ART adherence. Age, gender, and education level were not significantly correlated with adherence.

CONCLUSIONS: Stigma is significantly associated with reduced ART adherence among participants engaged in PC. Counseling through the NAP and duration of illness were found to be significantly associated with decreased adherence while ART retrieval from Pyaw was associated with increased adherence. PC should be promoted to improve care for HIV patients in Myanmar, and specific correlates among participants in PC should be taken into consideration when tailoring interventions to optimize HIV management.

TUPED757

Assessing perceived impacts of climate change on HIV health among HIV-infected smallholder farmers in the Nyanza region of Kenya

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BACKGROUND: Global efforts to combat HIV may be compromised by climate change since severe weather events disrupt livelihoods, food systems, and healthcare infrastructure. Few studies have examined the impact of climate change on HIV health outcomes. Using qualitative methods, we aimed to understand perceived impacts and mechanisms by which severe weather events affected HIV-related health, and gender-specific adaptation strategies.

METHODS: We interviewed 40 HIV-infected individuals from July to December 2018 enrolled within a larger cluster-randomized control trial of a multisectoral agricultural and financial intervention to improve HIV health outcomes among HIV-infected farmers in Kisumu, Homabay and Migori counties in Kenya (NCT02815579). We used purposive sampling to select an equal number of male and female participants from a diverse range of geographies among the 16-sites. In-depth interviews were conducted in participants' native language, transcribed, translated into English and double coded. Thematic content analysis of transcripts followed an integrated inductive-deductive approach.

RESULTS: Participants reported that severe weather including extreme flooding and droughts had negative impacts on HIV health through a number of interrelated mechanisms. Changes in food insecurity and diet quality, largely from decreased agricultural yields, negatively impacted nutritional status. Stress, insomnia, and symptoms of depression were important mental health impacts, attributed to loss of crops from flooding and drought, and hopelessness and despair related to not being able to feed one's family. These mental health and nutritional impacts compromised adherence to antiretroviral therapy and clinic attendance, which were also affected by infrastructure challenges such as road blockages in the setting of flooding. Participants also noted increases in other infections including malaria, diarrhea and flu-like illnesses related to contaminated waters during floods, and cold and damp living conditions. Men and women reported different strategies to adapt to severe weather, with resources more readily available to men including time, money, and utilization of agricultural extension services.

CONCLUSIONS: Climate change is an under-recognized potential determinant of poor HIV health outcomes operating through multiple interrelated pathways and should be explored in future studies. Furthermore, women may find it more difficult to adapt to the effects of climate change on HIV health due to access to fewer resources than men.

TUPED758

Divergent preferences for HIV testing services among young people in Nigeria: A choice experiment

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BACKGROUND: Despite high incidence rates of young people aged 14-24 years in Nigeria, less than 24% of this population have ever tested for HIV. The low testing rates among young people between 14-24 years suggest that current testing services may not align with their testing preferences. To address this gap, the objective of this study was to assess preferences for HIV testing services among young people between 14-24 years in Nigeria.

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METHODS: We conducted a choice survey to measure preferences for HIV testing services among a sample of 112 self-reported HIV-negative youth aged 14-24 years in Nigeria. Study participants completed a series of hypothetical HIV testing service choice scenarios. The choices comprised of six attributes centered around HIV testing service (i.e. location of testing, test administrator, mode of pre-test, mode of post-test counseling, type of HIV test, and cost of HIV test). For each choice set, participants were asked to select one of the options that they prefer or indicate none of the above. A descriptive analysis of the choices made by participants was conducted, looking at the number and percentage of participants who selected different options for HIV self-testing.

RESULTS: The mean age of study participants was 19.5 (SD=2.7) and the majority (68%) had at least a secondary school degree and were never married (95%). Participants indicated preferences for three HIV testing service characteristics:

- 1) being tested by a physician (70%),
- 2) having free HIV tests (63%), and
- 3) using oral HIV self-test (49%).

Other important characteristics of HIV testing services included: testing for HIV at a health facility (43%), having one-on-one pre-test counseling support (39%), and one-on-one posttest counseling support (33%).

CONCLUSIONS: Our finding suggest that young people have a range of preferences regarding HIV testing services in Nigeria. No single service is likely to be equally attractive or acceptable across different youth groups. However, understanding young people's preferences for HIV testing services is an important step toward promoting uptake of HIV testing among this population. This study strengthens the call for further investigation into young people's preferences to increase uptake of HIV testing services, including HIV self-testing.

TUPED759

HIV-related stigma, neighborhood poverty, and viral load suppression among men who have sex with men in Atlanta, Georgia, USA

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BACKGROUND: HIV-related stigma and neighborhood-level poverty have been associated with poor HIV treatment outcomes among men who have sex with men (MSM). The objective of this analysis was to describe HIV-related stigma, neighborhood-level poverty, and HIV viral load suppression among MSM residing in Atlanta, Georgia.

METHODS: Engage[men] is a prospective cohort study of Black and White HIV-positive MSM who reside in metropolitan Atlanta and aims to examine factors contributing to racial disparities in HIV care and treatment.

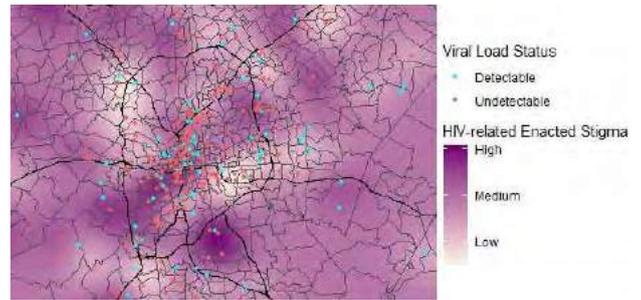
In this analysis, neighborhood was operationalized as census tract, and tract-level poverty data were abstracted from the 2016 American Community Survey. HIV-related enacted stigma was measured using the HIV Stigma Scale. We geocoded and anonymized participants' residences and used kriging to estimate enacted stigma across Atlanta.

RESULTS: Of the 200 White and 200 Black MSM enrolled, there were 188 Black MSM and 174 White MSM with complete residence and stigma scale data at baseline. Regarding enacted stigma, 24% of Black and 31% of White MSM reported no longer socializing with some people due to their HIV-positive status.

Black participants (68%) were more likely to reside in high poverty neighborhoods compared to White participants (37%), and 33% of Black participants and 20% of White participants had detectable viral load levels. Spatially, areas of high stigma were primarily located in southern metropolitan Atlanta, as were high poverty neighborhoods.

There did not appear to be overlapping spatial patterns between areas of high stigma and concentrations of participants with detectable viral loads in the overall study population.

CONCLUSIONS: This exploratory analysis suggests that neighborhood-level poverty and HIV-related stigma may be important factors associated with viral suppression outcomes among MSM in Atlanta. Though a spatial pattern between stigma and viral suppression was not observed in the overall study population, these relationships may differ by race, and additional analyses will examine these relationships.



[Figure. HIV-related Stigma and Viral Load Suppression among MSM in the Engagement Study, Atlanta, USA]

TUPED760

What about housing? Understanding a constant hurdle for Latinx PLWH in San Francisco, CA

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BACKGROUND: Structural factors will hinder initiatives to 'get to zero' and 'end the AIDS epidemic' in San Francisco, CA. Latinx people living with HIV (PLWH) in San Francisco face unique barriers when searching and maintaining housing arrangements, e.g., having a limited-English proficiency and documentation status. Research shows when housing is unstable or when conditions are substandard, medication adherence and appointment attendance become less of a priority; ultimately, contributing to poor clinical outcomes. Understanding and responding to housing issues facing Latinx PLWH is a major step in achieving the aforementioned goals.

METHODS: A qualitative study was conducted using semi-structured interviews with Latinx PLWH in San Francisco. Participants were 18yrs old or more, self-identified as Latinx, HIV+, and in HIV care for >1 year, and Spanish or English speaking. Interview topics centered on maintaining HIV care and treatment, housing-related concerns, and HIV-related stigma. Recordings were transcribed and coded for major themes using Dedoose.

RESULTS: A total of 27 interviews were completed. Participants were 28-65 years of age. Several issues related to housing surfaced; some were currently homeless (e.g. living in shelters or emergency housing, cars, on the street, or "couch surfing")-"because all of these situations you end up in the streets" and several were at risk of homelessness(e.g. living on week or month-long leases). Participants also reported discrimination based on HIV status and/or sexual orientation when searching for housing- "we can no longer rent you a room [after finding out HIV status]" - "there are places that don't accept gays or HIV positives"; feeling exposed to violent crimes and unsafe in their neighborhoods; all leading toward constant "rental stress."

CONCLUSIONS: The importance of stable housing for Latinx PLWH cannot be overstated, as there are clear implications for the overall quality of life and engagement in HIV care. Interventions are needed at the structural level, including the coordination of local housing programs communities and governmental agencies with HIV care providers, case managers/patient navigators. Housing stability must be considered a priority within the public health strategies and policies developed to end the AIDS epidemic.

Socio-economic differences: poverty, wealth, and income inequalities

TUPED761

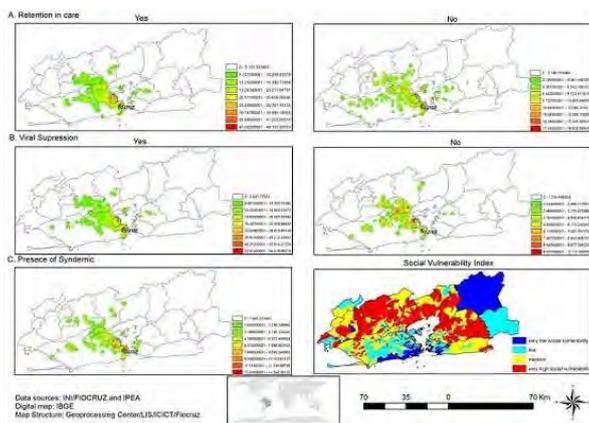
Social vulnerability, syndemics and the continuum of HIV care among people living with HIV/AIDS in Brazil

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BACKGROUND: Social vulnerability (SV) and synergic psychosocial comorbidities (syndemics) are understudied on the Latin America's HIV continuum of care, although the region presents huge social inequalities. We evaluated the association of SV and syndemic with non-retention in care (nRIC) and non-viral suppression (nVS) in Rio de Janeiro, Brazil.

METHODS: Syndemics (polysubstance use, binge drinking, depression, intimate partner violence and sexual compulsive behavior) was assessed in a nested cross-sectional study conducted in the INI/Fiocruz HIV cohort (2014-17). Participants' addresses were geocoded to obtain Social Vulnerability Index (SVI). Kernel density estimators were used to identify "hot spots" of syndemics, nRIC and nVS. Logistic regression models evaluated the association of syndemics and SVI with nRIC and nVS.

RESULTS: Most (68.2%) of the 1371 participants were men, median age was 43, 66.1% had ≥ high school. Overall, 26.8% participants presented one syndemic condition, 7.8% presented two, and 2.5% presented ≥ 3. The majority (45.9%) lived in areas of very low/low SV while 39.6% and 14.5% lived in areas of medium and high SV, respectively. The prevalence of nRIC was 27.2% and nVS was 17%. "Hot spots" of nRIC and nVS were identified in areas of high SV, not in areas of very low SV.



Non-retention in care: absence of 3 or more HIV care visits at least 90 days apart in the year after the interview. **Non-viral suppression:** two consecutive HIV-1 RNA measurements of ≤ 1000 copies/mL OR a single HIV-1 RNA measurement of >1000 copies/mL in the year after the interview. **Syndemic:** the presence of two or more conditions (i.e., PHQ2 score ≥ 3 , Binge drinking, Intimate partner violence, Polysubstance use and sexual compulsive scale Score ≥ 24). **Social Vulnerability Index** was developed by the Brazilian Institute of Applied Economic Research composed 18 indicators, aggregated at three dimensions (Urban Infrastructure, Human Capital and Income and Work).

[Hot spots: Retention in care (A), viral suppression (B) and syndemic (C). Social Vulnerability Index (D)]

Syndemics was not associated with nRIC or nVS. Compared to living in areas of very low SV, to live in areas of low, medium and high SV increased the likelihood of nVS, but were not associated with nRIC.

		Non-Retention in Care AOR[95%CI]	Non-viral Suppression AOR[95%CI]
Social vulnerability (SV) index	Low SV vs. Very low SV	1.35[0.87-2.10]	2.86[1.48-6.01]
	Medium SV vs. Very low SV	1.34[0.87-2.08]	2.2[1.14-4.61]
	High/Very high SV vs. Very low SV	0.77 [0.43-1.34]	2.25[1.05-5.10]
Syndemics	1 vs. 0	1.02 [0.73-1.40]	1.19 [0.78-1.79]
	2 vs. 0	1.22 [0.73-1.97]	1.77 [0.92-3.25]
	3 or more vs. 0	1.35 [0.57-3.01]	1.72 [0.61-4.37]

AOR: Adjusted Odds Ratio. CI: Confidence Interval. Non-retention in care= absence of 2 or more HIV care visits at least 90 days apart in the year after the interview. Non-viral suppression = two consecutive HIV-1 RNA measurements of ≤ 1000 copies/mL OR a single HIV-1 RNA measurement of >1000 copies/mL. Syndemics is the number of syndemic conditions (i.e., PHQ2 score ≥ 3 , Binge drinking, Intimate partner violence, Polysubstance use and sexual compulsive scale Score ≥ 24). Models are adjusted for sex, age, race/color, education, HIV transmission mode, CD4 nadir, and time on antiretroviral therapy

[Adjusted logistic models to predict non-retention ($n=1371$) and non-viral suppression ($n=1300$). Rio de Janeiro, 2014-17]

CONCLUSIONS: Social inequalities may preclude the achievement of the UNAIDS 90-90-90. The mechanism of this association remains a challenge to be understood and tackled.

Dynamics of social status and power: sex, gender, age, race/ethnicity, sexual orientation, disability

TUPED762

High levels of social and structural adversity among disabled HIV-positive adult caregivers of young people living with HIV: Implications for HIV programming

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BACKGROUND: Persons with disabilities have unique HIV prevention and treatment needs, which are frequently overlooked by service-delivery platforms. This study establishes associations between disability and socio-structural vulnerabilities, including theorized risk antecedents of HIV care engagement, among HIV-positive caregivers of young people living with HIV (YPLHIV) in two Zambian provinces.

METHODS: From July to October 2017, eligible households (N=528) in Central and Eastern Provinces of Zambia with a YPLHIV aged 5-17 years and their primary caregiver were recruited via two-stage sampling proportional-to-population size to participate in a survey assessing household wellbeing and HIV-related outcomes. Bivariate and multivariable binomial logistic regression - adjusting for socio-demographics and individually significant covariates - was used to identify associations between caregiver disability (dichotomized based on self-reported physical or intellectual impairment) and HIV care continuum indicators as well as financial stability, food security, social protection, and sexual risk behaviors.

RESULTS: Among 310 (58.7%) caregivers living with HIV, 24 (7.8%) had a disability, the most frequently reported being physical (83.3%). Twice the proportion of caregivers with a disability (CWDs) cared for YPLHIV with disabilities compared to non-CWDs (15.0% vs. 7.3%, $p=0.194$). In the presence of other covariates, CWDs had significantly higher odds of alcohol abuse [daily or near daily self-reported alcohol intoxication] (AOR 7.89, CI 1.42-43.84) and severe debilitating illness in the past month (AOR 4.97, CI 1.33-18.58) compared to non-CWDs. CWDs were significantly less likely to have a cohabitating partner (AOR 0.26, CI 0.07-0.93) and report social support from at least four sources in the household (AOR 0.35, CI 0.13-0.99). CWDs had significantly lower odds of affording food-related expenses in bivariate analysis only (OR 0.33, CI 0.13-0.81). No significant differences in current antiretroviral use (91.7% vs. 97.8%), 30-day medication adherence (95.5% vs. 92.8%), and past-year retention in care (100% vs. 94.6%) were observed between CWDs and non-CWDs.

CONCLUSIONS: CWD households exhibited high degrees of social and structural adversity, which, if unchecked, could destabilize medication adherence and care retention patterns among CWDs and support to YPLHIV. Findings contribute to a considerably limited body of evidence of care and treatment behaviors and household vulnerability among persons dually affected by disability and HIV infection.

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TUPED763

Characteristics of intersectional stigma and effects on HIV testing uptake among Black MSM in the United States

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BACKGROUND: Black men who have sex with men (MSM) experience the highest HIV incidence and prevalence rates in the United States. Black MSM are also subject to higher levels of structural and social stigma related to bearing multiple, intersecting stigmatized identities (e.g., Black and gay). Stigma has been proposed to drive population health inequities, and HIV-related and sexual behavior stigmas have been associated with poor HIV care outcomes. However, few studies have attempted to assess the context of intersectional stigma and its effects on HIV prevention outcomes. We characterized the context of intersectional stigma among a large sample of Black MSM and assessed its effects on HIV testing history.

METHODS: Between 2014–2017, we recruited sexually active Black MSM ≥18 years old (n=4425) attending Black Pride events in six U.S. cities into a serial cross-sectional study. We surveyed past-year experiences with perceived and enacted stigma from six sources (school, employment, housing, medical, law/police, and public), across five inclusive intersecting stigmatized statuses (race/ethnicity, socioeconomic, sexuality, HIV, and other) that participants could report as reasons for stigmatization. Intersectional stigmatization was defined as reporting ≥2 intersecting statuses for which participants reported experiencing any past-year perceived or enacted stigma events. Multivariable logistic regressions tested 1) associations between sociodemographics and intersectional stigma; and 2) associations between intersectional stigma and prior HIV testing history, adjusting for sociodemographics and city and year sampled.

RESULTS: 938 Black MSM (22.1%) reported past-year instances of being intersectionally stigmatized. Sex workers, bisexually behaving men, HIV-positive men, low-income (< \$10,000/year), and younger men (< 40 years old) were significantly more likely than their respective counterparts to report intersectional stigma. Race/ethnicity stigma (21.1%) and sexuality stigma (21.3%) were the most common stigma domains reported, and the most common combination of intersectional stigma (13.4%). Intersectional stigma was significantly associated with never previously receiving HIV testing (p<.05).

CONCLUSIONS: Black MSM in the U.S. experience a high burden of intersectional stigma, which has negative effects on HIV-related healthcare uptake, including HIV testing. There is a strong need for intervention design that incorporates intersectional stigma reduction frameworks for Black MSM communities to increase their engagement across the HIV prevention and testing continuum.

Intergenerational and/or transactional sex

TUPED764

Who are the men who pay for sex in Mozambique? Results from the National HIV/AIDS Indicator Survey (IMASIDA) 2015

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BACKGROUND: Mozambique has one of the highest HIV prevalence rates, where prevalence is estimated at 13.2% among adults aged 15–49 and 10.1% among adult males. Men who pay for sex (MPS) are considered a bridging population for HIV infections. However, the characteristics and risk factors of MPS in Mozambique is poorly understood.

METHODS: Secondary data analysis of the 4,724 men aged between 15–49 years was performed on data from the 2015 Mozambique AIDS Indicator Survey. Chi-squared test and multivariable logistic regression model, accounting for survey design, were used to assess the association between paying for sex (ever and past 12-months), demographic characteristics and other sexual risk behaviors.

RESULTS: The prevalence of MPS-ever and MPS-past 12 months was 19.2% (95% CI: 17.3–21.2) and 10.4% (95% CI: 9.0–12.1), respectively, with Cabo Delgado province having the highest proportion (73.7% and 38.9%, respectively). Among MPS-past 12 months, 13.5% were between 20–24 years, 17.8% were not in a relationship, 11.9% had primary education, and 14.1% were poor. For sexual risk behaviors and clinical outcomes, 50.3% had more than three sexual partners, excluding spouse, in last 12 months, 11.2% did not have comprehensive knowledge of HIV, 29.7% self-reported a STI in the past 12 months. HIV prevalence was higher among men who ever pay compared with men who did not (13.9% versus 9.4%, p=0.248). Men who reported 10+ lifetime partners (AOR=4.5, 95% CI 2.8–7.1; p< 0.001) and who reported 3+ partners in the last 12-months (AOR=10.6, 95% CI 4.2–24.9; p< 0.001) were more likely to have ever paid for sex. Men who reported 10+ lifetime partners (aOR 4.1 95% CI 2.4–7.1; p< 0.001), and who reported 3+ partners in the last 12-months (aOR 20.1 95% CI 6.2–65.3; p< 0.001) were associated with paid for sex in the last 12 months

CONCLUSIONS: The prevalence of paid sex among Mozambican men is high. Mozambican MPS have higher HIV prevalence than the general adult male population and were more likely to engage in risky sexual behaviors. Additional ethnographic research is needed to investigate the attitudes and beliefs of men who pay for sex, especially in Cabo Delgado.

TUPED765

Mediators of the relationship between transactional sex and incident HIV infection among young women in South Africa enrolled in HPTN 068

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BACKGROUND: Transactional sex is associated with an increased risk of HIV in adolescent girls and young women, but the mechanism for this relationship is unknown. We hypothesize that young women who report transactional sex may have multiple partners and older partners, thereby increasing their risk of HIV acquisition.

METHODS: We used data from the HIV Prevention Trials Network (HPTN) 068 study in rural South Africa. Adolescent girls and young women aged 13–20 years at enrollment were followed approximately annually for up to 6 years. We use the parametric g-formula to estimate the total effect of time varying, frequent transactional sex (receipt of gifts/money at least weekly vs monthly or less) on incident HIV infection and the controlled direct effect for mediation in a simulated cohort of 10,000. The controlled direct effect represents the effect of frequent transactional sex on HIV not operating through partner age difference (≥5 years) and number of sexual partners. We calculated hazard ratios over the study period. Confidence intervals were calculated using the standard deviation of results from 200 bootstrap samples.

RESULTS: We explored scenarios where all young women had multiple partners and where they had only older partners and examined how this would change the effect of frequent transactional sex on incident HIV. In scenarios where girls had only older partners and when they had multiple

partners, the controlled direct effect of transactional sex on HIV was attenuated from the total effect, thereby showing mediation. The hazard ratio for the total effect was 1.89 [95% CI: 1.71, 2.06], compared to 1.29 (95% CI: 1.20, 1.39) when holding both partner age and partner number constant.

CONCLUSIONS: Both partner age difference and partner number mediate the relationship between transactional sex and incident HIV infection. This suggests that young females with multiple partners serve as a network to high-risk male partners that might render them vulnerable to HIV. However, while these behaviors explain a large portion of the effect of transactional sex on HIV infection, they do not explain the entire effect, indicating that other mediators may also be important.

Migration and HIV

TUPED766

Being young and on the move in sub-Saharan Africa: How 'waithood' exacerbates HIV risks and disrupts the success of current HIV prevention interventions

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BACKGROUND: Being young and 'on the move' in sub-Saharan Africa places adolescents at particular risk of HIV-infection. The protracted twilight zone between childhood and adulthood has been characterised as a period of 'waithood' in which structural conditions disable young people's access to basic resources to become independent adults.

METHODS: We conducted a qualitative longitudinal study with young people (aged 16-24 years old) living in high HIV risk settings in peri-urban South Africa and Uganda. Using repeat in-depth interviews and participatory workshops over the course of 12 months, we explored with 80 young people (50% women) their experiences of migration, employment, sexual relationships and the approaches they take to mitigate HIV risk.

RESULTS: We identified distinct patterns of risks within the participants' first year of arriving in a new place. Their lives were characterised by fluidity and transience, underpinned by an inherent fragility of options commonly exacerbated by exploitative employers. Conditions of gendered employment opportunities left women reliant on the economic opportunities enabled through sexual relationships. Such relational currency bought limited economic power and/or social capital but helped sustain them in this period of acute vulnerability.

Three core themes emerged. 1) Young people considered that significant risk accompanied being young and if they were to survive financially engaging in risky behaviour was inescapable. 2) Relational and economic stability was not an expectation. 3) Delays in the achievements of goals associated with adulthood made youth ('waithood') a near permanent state.

CONCLUSIONS: While navigating an 'adult' world, these 'not yet adults' are exposed to substantial risks. Young people are susceptible to becoming stuck, unable to access forms of economic, relation and physical security. This has significant implications for the current portfolio of prevention interventions targeted at youth, which cluster around the notion that adolescence is ephemeral, and that stability is attainable through the accomplishments of adulthood. Our findings suggest that these assumptions are detached from the complex and fluid economies and realities that young people on the move are navigating.

Violence and conflict: political, social, structural, interpersonal, and family-based

TUPED767

High HIV positive yield among clients of female sex workers in the context of socio-political unrest in Bamenda, Cameroon

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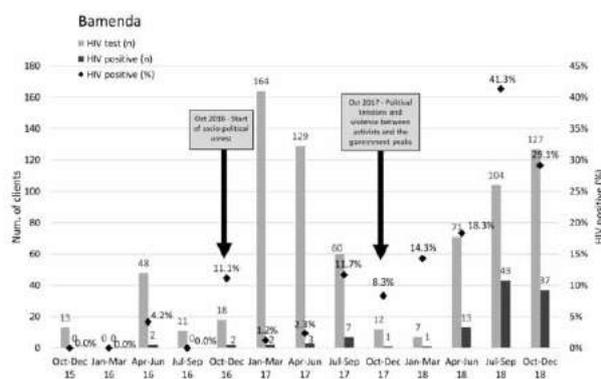
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BACKGROUND: The Cameroon National HIV Strategic Plan (NSP 2018-2022) considers female sex workers (FSW), clients of FSW and armed forces as key/priority populations. FSW have high burden of HIV (estimated prevalence: 26%), while clients of FSW are considered a key driver of the HIV epidemic. Bamenda, North-West Cameroon, has experienced elevated socio-political unrest since October-2016 with increased military presence and regular violence between government security forces and militant separatist groups, weekly citywide shutdowns, and widespread displacement. We assessed trends in positive yield among clients tested through a community-based program targeting FSW.

METHODS: CHAMP is a PEPFAR/USAID-funded program which aims to reduce HIV/STI infections and related morbidity/mortality by providing evidence-based HIV services to key populations in Cameroon. HIV testing services have been provided to clients of FSW at implementing community-based organisations in Yaounde, Douala and Bamenda since July-2014 through both outreach and fixed-services. Programmatic data are electronically collected through CommCare. Aggregate data on positive yield by quarterly interval were assessed for linear trends from July-2016 to December-2018.

RESULTS: In 2018, 94/309 (30.4%) clients tested HIV positive in Bamenda, compared to 13/365 (3.6%) in 2017. HIV positive yield was comparatively lower in Yaounde (3.1%, 20/646, $p < 0.01$) and Douala (4.8%, 94/399, $p < 0.01$) in 2018. There was a significant linear trend in positive yield among clients in Bamenda (coef: 3.59; 95%CI: 1.6-5.5; $p < 0.01$) since July-2016; no trend was observed in Yaounde (coef: -1.8; 95%CI: -4.1-0.5; $p = 0.11$) or Douala (coef: 0.1; 95%CI: -0.7-0.9; $p = 0.74$).



[HIV testing/positivity among clients, Bamenda, and timing of significant socio-political unrest]

CONCLUSIONS: Trends in increasing positivity among clients appear unique to Bamenda and may be due to more targeted testing, change in client risk profile or increasing HIV prevalence. Socio-political unrest may amplify HIV risks due to hindrance of HIV prevention and service delivery, influx of populations with high HIV risk, internal displacement, and violence. Means to maintain adequate HIV prevention, testing and treatment services to FSW and their clients are imperative.

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TUPED768

The end is still too far: Human rights violations among people living with HIV and AIDS enrolled in a semi-urban health center in KenyaA. Shamsudin^{1,2,3}, J. Kavisi^{1,3}, S. Yonge³, J. Kwatampora⁴, S. Kinyanjui⁴, W. Maranga⁴, P. Lutung⁵¹AIDS Healthcare Foundation, Mombasa, Kenya, ²Jomo Kenyatta University of Agriculture and Technology, Public Health, Mombasa, Kenya, ³Technical University of Mombasa, Public Health, Mombasa, Kenya, ⁴AIDS Healthcare Foundation, Nairobi, Kenya, ⁵AIDS Healthcare Foundation - Uganda Cares, Kampala, Uganda**BACKGROUND:** Despite the existence of legal frameworks for the protection of human rights for people living with HIV and AIDS (PLWHA) in Kenya, cases of human rights violation among this population still exists. The aim of this study was to determine the type and magnitude of human rights violations among PLWHA enrolled in a primary health clinic in a semi-urban part of Kenya.**METHODS:** This cross-sectional study was conducted at a primary health center in Kilifi County in Kenya. A purposive sample of 385 respondents was recruited between July - September 2018. These were PLWHA who had been followed up at the health facility for at least six months. A validated structured questionnaire was used to collect data on predefined variables. The data were analyzed using SPSS Statistics Version 25. Ethical considerations were observed in accordance with the principles of the Declaration of Helsinki.**RESULTS:** The response rate was 81%. Of these, 296 (77%) respondents were female. The median age was 32.6 years. Majority had completed primary education (78%) while only 3% had no formal education. 91% of the respondents were on 1st line antiretroviral regimen and 83% had undetectable viral loads. 42% of the respondents felt their human rights had been violated once or more since they were diagnosed with HIV (P<0.05). The types of violations commonly cited included discrimination by health workers, family members and co-workers, denial of services, compulsory medical services, rejection of health or life insurance applications, arbitrary arrest and incarceration by law enforcement officers and disclosure of health status to third parties without consent. While the majority of the respondents (85%) were aware of the available channels to obtain redress, less than a half (42%) had faith in these channels.**CONCLUSIONS:** Human rights violation of PLWHA continues unabated within some of the very institutions that are mandated to protect their rights. There is need for continued awareness creation among stakeholders on how human rights violation undermines efforts to fight HIV.

TUPED769

Childhood and adulthood exposure to violence linked to HIV risk behaviors among men in EswatiniJ. Pulerwitz¹, A. Gottert¹, L. Apicella², B. Lukhele³, P. Shabangu³, S. Mathur¹
¹Population Council, Washington, DC, United States, ²Population Council, Dar es Salaam, Tanzania, United Republic of, ³IHM Southern Africa, Mbabane, Eswatini**BACKGROUND:** Qualitative research has suggested that men's lifetime experience of violence leads to HIV risk behaviors, but little quantitative evidence has demonstrated the same. We sought to test how experiencing or witnessing of violence in childhood and adulthood can influence HIV risk behaviors among men.**METHODS:** We conducted cross sectional surveys with 1,091 men ages 20-34 at informant-identified hot spot venues across 19 districts in Eswatini (covering all four regions of the country). Gender attitudes were assessed by the GEM Scale, and hazardous drinking by the AUDIT-C.**RESULTS:** Men were 26 years old on average, and 15% were married/cohabiting. Half (51%) were employed, and 62% had completed secondary school. Before the age of 18, 75% had been beaten at home (e.g., with a stick/whip) and 40% had been beaten often or very often; 22% had seen their mother being beaten by her partner. In adulthood, one-third (34%) had ever witnessed an armed attack, one quarter (25%) had ever been/felt close to death, and 18% had been robbed at gunpoint or knife-point. These events were no more common in urban versus rural areas. Current

hazardous drinking was 41%, and 36% of all respondents had multiple sexual partners in the last year. In multivariable analyses controlling for demographic characteristics, experiencing/witnessing violence as a child, or as an adult, were associated with increased odds of current hazardous drinking (respectively: aOR=1.4 [95%CI: 1.0, 1.9], p< 0.05; aOR=2.3 [95%CI: 1.8, 3.1], p< 0.001). Experiencing/witnessing violence as an adult was also associated with having a higher number of sexual partners in the last year (p< 0.01) and with endorsing more inequitable gender norms (p< 0.001).

CONCLUSIONS: The majority of men in this study across Eswatini experienced or witnessed violence as children and as adults. These experiences were significantly associated with increased HIV risk behaviors and endorsement of inequitable gender norms. To reduce HIV risk for both men and their partners, it is imperative to prevent these traumas from occurring and increase opportunities for men and boys to cope with past traumas.

TUPED770

Characterizing the relationship between violence and HIV infection among sex workers across 10 countries in sub Saharan AfricaC. Lyons¹, B. Cham², D. Diouf³, F. Drame³, A. Kouame⁴, S. Kouanda⁵, Z. Mnisi⁶, T. Mothopeng⁷, S. Murray⁸, R.N. Phaswana-Mafuya⁹, S. Schwartz¹, A. Simplicio¹⁰, U. Tamoufe¹¹, S. Baral¹¹Johns Hopkins Bloomberg School of Public Health, Department of Epidemiology, Baltimore, United States, ²Actionaid, Banjul, Gambia, ³Enda Sante, Dakar, Senegal, ⁴Ministère de la Sante et de l'Hygiène Publique, Abidjan, Cote D'Ivoire, ⁵Institut de Recherche en Sciences de la Santé, Ouagadougou, Burkina Faso, ⁶Health Research Department, Strategic Information Division, Ministry of Health, Mbabane, Eswatini, ⁷People's Matrix Association, Maseru, Lesotho, ⁸Johns Hopkins Bloomberg School of Public Health, Department of Mental Health, Baltimore, United States, ⁹Human Sciences Research Council, Port Elizabeth, South Africa, ¹⁰ONG Arc-en-Ciel, Lome, Togo, ¹¹Metabiota, Yaounde, Cameroon**BACKGROUND:** Across HIV epidemics, female sex workers consistently bear a disproportionate burden of HIV when compared to women of reproductive age. Where data exist, violence affecting sex workers is prevalent and has been associated with HIV risk behaviors. This assessment aims to assess the relationship between violence and HIV across legal contexts.**METHODS:** Respondent driven sampling was used to recruit sex workers over the period of 2011-2018 across 10 countries: Burkina Faso, Cameroon, Côte d'Ivoire, Gambia, Guinea-Bissau, Lesotho, Senegal, eSwatini, South Africa, and Togo. Interviewer-administered socio-behavioral questionnaires and biological testing for HIV were conducted. Legal status of sex work for countries was defined and categorized based on the legal approach: Not specified; partially legalized; criminalized. Multivariable logistic regression models were used to measure the association between violence and HIV, and effect measure modification was assessed through an interaction term between violence and legal status.**RESULTS:** Overall, 47.8% (3141/6578) reported verbal harassment, 31.2% (2200/7252) reported blackmail, 3% (2360/724) reported history of physical violence, and 30.5% (2208/7237) reported history of forced sex. HIV was associated with uniformed officer refusal to provide protection (aOR:2.2;95%CI:1.3,3.6; p-value <0.01); verbal harassment (aOR:1.3; 95%CI:1.02,1.6;p-value< 0.05); physical violence (aOR: 1.7;95%CI:1.1,2.5;p-value< 0.05); and forced sex (aOR: 1.3;95%CI:1.1,1.6; p-value< 0.01). HIV was associated with physical violence in criminalized settings (aOR:2.2; 95%CI:1.6,3.0;p-value< 0.001), and the relationship between sexual violence and HIV did not differ by legal status of sex work.

Pooled relationship between violence and HIV infection among female sex workers

	Living with HIV													
	OR	95% CI	P Value	aOR**	95% CI	P Value	MR Test of Heterogeneity p value†	Ref Category	Some aspect of sex work is legal	Some aspect of sex work is not legal	Criminalized			
Physical violence	2.14	1.57,2.94	<0.001	2.19	1.52,3.02	0.002	0.0005	1.58	1.51, 1.67	<0.001	2.69	1.59,4.57	<0.001	1.58
Verbal harassment*	1.32	1.15,1.47	<0.001	1.29	1.02,1.62	0.034	0.1687	-	-	-	-	-	-	-
Blackmail*	1.19	1.07,1.32	0.002	1.17	0.94,1.46	0.153	0.0625	1.49	1.42,1.56	<0.001	1.06	0.70,1.48	0.873	1.49
Physical violence	1.59	1.43,1.77	<0.001	1.69	1.13,2.51	0.010	<0.0001	0.79	0.55,1.13	0.200	2.19	1.26,3.01	<0.001	0.79
Forced to have sex	1.29	1.16,1.44	<0.001	1.24	1.11,1.42	0.003	0.0272	-	-	-	-	-	-	-

*Exposure to IPV only

**Adjusted for age, education level, country and its country

†MR Test of heterogeneity (assessed through a logistic model)

††0.05 significance level for test for heterogeneity

[Pooled relationship between violence and HIV infection among female sex workers]

CONCLUSIONS: Violence affecting sex workers was prevalent across countries and legal contexts and associated with HIV infection. Physical violence was associated with HIV and the degree of association varied by legal context, with an increased association in criminalized settings. In contrast, the degree of the relationship between sexual violence and HIV did not vary across legal contexts. Our findings suggest that partial legalization is not sufficient for reducing sexual violence as a risk factor HIV. Combined structural interventions alongside legalization to ensure safe work environments.

TUPED771

Police abuse, ART adherence, and harm reduction among PWID living with HIV in Ukraine

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BACKGROUND: People who inject drugs (PWID) in Ukraine living with HIV continue to be affected by police abuse. This study aimed to assess the current relationship of police abuse experienced by PWID living with HIV in Ukraine and HIV care and harm reduction outcomes. We hypothesized a relationship between police abuse and adherence to ART, as well as a relationship to harm reduction service utilization.

METHODS: We collected cross-sectional survey data at seven addiction care facilities in six regions of Ukraine between August and September 2017. For this analysis, we included 191 PWID living with HIV who received opioid agonist treatment, with a subsection of 156 participants currently on ART. We fit separate regression models to evaluate the association between the independent variables „arrests for needle possession or needles/drugs planted“, „physical or verbal violence“, „sexual violence“ (being forced to have sex with a police officer; females only) as reported by participants and „adherence to ART“ (≥90% adherence on a visual analog scale) and „recent use of harm reduction services“ (past 6 months).

RESULTS: 90.5% of study participants reported any police abuse, with 71% reporting unjustified arrests, 86.9% reporting verbal or physical violence or both, and 6.9% (25% of females) reporting sexual violence. Of 156 participants on ART, 87.8% were adherent, and 77.9% had made use of harm reduction services in the last 6 months. We found no significant association between police abuse and ART adherence, or recent use of harm reduction services in this study population.

CONCLUSIONS: The high rates of unjustified arrests, violence and sexual violence perpetrated by police towards people in addiction care in Ukraine is concerning. While the lack of association between police abuse, ART adherence and harm reduction utilization might suggest that people in addiction care have overcome police abuse as a barrier to care, structural changes and legal action need to end these human rights infringements. Continued exploration to further elucidate health care implications and health consequences of police abuse is necessary.

Sexuality- and/or gender-based violence and exploitation, including in conflict settings

TUPED772

Sexual violence and HIV risk in the bridging population of men who have sex with both men and women: Longitudinal data from four countries of West Africa

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BACKGROUND: Men who have sex with both men and women (MSMW) are a potential bridge population for HIV transmission between MSM and women. However, little longitudinal data is available for this subpopulation of MSM in Africa. The objective was to identify socio-behavioural factors associated with condomless sex with female partners among MSMW in West Africa.

METHODS: Data were collected from 495 HIV-negative MSM included in the 18 months' community-based interventional cohort CohMSM ANRS 12324 in four West African countries (Mali, Cote d'Ivoire, Burkina Faso, Togo). Participants were offered a quarterly preventive package including HIV testing and counselling and completed a face-to-face socio-behavioural questionnaire every 6 months. Multivariate logistic analyses were performed to investigate the relationship between inconsistent condom use during vaginal or anal sex with female partners (CVSAF) at time t and psychosocial and behavioural variables at time t-1 (6 months earlier).

RESULTS: Our analysis included 279 MSMW and 868 observations, which is 49% of the total sample of MSM. Among MSMW, proportion of CVSAF was 49%. Sexual violence respectively from and against female partners was declared in 10% and 7% of observations. Proportion of self-perceived heterosexual, homosexual and bisexual identity was respectively 4%, 12% and 81%. In univariate analysis only, heterosexual identity tended to be positively associated with CVSAF while homosexual identity was protective (respectively 2.21 [0.91;5.35], p=0.08 and 0.5 [0.3;0.8], p=0.002; reference: bisexual). In multivariate analysis, CVSAF at t was associated with committing sexual violence against female partners at t-1 (3.26 [1.01;10.52], p=0.048) and tended to be associated with experiencing sexual violence from female partners at t-1 (2.71 [0.90;8.20], p=0.076) and the depressive symptoms score (0.9 [0.85;1.00], p=0.076).

CONCLUSIONS: Half of MSM also had sex with women. Sexual violence with female partners increases the risk of bridging the HIV epidemic between MSM and the general population. Difficulties related to the acceptance of homosexuality among MSMW might lead to sexual violence within heterosexual couples, associated with suboptimal condom use. Specific support activities for MSMW are needed to strengthen HIV prevention in West Africa.

TUPED773

Redressing violence among female sex workers through crisis response system: Experience from a community-led HIV prevention intervention in India

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BACKGROUND: Historically and socially sex work in India has been considered as immoral and put female sex workers (FSWs) at risk of violence of different sort i.e. physical, sexual, verbal. Avahan (a large-scale HIV-prevention program in India for high-risk groups) in each of its three phases (2003-17) implemented multiple strategies to address crisis (violence)

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through legal aid to FSWs, providing support to incidents reporting, and reducing episodes of violence through building a community organisation. Evidences from two phases of the program noticed decline in violence incidents. The present study is conducted to present an update on the changes in crisis redressal efforts of the program among FSWs in context of the concluding phase (2014-17).

METHODS: A panel data of 2085 FSWs selected across five states of India was used for the study. Both bivariate and multivariate analyses were performed. A series of multiple logistic regression models were fitted to understand the adjusted relationship between outcome measures and key predictors.

RESULTS: On average FSWs were 35 years old, slightly over half of them having formal education and nearly two-thirds were currently married. A significant improvement was observed in overall crisis response index from baseline to end line (62% vs 87%, Adjusted Odds Ratio (AOR): 3.95, 95% CI: 3.36-4.65). Similarly, reporting of violence episodes (48% vs 96%, AOR: 29.25 95%CI:9.66-88.51) and redressal of cases in a day (19% vs 60%, AOR: 7.90 (8.86-9.94) were ameliorated significantly from baseline to end line. The average time to redress violence cases reduced from 257 minutes/case to 88 minutes/case from 2015 to 2017. Compared to 2015, FSWs in 2017 perceived nine times safer to practice sex work (14% vs 51%, AOR: 9.16, 95% CI: 7.74-10.80) and reported to have received four times higher support from community (37% to 7%, AOR: 4.00 (3.58-4.47) during crisis.

CONCLUSIONS: Crisis control efforts through community mobilisation, as discussed in the paper, offer a promising violence reduction strategy for proving enabling environment for FSWs.

TUPED774

Association between forced sexual initiation, sexual risk behaviours and HIV status among young people in Botswana: A cross-sectional study

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BACKGROUND: Although the high HIV prevalence among women has brought into focus the problem of violence against women, in Botswana, little research examining forced sexual initiation as related but independent risk factor to HIV has been conducted. The purpose of this study is to examine the association between forced sexual initiation, sexual risk behaviours and HIV status of young people in Botswana.

METHODS: The study uses data from a cross-sectional, nationally representative Botswana AIDS Impact Survey IV which was conducted in 2013 by Statistics Botswana. Data was collected through face-to-face administration of questionnaire and HIV status measured by testing for HIV antibodies using commercial ELISA test kits from individual who consented and were aged 18 months and above. The sample size is 465 randomly selected young people aged 15-24 years and had ever had sex. Both descriptive and multivariate logistic regression analysis were used to analyse data using SPSS Version 25.

RESULTS: Sixty-eight young people (14.6%) reported an experience of forced sexual intercourse. The study results showed that young people who have experienced forced sexual intercourse do not necessarily report elevated sexual risk behaviours. Young people who have experienced forced sex do not necessarily engage in multi-sexual partnerships (OR: 0.840; 95%CI: 0.340-2.075); engage in transactional sex (OR: 0.726; 95%CI: 0.098-5.376); but have elevated probability of non-use of condoms (OR: 1.373; 95%CI: 0.694-2.716), and were more likely to be HIV positive (OR: 1.867; 95%CI: 0.740-4.709), although these differences were not statistically significant.

CONCLUSIONS: The history of forced sexual intercourse do not necessarily translate into increased sexual risk behaviours and HIV positive status. The study demonstrates that sexual violence is a problem in Botswana that affects young people as well and therefore needs government intervention to root it out.

Prisons and other closed settings

TUPED775

Assessing the risk of incarceration on time to first injection initiation assistance provision among a cohort of people who use drugs in Vancouver, Canada

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PRIMER: PReventing Injecting by Modifying Existing Responses

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BACKGROUND: Prison has been identified as a risk environment for the initiation of injection drug use (IDU) and related HIV transmission. Relatedly, evidence suggests that the vast majority of people who initiate drug injecting require assistance to do so from people who inject drugs (PWID). It is unknown, however, whether incarceration may increase the risk that PWID will provide IDU initiation assistance to others.

METHODS: PReventing Injecting by Modifying Existing Responses (PRIMER) is a multi-cohort study investigating factors influencing the risk that PWID initiate others into IDU. The present analysis used data from linked cohorts of people who use drugs in Vancouver, Canada (the Vancouver Drug Users Study (VDUS)/AIDS Care Cohort to Evaluate Access to Survival Services (ACCESS)). Survey questions were collected every 6 months from December 2014 to May 2017. Discrete-time survival analysis was used to examine the association between recent (i.e. past 6 months) incarceration and first report of IDU initiation assistance provision adjusting for age, gender, years since first injection and recent injecting of heroin, cocaine and methadone.

RESULTS: Among 2,132 participants who completed the PRIMER baseline, 1,392 reported never having previously initiated others into IDU. Among this subsample, 78 (5.6%) reported their first IDU initiation assistance provision during the 2.5 years follow-up. The incidence of reporting recent incarceration at each visit ranged from 3.3% to 5.9%. In a multivariable discrete-time hazard model, reporting recent incarceration was associated with a concurrent higher odds of reporting IDU initiation assistance provision (Adjusted Odds Ratio: 2.05; 95% Confidence Intervals: 1.05-3.98, $p = 0.034$).

CONCLUSIONS: Among a cohort of people who use drugs in Vancouver, recent incarceration was associated with an increased odds of concurrently reporting IDU initiation assistance provision. This suggests that, rather than deterring drug use, incarceration may increase the risk that individuals transition into IDU. This is of concern given ongoing efforts to prevent IDU behaviors through criminal sanctions.

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WEAA01 Paediatric HIV infection: The fight starts early

WEAA0101

Decreased ex vivo T cell proliferation and increased immune exhaustion in early treated and long-term suppressed HIV-infected pre-adolescents from the CHER trial: Implications for cure strategiesS. Naidoo¹, T. Maponga¹, K. Veldsman¹, B. Laughton^{2,3}, M. Cotton^{2,3}, R. Glaschoff⁴, HIV Reservoir Study Group¹Stellenbosch University, Division of Medical Virology, Cape Town, South Africa, ²Stellenbosch University, FAMCRU, Cape Town, South Africa, ³Tygerberg Children's Hospital, Cape Town, South Africa, ⁴Stellenbosch University, Medical Microbiology and Immunology, Cape Town, South Africa

BACKGROUND: Suppressive long-term ART is accompanied by several immune aberrations that are not normalized even with early therapy. The extent to which continuing immune dysfunction exists in HIV infected, long-term treated South African pre-adolescents, requires delineation. Understanding the role dysfunctional immune mechanisms play in HIV persistence is required to develop additional novel therapeutic targets for alleviation of immune-mediated damage.

METHODS: Samples originated from the Children-with-HIV-Early-Antiretroviral (CHER) trial. ART was initiated at < 1 year with sustained viral suppression after 8 years. The frequency of CD4+ and CD8+T-cells expressing cellular immune markers of activation (CD38, CD69, HLA-DR), proliferation (Ki67) and exhaustion (PD-1, Tim-3, TIGIT, LAG-3) was measured by flow cytometry. An extensive panel of T-cell related plasma cytokines was evaluated using Luminex® Multiplex assays. Age-matched controls were measured for the same biomarkers. A subset of HIV+ participants was tested for HIV-1 DNA using qPCR targeting *integrase*. Statistical analysis employed a nonparametric ANOVA-Kruskal-Wallis.

RESULTS: 162 samples (88 HIV+, 74 HIV-controls) were quantified for plasma biomarker levels and 64 participants (29 HIV+, 35 HIV-controls) were analyzed for cellular markers. Median viral load and CD4-percentage at ART initiation was 738,500.5copies/ml and 36.9%. At 8 years, there were no differences between the CD4-percentage of the HIV+ and control group ($p=0.261$). The HIV+ group showed lower levels of IL-3 ($p < 0.0005$), RANTES ($p=0.0078$), GCSF ($p < 0.00001$), INF- ($p=0.003$), TGF β_1 ($p < 0.00001$) and IL-17A ($p < 0.00001$). HIV+ children showed decreased expression of CD38 and HLA-DR, on both CD4+ ($p=0.005$) and CD8+ ($p=0.004$) T-cells. Ki67 on CD4+T-cells were lower in the HIV+ group ($p=0.0387$). Exhaustion parameters on CD4+T-cells were elevated in the HIV+ group (TIGIT [$p=0.017$]; LAG-3 [$p=0.0002$]; PD-1 [0.0052]) including LAG-3 ($p=0.0021$) and PD-1 ($p=0.0037$) on CD8+T-cells. Among 32 children assessed for HIV-1 DNA, a median of 32.5 copies/million cells was observed at 8 years.

CONCLUSIONS: Full restoration of immunity does not reach normality comparable to uninfected counterparts despite early, long-term viral suppression, normalized CD4 counts and low cell-associated HIV-infectivity. Decreased immune activation, poor T-cell proliferative capacity and immune exhaustion, may predispose to rapid viral rebound and lack of immune control on cessation of therapy. Any cure approaches need to attempt functional immune restoration prior to intervention, even when measures of viral infectivity are low.

WEAA0102

Immune activation markers and CMV DNA-aemia in children with perinatally acquired HIV infectionL.-M. Yindom¹, V. Simms², E.D. Majonga^{2,3}, G. McHugh^{2,3}, E. Dauya³, T. Bandason³, J. Rylance⁴, S. Munyati³, R.A. Ferrand^{2,3}, S.L. Rowland-Jones¹¹University of Oxford, Nuffield Department of Medicine, Oxford, United Kingdom, ²London School of Hygiene and Tropical Medicine, London, United Kingdom, ³Biomedical Research and Training Institute, Harare, Zimbabwe, ⁴Liverpool School of Tropical Medicine, Liverpool, United Kingdom

BACKGROUND: Soluble factors in blood plasma play a pivotal role in both the innate and adaptive immune responses to pathogens. Changes in their levels may impact on diagnosis and management of infectious diseases including HIV. In sub-Saharan Africa, long-term survival of older children with perinatally acquired HIV (PHIV) is associated with significant health problems that are not typical of HIV-associated opportunistic infections or AIDS-defining illnesses. They experience a range of chronic complications including growth impairment and chronic lung disease (CLD). Moreover, the beta herpes virus cytomegalovirus (CMV) which is ubiquitous in Africa, infects all children by age 18 months. We hypothesised that CMV reactivation is associated with changes in levels of biomarkers and comorbidities associated with persistent immune activation and/or inflammation in older children with PHIV.

METHODS: Plasma samples were isolated from two cohorts of older children and adolescents aged 6-16 years with PHIV ($n=402$) and HIV uninfected controls ($n=224$). The HIV-infected children were either newly diagnosed (antiretroviral therapy (ART) naïve) or known to be HIV+ but stable on ART. CMV DNA-aemia was measured using quantitative polymerase chain reaction (qPCR). A multiplex bead array assay was used to measure the levels of 30 biomarkers of immune activation, inflammation, angiogenesis, fibrinolysis and apoptosis.

RESULTS: At enrolment, CMV DNA-aemia ≥ 1000 copies/ml (defined as "clinically significant") was detected in 5.8% of uninfected children, 14.1% of HIV-infected participants stable on ART and 22.5 % of the HIV-infected ART-naïve children ($\chi^2 = 23.4$, $p < 0.001$). High CMV load was independently associated with reduced lung function (adjusted odds ratio aOR=3.15, 95%CI: 1.20-8.28, $p=0.02$) and stunting in the HIV+/ART-naïve and ART-treated groups, respectively. Data on CMV contribution to levels of immune activation and other biomarkers are being analysed and will be presented at the conference.

CONCLUSIONS: CMV DNA-aemia is common in older children and adolescents with PHIV and may contribute to changes in the levels of biomarkers of immune activation/inflammation, even amongst those stable on ART, suggesting a role for inadequately controlled CMV infection in the pathogenesis of PHIV in Africa.

WEAA0103

Deep sequence analysis of HIV adaptation following vertical transmission: Importance of human leucocyte antigen-driven selection on the evolution of HIVS. Gaudieri^{1,2,3}, J. Currenti¹, M. John³, E. McKinnon³, S. Leary³, A. Chopra³, M. Pilkinton², R. Smith², L. Barnett², W. McDonnell², M. Lucas⁴, S. Mallal^{2,3}, J. Conrad⁵, S. Kalams²¹University of Western Australia, School of Human Sciences, Nedlands, Australia, ²Vanderbilt University Medical Center (VUMC), Division of Infectious Diseases, Nashville, United States, ³Murdoch University, Institute for Immunology and Infectious Diseases, Murdoch, Australia, ⁴University of Western Australia, Nedlands, Australia, ⁵Vanderbilt University, Nashville, United States

BACKGROUND: HIV can adapt to an individual's T cell immune response via mutations that affect antigen recognition and disease outcome. These viral adaptations are specific to the host's human leucocyte antigen (HLA) alleles, as these molecules determine which peptides are presented to T cells. Transmitted viral adaptations can be maintained or undergo reversion in a new host dependent on the cost-benefit balance. We used the unique features of vertical HIV transmissions, primarily a known source of transmitted virus and sharing of HLA alleles that restrict T cell epitope

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specificity, to predict the *in vivo* replicative capacity and immune escape benefit of specific HIV adaptations that could be used to inform vaccine design.

METHODS: A deep sequencing approach was utilised to determine the HIV clade B quasispecies in 26 confirmed mother-to-child transmission pairs where the potential for founder viruses to be pre-adapted is high due to the pairs being haplo-identical at HLA loci. This scenario allowed the assessment of the dynamics of known HIV adaptations following transmission in either a non-selective environment (mediated by HLA mismatched to original selecting HLA), or selective immune environment (mediated by shared HLA alleles). Anti-HIV-specific IFN- γ T cell responses were assessed using intracellular cytokine staining.

RESULTS: Overall, the transmitted virus was highly adapted to the child's anti-HIV T cell immune potential. The pattern of reversion and fixation of HIV adaptations following transmission was strongly influenced by the HLA-driven selective environment of the recipient and provided an insight into the replicative capacity cost associated with specific adaptations. Furthermore, there was evidence of *de novo* post-transmission adaptation, representing new targets of the child's T cell responses. These *de novo* adaptations were more likely to occur at sites relevant to paternally inherited HLA alleles compared to sites relevant to the mother's HLA alleles ($p=0.008$; mixed-effects logistic regression); reflecting the transmission network.

CONCLUSIONS: HLA-driven selection pressure is a major contributor to HIV evolution. An understanding of the balance between replicative capacity and immune escape benefit of these adaptations is an important consideration for vaccine and cure strategies for individuals exposed to adapted viruses via transmission or activated from reservoirs.

WEAA0104

No evidence of HIV-1 evolution in circulating reservoirs in children during more than six years of early suppressive antiretroviral therapy despite detectable levels of cell associated-HIV-RNA

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BACKGROUND: Whether HIV-1 maintains its latent reservoirs by long-term survival and proliferation of cells infected before the initiation of antiretroviral therapy (ART), or by ongoing viral replication, is still under debate. Our aim were to determine in HIV-1-infected children if viral evolution occur during early suppressive ART and if the viral diversity correlate with reservoir size.

METHODS: Peripheral blood cells from 5 HIV-1-infected children were evaluated by MiSeq deep sequencing of *p17gag* region prior to ART initiation and during 6-15 years (3-5 samples/children) of viral suppression (VS). Haplotypes were constructed by merging sequences of frequencies below the error rate (< 0.5%) with the most common ones to reduce the effects of PCR and sequencing errors. Relationships among the sequences obtained before starting ART and throughout VS were evaluated using maximum likelihood method. Subsequently, molecular evolution was tested by root-to-tip analysis. Cell associated HIV-1-DNA and -RNA (CA-HIV-DNA and -RNA) were quantified by semi-nested real time PCR.

RESULTS: Children started ART and achieved VS at a median age of 4 and 10 months of life, respectively. Neither read depth nor levels of CA-HIV-DNA showed correlation with the number of haplotypes recorded: $R^2 = 0.175$ and $R^2 = 0.105$, respectively; suggesting no bias in the pipeline. Phylogenetic analysis showed no relationship between the viral sequences and sampling time, visualized as an intermingling of the haplotypes at different times. The linear regression obtained by the root to tip analysis showed an R^2 from 0.003 to 0.154, indicating a poor correlation between genetic divergence and sampling time. Moreover, in the 5 children, 100, 94, 75, 66 and 34% of the haplotypes found at last visit (6-15 years under VS), representing virus from the circulating reservoir, were identical to those before starting ART. Surprisingly, CA-HIV-RNA was detectable at last visit in all patients with a median of 3.6 (IQR: 1.5-3.76) \log_{10} copies/ μ g RNA.

CONCLUSIONS: These findings support that the reservoirs originate from cells infected closely to ART initiation and not by ongoing viral replication. However, the detection of active viral transcription needs further study. Our results contribute to the understanding of HIV-1 reservoirs dynamics in children, which is important for eradication strategies.

WEAA0105

Oral TLR7 agonist administration induces an immunostimulatory response in SIV-infected ART-suppressed infant Rhesus macaques

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BACKGROUND: Globally, 2.1 million children are living with HIV-1 and the majority of new infections occur postnatally through breast milk transmission. The major obstacle to HIV/AIDS cure is the presence of a reservoir of latently infected cells that persists even under ART treatment. Recent studies have demonstrated that a toll-like receptor 7 agonist can reverse viral latency and alone or with use of a therapeutic CD8-inducing vaccine may facilitate reduction of the viral reservoir. In this study, two dose levels of an orally delivered TLR7 agonist (GS-986) were administered to SIV-infected ART-suppressed 7-month old rhesus macaques (RMs) to evaluate tolerability and pharmacodynamic responses.

METHODS: Two 5-week-old RMs were infected with SIVmac251 orally in two doses 24 h apart and placed on daily ART beginning at 4 wks post infection. Both animals were virologically suppressed for over 3 months before administration of GS-986. At 7 months of age, RMs received 0.1 mg/kg GS-986 via oral gavage (o.g.). Complete blood count (CBC), serum chemistry, plasma viral loads, plasma cytokine concentrations, and immune cell activation were monitored prior to administration, 24 h, and 1 wk post administration. Plasma was collected prior to and 30 min following administration for pharmacokinetic (PK) analysis. Following 4 wks of rest, animals received a second dose of 0.3 mg/kg (o.g.) and analyses were repeated.

RESULTS: GS-986 was well tolerated at both administered doses with no adverse clinical observations and normal CBC and chemistry at 24 h and 7 d post administration. Both RMs maintained undetectable viremia following administration. Concentrations of IFN- α , IL-1RA, IL-6, IP-10, and I-TAC were elevated in the plasma at 24 h post-administration and returned to pre-dosing levels by 7 d post-administration. Increases in monocytes (CD3⁺CD4⁺CD14⁺CD16⁺) and circulating (CD169⁺) macrophages was observed 24 h following GS-986 administration with a return to baseline by day 7.

CONCLUSIONS: In summary, we have demonstrated that oral administration of GS-986 is tolerated in infant RMs, with induction of expected immune parameters. Future work will involve investigating the effect of GS-986 with a therapeutic vaccination on viral reservoir and viral rebound following analytical treatment interruption.

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WEAA02 Pathogenesis: And the band plays on

WEAA0201

Longitudinal dynamics of follicular CD4⁺ T cells in acute SIV infection

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BACKGROUND: Follicular T helper CD4⁺ (Tfh) cells play a critical role in germinal center (GC) formation and B cell maturation. GCs in lymph nodes (LN), particularly within Tfh cells, are sites for preferential SIV infection and replication. Changes in Tfh cells in early acute SIV infection may be a major determinant in the development of effective antibody-mediated control of SIV infection.

METHODS: Eighteen macaques were infected with SIVmac251 and underwent staggered necropsy during acute and chronic infection. Tfh cells from surface LN (sLN), mesenteric LN (mLN) and spleen were immunophenotyped. We further examined mLN to quantify and localize viral RNA (vRNA) using immunohistochemistry, and performed gene expression and pathway enrichment analyses on sorted Tfh cells from LNs in resting and stimulated conditions.

RESULTS: The frequency of Tfh cells decreased after 10 days post-infection (d.p.i.) and partially rebounded after 20 d.p.i. in all tissues. Using principal component analyses we found similar phenotypic profiles in Tfh from mLN and sLN; in contrast, Tfh isolated from the spleen clustered separately after 10 d.p.i. Although plasma viremia (pVL) peaked at 10 d.p.i., vRNA in mLNs was detectable as early as 5 d.p.i. within follicles and the T cell zone. While pVL decreased after 20 days, tissue vRNA was increased until 90 d.p.i. but was not preferentially found within the follicles. Very early following infection, transcriptional profiling of Tfh-related genes showed profound modulation of cytokine production and inflammatory pathways. We observed a decrease in Tfh responsiveness to stimulation as early as 5 d.p.i. Functions were partially recovered after 20 d.p.i. irrespective of the increasing vRNA in tissues. tSNE analyses showed independent clustering pre- and post-infection, and Tfh cells from 90 d.p.i. had the closest profile to pre-infection suggesting a partial recovery in responsiveness in later stages of infection.

CONCLUSIONS: SIV infection has a profound effect in Tfh frequencies, phenotypic and genetic profiles across tissues since acute infection. This effect suggests a temporal decrease in Tfh ability to provide B cell help during early stages of infection associated with high levels of viremia in blood and tissues, that may directly impact or delay the early induction of SIV-specific antibody production.

WEAA0202

HIV gp120-mediated CD4⁺T cell activation is inhibited by non-neutralizing gp120-V2 loop antibodies

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BACKGROUND: HIV-1 preferentially replicates in inductive sites of GALT; however, the propensity to replicate in these tissues is not fully understood. Trafficking of both naive and memory CD4⁺T cells to gut tissues is mediated, in part, by integrin $\alpha_4\beta_7$ binding to MAdCAM on high endothelial venules in the gut. The interaction between MAdCAM and $\alpha_4\beta_7$ delivers costimulatory signals to lymphocytes that, in the context of antigen specific signaling, activates lymphocytes. HIV and SIV gp120 also bind to integrin $\alpha_4\beta_7$. This interaction is mediated primarily by the V2 loop of gp120, which mimic MAdCAM in the way that it binds to $\alpha_4\beta_7$. We previously reported that MAdCAM costimulation through $\alpha_4\beta_7$ promotes CD4⁺T cell activation and proliferation thereby rendering cells more susceptible to viral replication.

These observations prompted us to evaluate the capacity of gp120 V2-mediated signaling to co-stimulate cells in a manner to that of MAdCAM.

METHODS: Freshly isolated CD4⁺T cells were stimulated with various combinations of anti-CD3, HIV and SIV gp120, MAdCAM, anti-CD28 and retinoic acid (RA). Activation and proliferation were evaluated by standard methods. Gene expression profiling was also carried out.

RESULTS: We determined that gp120 proteins can promote the activation and proliferation of primary $\alpha_4\beta_7^{\text{high}}$ /CD4⁺T cells. This activation is inhibited by an anti- $\alpha_4\beta_7$ mAb. It is also inhibited by anti-V2 domain antibodies including non-neutralizing mAbs that recognize an epitope in V2 that has been linked to reduced risk of acquisition in the RV144 vaccine trial.

CONCLUSIONS: The capacity of the V2 domain of gp120 to mediate signaling through $\alpha_4\beta_7$ on CD4⁺T cells likely impacts early events in infection immediately following transmission. In this regard, the ability of an anti- $\alpha_4\beta_7$ mAb to block this activity raises the prospect that treatment with $\alpha_4\beta_7$ antagonists may inhibit pathogenic mechanisms associated with HIV disease, particularly in gut tissues. Finally, the capacity of non-neutralizing V2 antibodies to block this activity provides a novel mechanism whereby such antibodies might impact both transmission and pathogenesis of HIV/SIV.

WEAA0203

Tandem bispecific antibody prevents fully and induces prolonged T cell immunity against pathogenic SHIV in monkey models

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BACKGROUND: Passive immunization of highly potent and broadly neutralizing antibodies (bNAbs) have been shown to prevent and suppress viremia in animal models and human clinical trials. Our previous study has proved that the tandem bi-specific bNAbs, BiA-SG, was highly effective in protection and treatment settings in humanized mice. Here, we further investigate the prophylactic and therapeutic potential of BiA-SG against simian-human immunodeficiency virus (SHIV) challenge in Chinese-origin rhesus macaques.

METHODS: Rhesus macaques were infected intravenously with SHIV_{SF162P3} (5000TCID50). For prophylaxis, BiA-SG was administered intramuscularly 1 day before challenge, whereas for treatment, BiA-SG was given either 1 day or 3 days after challenge. Plasma viral loads were monitored by real-time PCR. Antibody concentration and neutralizing activity was evaluated by ELISA and neutralization assay. ELISPOT and ICS assays were performed to assess T cell response.

RESULTS: We show that the half-life of BiA-SG is around 2.3 days in the macaques. A single intramuscular injection of BiA-SG one day before SHIV_{SF162P3} infection conferred full protection in all rhesus macaques tested. In addition, with a single infusion of BiA-SG after 1 day or 3 days of SHIV_{SF162P3} challenge, the peak viremia occurrence was significantly postponed, followed by undetectable setpoint viral loads from 2 months post infection onwards. Importantly, the antibody infusion vastly reduced the chance of rapid progression to AIDS. Mechanistically, CD8⁺ T cells were involved in long term viral suppression. Rapid viral rebound was induced in animals treated with T-cell-depleting anti-CD8 β antibody, suggesting that early administration of BiA-SG may induce long-lasting CD8⁺T cell immunity to durably suppress SHIV_{SF162P3} replication.

CONCLUSIONS: In summary, our study demonstrates the efficacy of BiA-SG in controlling SHIV infection. Our findings strongly support the investigation of BiA-SG immunotherapy for HIV-1 in humans

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WEAA0204

Bone marrow stromal antigen-2 (bst-2) gene variants associate with HIV-1 control in black South African individualsB.D.C. Dias¹, M. Paximadis¹, Z. Waja², N. Martinson^{2,3}, R.E. Chaisson³, O. Ebrahim⁴, C.T. Tiemessen¹¹Centre for HIV and STIs, National Institute for Communicable Diseases, National Health Laboratory Service, and Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa, ²Perinatal HIV Research Unit (PHRU), SA MRC Soweto Matlosana Collaborating Centre for HIV/AIDS and TB, University of the Witwatersrand, Johannesburg, South Africa, ³Center for TB Research, Johns Hopkins University, Baltimore, United States, ⁴School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa**BACKGROUND:** Variability in susceptibility to HIV-1 acquisition and the clinical course of infection is influenced by host genetic factors, including viral restriction factors. Bone marrow stromal antigen-2 (BST-2 or tetherin), is a restriction factor which efficiently blocks the release of enveloped viruses. Few studies have assessed the role of *bst-2* polymorphisms in HIV-1 acquisition or disease progression, particularly in sub-Saharan Africa.**METHODS:** We used size discrimination gel electrophoresis and allele-specific SYBR[®] green real-time PCR assays to determine the frequency of four *bst-2* variants, previously associated with the clinical course of HIV infection, namely: rs3217318 (19 bp deletion(Δ)→insertion (i)), rs12609479 (G→A), rs10415893(G→A) and rs113189798 (A→G) in a cohort of HIV-1 uninfected black South Africans [n=96].**RESULTS:** Interestingly, homozygosity for the rs12609479-A (minor allele in Africans), previously predicted to decrease HIV-1 acquisition risk by increasing expression, was notably underrepresented in our population (2%) compared to reference African populations (9%) and Europeans (61%) (p=0.04 and p< 0.001, respectively). To assess the influence of these variants on HIV-1 control, a purposely recruited group of HIV-1 infected ART-naïve participants were grouped into: progressors [n=72] and controllers [n=71], the latter including elite controllers [EC: n=23; VL< 50 RNA copies/ml]. Our results revealed that rs12609479 (G/A) heterozygosity was enriched in progressors compared to ECs (47.2% vs 21.7%, OR=3.50 [1.16-10.59], p=0.03) whilst rs113189798 heterozygosity (A/G) showed a strong trend of overrepresentation in ECs compared to progressors (47.8% vs 26.4%, OR=0.39 [0.14-1.04], p=0.07). Owing to moderate linkage disequilibrium between loci, the influence of combined genotypes was investigated. Heterozygosity at both rs3217318 (i19/Δ19) and rs10415893(G/A) was associated with a faster rate of CD4+T-cell decline in progressors (p=0.03). Possession of rs12609479 (G/G) and rs113189798 (A/G) combined genotype was associated with significantly lower VL in controllers (p=0.0188) and higher CD4+T-cell counts within the progressor group (p=0.0467), suggesting a protective genotype.**CONCLUSIONS:** These data suggest possession of select combinations of *bst-2* genotypes influence disease progression, implicating improved BST-2 restriction of HIV-1 in elite control and in preservation of CD4+ T-cells in progressive infection.Tuesday
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WEAA0301

Sting agonist as a kick and kill agent to target the HIV reservoirM. Mavigner¹, A.D. Brooks¹, A. Koblansky^{2,3}, C. Galardi^{2,3}, H. Madsen^{2,3}, D.M. Margolis³, G. Silvestri¹, A. Chahroudi¹¹Emory University School of Medicine, Atlanta, United States, ²ViiV Healthcare, Research Triangle Park, United States, ³University of North Carolina, Chapel Hill, United States**BACKGROUND:** A favored strategy to eliminate the latent HIV reservoir is referred to as "kick and kill", that aims to reactivate HIV gene expression followed by clearance of cells with reactivated virus. The signaling protein STING (STimulator of Interferon Gene) is a key mediator in innate immune sensing of viruses. STING-mediated activation of IRF3, IRF7 and NF-κB leads to production of type I IFN, proinflammatory cytokines TNFα and IL-6, and chemokines such as IP-10. STING agonism may also enhance antigen presentation and priming of antigen-specific T-cell responses. Activating the STING pathway represents a previously unexplored strategy for HIV cure with the potential to result in both latency reversal and boosting of HIV-specific T-cell responses.**METHODS:** We evaluated safety and efficacy of a small molecule STING agonist (STINGa) with a dose escalation study in rhesus macaques (RMs). Six RMs were infected i.v. with SIV_{mac239r} treated with antiretroviral therapy (ART) for over a year, and then administered weekly STINGa at ascending doses. Pharmacokinetic and pharmacodynamic parameters were tracked, along with plasma viral loads.**RESULTS:** STINGa was well tolerated in ART-suppressed SIV-infected RMs, with complete blood counts and serum chemistries within normal limits. STINGa dose escalation resulted in increased drug exposure, as expected. Pharmacodynamic analyses showed a significant response at the highest dose. Specifically, STINGa administered at the highest dose resulted in a transient decrease in the frequency of (i) monocytes and (ii) T-cells in 4/6 RMs, and (iii) B-cells in 5/6 RMs.Furthermore, STINGa activity was confirmed by an increase in phosphorylated IRF3 in PBMCs and elevated plasma IL-6 and IP-10. Interestingly, STINGa induced transient but high-level virus reactivation in 2/6 RMs with on-ART viremia rising from < 60 to 2,580 and 1,450 copies/ml of plasma, respectively, 24h after the last dose. These 2 RMs also demonstrated an increase in IFN-γ production in response to *gag* and *env* SIV peptides 5d after the last dose of STINGa.**CONCLUSIONS:** This pilot study provides the first evidence for the potential to deploy a STING agonist as a "kick and kill" strategy for HIV latency reversal and enhancement of virus-specific immune responses.

WEAA0302

Different regimens of Romidepsin administration for reversion of SIV latency in a rhesus macaque model of complete virus controlA. Kleinman¹, S. Murali Kilapandal Venkatraman¹, E. Penn¹, B. Policicchio¹, P. Sette¹, E. Brocca-Cofano¹, M. Cottrell², R. Sivanandham¹, A. Valentine¹, C. Xu¹, K. Raetz¹, T. Dunsmore¹, G. Haret-Richter¹, A. Kashuba², J. Mellors¹, I. Pandrea¹, C. Apetrei¹¹University of Pittsburgh, Pittsburgh, United States, ²University of North Carolina at Chapel Hill, Chapel Hill, United States**BACKGROUND:** HIV persistence in latent reservoirs requires lifelong antiretroviral treatment (ART) for control, necessitating a cure. The "shock and kill" approach utilizes latency reversing agents (LRAs) to reactivate and subsequently clear virus through viral cytolysis and cell-mediated immune response. Histone deacetylase inhibitors are a well-studied class of LRAs, the most potent being romidepsin (RMD), which has been shown to reactivate HIV/SIV reservoirs. Here, we investigated repeated and "double doses" of RMD in our spontaneous control model of SIV infection in rhesus macaques (RMs).

METHODS: Five SIVsub-infected RMs were monitored until viral loads (VLs) were suppressed (< 30 vRNA copies/mL) for minimum 2 months. RMs then received three rounds of RMD (7mg/m²; 4-hour slow-perfusion) every two months. Three RMs received two additional rounds of "double dose" RMD administration (two doses, 48 hours apart) with two months between rounds. The remaining two animals were treated with CD8-depleting antibody, M-T807R1, after the first three RMD administrations.

RESULTS: We found that in the infected macaques, the median RMD half-life was 15 hours in blood, while in lymph nodes and gut RMD persisted for up to 9 days post-treatment. RMD induced robust CD4⁺ T-cell activation. In the absence of ART, SIV reactivated up to 10⁴ vRNA copies/mL. In three RMs, virus reactivation occurred after each round of RMD administration. Interestingly, in two RMs virus reactivation depreciated with each subsequent dose, concluding with no reactivation after the third. CD8 depletion resulted in loss of viral control in one animal that replicated the virus up to 10⁶ vRNA copies/mL. In the remaining RM, plasma vRNA remained undetectable. The switch to double dosage resulted in increased and more persistent immune activation and viral reactivation.

CONCLUSIONS: Our results show that the novel approach of giving double doses of RMD was readily tolerated by the animals and resulted in robust immune activation and viral reactivation. In a model of controlled SIV infection, RMD effectively and potently reactivated the latent reservoir. Importantly, the sequential decrease in viral reactivation with repeated RMD administration and complete lack of viral reactivation after CD8 depletion in one RM indicates that RMD may be decreasing the viral reservoir in this model.

WEAA0303

Fingolimod treatment at ART initiation delays SIV rebound after ART interruption

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BACKGROUND: Lymph-nodes (LN) are a critical site of HIV replication and persistence. Therefore, optimizing antiviral activity in lymphoid tissues is likely needed to reduce the HIV reservoir. We previously found that fingolimod (FTY720), a sphingosine-1-phosphate receptor modulator clinically approved for treatment of multiple sclerosis, promotes retention of cytolytic T-cells in lymphoid sites of viral persistence in ART-suppressed SIV-infected rhesus macaques (RMs). In this new study, we treated SIV-infected RMs with FTY720 at ART initiation, when HIV-reactive cytolytic T-cells are found in larger number than seen in ART-treated aviremic animals. With this design, we aimed at exploring FTY720 potential to enhance SIV-specific defenses in lymphoid sites during early infection thereby diminishing the size of SIV reservoirs.

METHODS: 14 RMs infected with SIV_{mac239} started ART at d42 post-infection. Six RMs received only ART, while eight received FTY720 (daily, 500 mg/Kg) during the first 60 days of ART. ART was interrupted (ATI) after 11 months, and animals longitudinally followed for immunologic and virologic analyses.

RESULTS: FTY720 at ART initiation was remarkably effective in reducing circulating CD4⁺ and CD8⁺ T-cells (p< 0.0001), including those with cytolytic potential (p< 0.01), and induced a transient increase in frequencies of cycling (Ki-67+) T-cells in blood (p< 0.05). In FTY720-treated animals the early kinetics of viral decay after ART initiation were similar (for productively infected short-lived cells) or slower (productively infected long-lived cells; p=0.02) than those of controls, despite a dramatically reduced number of circulating CD4⁺ T-cells. These data suggest that plasma SIV-RNA levels persisting after ART initiation are generated in tissues and not dependent on circulating infected CD4⁺ T-cells. Upon ATI, and nine months after the last dose of FTY720, 4 out of 8 treated RMs exhibited a delayed viral rebound when compared to rebound among controls (P=0.048), suggesting that FTY720 treatment at ART initiation may have reduced the size of viral reservoir. Viral quantification in tissues is pending to confirm.

CONCLUSIONS: FTY720 administration at ART initiation retains T-cells in lymphoid sites of SIV persistence and delays SIV rebound after ATI. These findings provide rationale for strategies designed to retain antiviral T-cells in lymphoid tissues during early HIV infection to target HIV remission.

WEAA0304

Vesatolimod (GS-9620) is safe and pharmacodynamically active in HIV-infected individuals

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BACKGROUND: HIV infection requires lifelong treatment due to persistent viral reservoirs. Vesatolimod (VES; GS-9620) is an investigational oral toll-like receptor (TLR) 7 agonist that has led to viral remission in preclinical S(H)IV models when combined with an anti-HIV antibody or CD8 vaccine. VES targets dendritic cells in gut associated lymphoid tissue (GALT) and the liver, resulting in a pre-systemic response with localized cytokine production and innate immune modulatory effects. We evaluated the activity of VES in people living with HIV (PLH).

METHODS: Virologically-suppressed PLH were enrolled in a double-blind, placebo-controlled dose escalation study. Participants (n=48) were randomized (6:2) to receive VES or placebo every other week in sequential dose escalation cohorts. Multiple (6-10) doses of 1-12 mg were tested. Measurements collected included: plasma HIV-1 RNA, pharmacokinetic (PK), and pharmacodynamic (PD) parameters [interferon stimulated gene (ISG) mRNA expression, serum cytokines and cellular activation].

RESULTS: The median (IQR) age of the participants (43 men, 5 women) was 47 (39, 54) years. The majority of individuals initiated antiretroviral therapy (ART) during chronic HIV-1 infection, with a median of 8.1 years on ART. VES was well-tolerated at all doses, with no study drug-related Grade (G) 3 or 4 adverse events (AEs), no related serious AEs, and no AEs leading to study drug discontinuation. Study drug-related AEs including mild, flu-like symptoms consistent with VES PD, resolving within one day and not occurring with each dose, were observed in 10/40 participants at ≥2 mg. VES plasma exposure increased with dose escalation. Individuals receiving VES ≥4 mg had dose-dependent induction in whole blood ISG mRNA at 24-48 hours post-dose, and changes in the serum cytokines/chemokines ITAC, IP-10 and IL-1RA. Consistent T cell and NK cell activation occurred at doses ≥8 mg. Transient increases in plasma HIV-1 RNA >20 copies/mL (range 21-2430 copies/mL) were observed at least once in 13/48 participants (blinded) after 1 to 3 oral doses at different dose levels.

CONCLUSIONS: VES is well-tolerated at doses of 1-12 mg and induced immune activation at higher doses. Clinical trials are in progress to evaluate the efficacy of VES, alone or in combination with other agents, to control viremia without ART.

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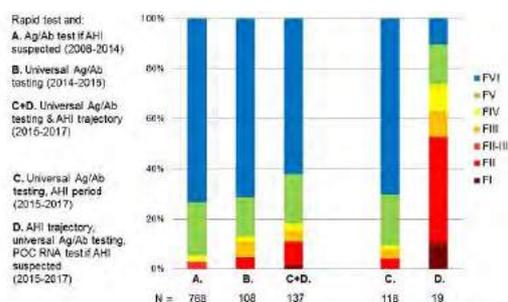
Monday
22 July**WEAB01 Same-day ART, one size fits all?****WEAB0101****Targeted screening and immediate start of treatment for acute HIV infection decreases time between HIV diagnosis and viral suppression among MSM at a Sexual Health Clinic in Amsterdam**

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on behalf of the H-TEAM Initiative

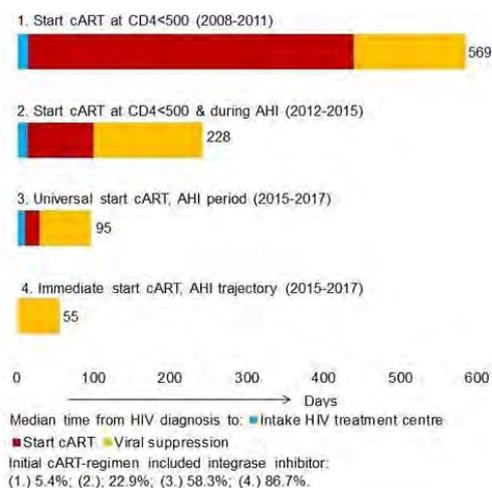
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BACKGROUND: Immediate start of antiretroviral therapy (cART) during acute HIV infection (AHI) is beneficial for patients and reduces onward transmission. An AHI trajectory among men who have sex with men (MSM) was implemented in Amsterdam in 2015; MSM diagnosed with AHI were referred to start cART within 24 hours. We evaluated the AHI trajectory by comparing MSM diagnosed through the AHI trajectory and through routine strategies regarding the proportion of AHI (Fiebig I-II) among HIV diagnoses and the time between diagnosis and viral suppression.

METHODS: Data from 1,013 MSM newly diagnosed at the Sexual Health Clinic (2008-2017) were linked with data from HIV treatment centres by a Trusted Third Party. We compared time between HIV diagnosis and viral suppression using the log-rank test for four cART-initiation policies: (1) start cART at CD4 < 500 cells/mm³ (2008-2011); (2) start cART at CD4 < 500 cells/mm³ and in patients with AHI (2012-2015); (3) universal start of cART (2015-2017); and (4) immediate start of cART, AHI trajectory (2015-2017).



[Figure 1. Fiebig stage for 1,013 newly diagnosed MSM stratified by diagnostic strategy at a Sexual Health Clinic in Amsterdam, 2008-2017]



[Figure 2. Median time from HIV diagnosis to viral suppression stratified by cART-initiation policy among newly diagnosed MSM at a Sexual Health Clinic in Amsterdam, 2008-2017]

RESULTS: In 2015-2017, the proportion of AHI among HIV diagnoses was 52.6% (10/19) in the AHI trajectory and 4.2% (5/118) using routine diagnostic procedures (Figure 1). The median time between diagnosis and viral suppression for cART-initiation policy 1, 2, 3, and 4 was 569 (IQR 259-1031), 228 (IQR 129-435), 95 (IQR 63-136), 55 (IQR 31-72) days respectively, $p < 0.001$ (Figure 2).

CONCLUSIONS: Implementation of the AHI trajectory, along with changes in treatment guidelines, resulted in a higher proportion of AHI diagnoses and a decreased time between HIV diagnosis and viral suppression.

WEAB0102**Same-day antiretroviral therapy initiation in Thailand: Different models and initial outcomes from scale-up in five provinces in Thailand**

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BACKGROUND: The World Health Organization (WHO) has recommended same-day antiretroviral therapy (SDART) for clients who are ready. Since 2017, Thailand has scaled up SDART in five provinces, with different models based on laboratory requirements to facilitate ART initiation. This study aims to describe and evaluate initial outcomes from the various SDART models.

METHODS: Data was obtained from HIV-positive clients from nine facilities in five provinces (Chiang Rai, Chiang Mai, Chonburi, Bangkok and Songkhla) between July 2017-December 2018. Baseline laboratory tests and chest X-rays were performed according to national guidelines. ART eligibility was determined by a physician. Facilities were categorized, by the need to have laboratory results prior to ART initiation, into Group 1: no laboratory results needed, Group 2: CD4 count needed, and Group 3: safety laboratory results needed, without CD4 count. Logistic regression was performed to identify factors associated with successful SDART initiation and ART-related adverse events.

RESULTS: Results presented are in order of Groups 1, 2, and 3. Of 2,876, 236, and 227 clients tested HIV-positive, SDART acceptability was 89.4%, 99.6%, and 93%. ART was initiated in 86.5%, 84.7%, and 81.5%. Median (IQR) CD4 count was 298 (200-423), 290 (77-427), and 233 (80-371) cells/mm³ ($p < 0.001$). SDART initiation was 78.4%, 45.7%, and 57% ($p < 0.001$). There were 4 and 1 deaths in Groups 1 and 3, respectively. None was related to immune reconstitution inflammatory syndrome. Being in Group 1 (aOR 6.15, 95%CI 3.86-9.79, $p < 0.001$) and Group 3 (aOR 2.15, 95%CI 1.2-3.84, $p = 0.010$) increased the chance for SDART initiation. When looking at individual hospital and excluding a stand-alone, VCT clinic, being newly diagnosed (aOR 0.51, 95%CI 0.29-0.88, $p = 0.015$), abnormal ALT (aOR 0.47, 95%CI 0.23-0.98, $p = 0.044$), and abnormal chest x-rays (aOR 0.16, 95%CI 0.05-0.57, $p = 0.004$) decreased the likelihood of starting ART on same-day. No factor was determined to be correlated to ART-related adverse events.

CONCLUSIONS: Various SDART models have been explored in Thailand and all models were proved to be feasible and safe in different hospital settings. Requirement to have CD4 count prior to ART initiation, as still commonly practiced, could unnecessarily delay ART initiation without clinical benefits.

WEAB0103

Treatment outcome among patients on ART in Southern Tanzania: Does time of ART initiation matter?

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BACKGROUND: Tanzania adopted test and treat recommendation by WHO aiming at achieving early ART initiation which is associated with better treatment outcome and reduces HIV transmission risk. ART Initiation on day of diagnosis is among approaches used to ensure improved linkage to treatment. However, there has been concerns that same day ART initiation will negatively affect patients' readiness and eventually their adherence to treatment. Effect of time of ART initiation on retention rate and HIV Viral suppression rate was assessed.

METHODS: Analysis of patient data from 5 hospitals in Iringa, Morogoro and Njombe regions was conducted. Treatment outcome of patients \geq 15 years enrolled between April and September 2018 and initiated on ART on the same day of diagnosis were compared against those initiated under standard of care (1-14 days). Outcome of retention at 6 and 12 months and viral suppression at 12 months were measured. Data was extracted from CTC2 database and analyzed using STATA.

RESULTS: Among 1,105 patients initiated on ART, 431 were initiated on same day of diagnosis while 674 were initiated in 1-14 days. Proportion of females was 72% and 63% in same day and 1-14 days group respectively. Retention at 6 months was high in same day group, 91% (95% CI 88% - 94%) compared to 84% (95% CI 81% - 87%, $p=0.0002$) in 1-14 days group. Retention at 12 months was also high in same day group 88% (95% CI 84% - 92%) compared to 84% (95% CI 79% - 85%, $p = 0.019$) in 1-14 days group. There was no significant difference in viral suppression at 12 months between the two groups, 94% (95% CI 89% - 99%) for same day and 95% (95% CI 92% - 99%, $p=0.709$) for 1-14 days group.

CONCLUSIONS: Patients initiated on treatment on the same day of diagnosis had better retention at 6 and 12 months compared to those initiated under standard of care. Viral suppression was high in both groups, there was no significant difference. Scaling up same day ART initiation as part of test and treat strategy is important in eliminating treatment gap caused by delays in treatment initiation.

WEAB0104

High acceptability and feasibility of same-day antiretroviral therapy services among HIV-positive adolescents in Bangkok, Thailand

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BACKGROUND: There has been an increase in global HIV incidence among adolescents; however, little is known about their care status after HIV diagnosis. Same-day antiretroviral therapy (SDART) services have shortened preparatory steps while maintaining close relationships with clients after ART initiation. This study aims to assess the acceptability and feasibility of SDART among adolescents.

METHODS: Data were collected among HIV-positive clients aged 12-19 years at the Thai Red Cross Anonymous Clinic, the largest VCT clinic in Bangkok. Acceptability was self-reported. Baseline laboratory tests and

chest X-rays were performed according to national guidelines. Physicians evaluated ART eligibility and initiated Tenofovir/Emtricitabine/Efavirenz, Nevirapine or Rilpivirine regimens on the day of diagnosis or as soon as clinically possible. Clients were screened for mental health problems as needed. ART was provided for 2 months and clients linked to long-term ART according to their health insurance scheme. Time from care engagement to ART initiation and retention in care were calculated.

RESULTS: From July 2017-December 2018, 100 adolescents tested HIV-positive: 82% were men who have sex with men (MSM), 16% general population and 2% transgender women (TGW). 95% accepted SDART: 96.3% among MSM, 87.5% general population, and 100% of TGW. Median (IQR) CD4 was 311 (253-381) cells/mm³; 27.5% tested reactive for syphilis (rapid plasma reagin test). 79% had same-day ART initiation, another 17.8% within one week. Of 20 clients who had mental health screening, 4 had adjustment disorder, and 1 had major depressive disorder. Linkage to long-term ART sites was successful in 81.3%. Retention among those linked successfully at 3, 6, and 12 months was 91.4%, 86.8%, and 80% respectively. 78% (25/32) of clients were virally suppressed after 6-months of ART. Adolescents who were lost to follow-up had lower income (100% vs. 42.9% with monthly income \leq 10,000 THB, $p=0.042$) than those retained.

CONCLUSIONS: The majority of newly diagnosed HIV-positive adolescents were MSM. Acceptability of SDART was high and almost 80% started ART on the day of diagnosis. However, to ensure engagement in long-term ART care, integrated mental health services and social support is needed for programs serving adolescents.

WEAB0105

"Test and treat" approaches to HIV care may affect the Xpert MTB/RIF testing impact in high burden TB/HIV settings: Results from a cohort from a rural hospital in Southern Mozambique

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BACKGROUND: Global roll out of Xpert MTB/RIF technology has resulted in dramatic changes in TB diagnosis, increasing bacteriologically confirmed TB cases two-fold and detection of multi-drug resistant TB cases eight-fold. When endorsing Xpert MTB/RIF, WHO forecasted a two-fold increase in the number of HIV-associated TB cases reported.

However, health system factors may limit the benefit in high-burden TB/HIV settings, particularly when using "test and treat" approaches for HIV care.

METHODS: The Carmelo Hospital of Chôkwê (CHC) is a TB/HIV reference center in Gaza Province in Southern Mozambique. Xpert MTB/RIF testing was introduced in 2013. Implementation of a "test and treat" approach for ART started in 2016, following Ministry of Health guidelines. We conducted a retrospective cohort study of TB infected patients \geq 15 years of age, diagnosed and treated at CHC between January 1, 2006 and December 31, 2017.

Patient characteristics, results of sputum acid fast bacilli smear and Xpert MTB/RIF, TB and HIV treatment starting dates, and treatment outcomes were recorded and compared before and after Xpert MTB/RIF and "test and treat" introduction. Tendencies in treatment outcomes were analysed with chi-square.

RESULTS: 9,739 patients \geq 15 years of age were included in the analysis, 4,357 (44.7%) were female. HIV testing was conducted in 9,729 patients (99.9%), with 8,132 (83.5%) having TB/HIV co-infection. The number of TB/HIV co-infected patients varied between 600-800 cases per year, with no observed increase after introduction of Xpert MTB/RIF testing. Percentages of bacteriologically confirmed cases dropped from 42.4% in 2008 to 22.0% in 2017.

Death rates decreased to 12.1% in 2013, but later increased again up to 25.7% in 2017. The number of TB cases starting TB treatment prior to ART start declined from 58.0% in 2015 to 31.7% in 2017 after the introduction of "test and treat" approach ($p < 0.0001$).

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CONCLUSIONS: Despite the impact of Xpert MTB/RIF introduction in TB diagnosis, challenges remain as to how to integrate Xpert MTB/RIF into diagnostic algorithms to maximize the effect of this new technology. HIV care "test and treat" approaches should be reviewed to highlight the need of reasonably excluding TB disease before ART start.

WEAB02 #Recognize & optimize: Pediatrics and adolescent HIV

WEAB0201

Describing the characteristics and long-term outcomes of adolescents living with perinatally acquired HIV in the leDEA-Southern Africa Collaboration: 2004-2017

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BACKGROUND: Adolescents living with perinatally acquired HIV (ALPH) have several unique characteristics resulting from their long-term exposure to HIV and chronic exposure to antiretroviral drugs. We describe the characteristics and long-term outcomes of ALPH within leDEA-Southern Africa (leDEA-SA).

METHODS: We analysed routine data from 16 leDEA-SA sites (2004-2017) of ALPH entering HIV care aged < 13 years, who had ≥1 HIV care visits after age 10 years. Patient characteristics are described at enrolment, initiation of antiretroviral therapy (ART) and at different ages during adolescence. Using competing risks analysis, we estimated the outcomes: mortality, loss to follow-up (LTFU: no visit in the 12 months before database closure) and transfers. We used Cox Proportional Hazards regression to determine predictors of mortality in the 6 years following their 13th birthday.

RESULTS: Of 25,401 ALPH included, 51% were female. At enrolment, median (interquartile range [IQR]) age was 8.8 (5.9-10.9) years, with 51.8% (95% confidence interval [CI] 51.1-52.6) severely immunosuppressed (WHO 2007 criteria), 42.7% (41.6-43.7) underweight (weight-for-age z-score < -2) and 50.6% (49.3-51.8) stunted (height-for-age z-score < -2). Median (IQR) age at ART start and duration of follow-up from ART initiation were 8.9 (6.1-10.9) years and 6.0 (3.0-8.6) years, respectively (Table).

Characteristic, median (IQR)	At age 13 years (n=14,359)	At age 15 years (n=8,407)	At age 18 years (n=3,170)
Duration on ART (years)	3.6 (1.7 - 6.0)	5.0 (3.3 - 7.0)	7.1 (5.8 - 8.8)
CD4 cell count (cells/μL)	601 (378 - 848)	567 (390 - 785)	488 (296 - 680)
Height-for-age z-score	-2.07 (-2.90 - -1.21)	-1.91 (-2.77 - -1.11)	-1.48 (-2.29 - -0.77)
HIV-RNA <400 copies/mL (n/N)*: % (95% CI)	(3415/4693); 72.8 (71.5 - 74.0)	(2044/3045); 67.1 (65.4 - 68.8)	(742/1101); 67.4 (64.5 - 70.2)

*non-missing observations of patients at sites offering routine viral load monitoring

[Table: Characteristics of ALPH by age]

During follow-up, 2.6% died, 15.6% transferred and 21.4% were LTFU. Cumulative incidence (95%CI) for mortality, transfers and LTFU from age 10 years were 4.1% (3.7-4.4), 26.5% (25.7-27.3) and 32.1% (31.3-32.9) at age 18 years, respectively. Characteristics at age 13 years associated with subsequent confirmed mortality were: duration on ART (adjusted hazards ratio [aHR] per year increase 0.80 [95%CI 0.66-0.98]), immunosuppression (CD4 < 350: aHR 7.02 [4.41-11.18], CD4 350-500: aHR 2.59 [1.44-4.67] vs. CD4 >500) and calendar year of their 13th birthday (aHR per year increase 0.88 [0.81-0.95]).

CONCLUSIONS: Children with perinatally acquired HIV have suboptimal retention, viral suppression and survival during adolescence. Those initiating ART at older ages and those immunosuppressed during adolescence need careful follow-up to optimize outcomes.

WEAB0202

Predictors of treatment failure, time to switch and reasons for switching to second line antiretroviral therapy in HIV-infected children receiving first line anti-retroviral therapy

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BACKGROUND: Treatment failure and delay in switching to second line regimen are major concerns in the treatment of HIV infected children in a resource limited setting. The aim of the THIS study was to assess the prevalence and predictors of 1st line ART regimen failure, reasons for switching and time taken switch to 2nd line ARV drugs after treatment failure among HIV-infected children in Tertiary Care Hospital, Ethiopia.

METHODS: A retrospective cohort study was conducted February 2003 to May 2018. All HIV infected children ≤ 15 years of age and who were taking first line ART for at least 6 months were included. Data was collected from patients' chart. Binary and multivariable logistic regression statistics were used.

RESULTS: Out of 318 enrolled HIV-infected children, the prevalence of overall HIV treatment failure was found to be 22.6% (72/318), among these 37 (51.4%) had only immunologic failure, 6 (8.3%) had only virologic failure and 24(33.3%) had both clinical and immunological failure. The mean time taken to modify cART regimen was 12.67(4.96) weeks after treatment failure was confirmed. WHO Stage 3 and 4 [Adjusted Odds Ratio (AOR), 3.64, 95% CI 1.76 - 7.56], not having both parents as primary caretakers [AOR, 2.72 95% CI, 1.05 - 7.06], negative serology of care takers [AOR, 2.69 95% CI, 1.03 - 7.03], and cART initiation at 11 month or younger were predicting factors of treatment failure. Of the 141(47.9%) children who had regimen switching or substitution, treatment failure (44.4%) and replacement of stavudine (d4T) (30.8%) were major reasons. A total of 6.6% (26/391) children died and only 6.6% (21/318) patients had received PMTCT service.

CONCLUSIONS: One fifth of the patients had experienced treatment failure. Advanced WHO stage at baseline, not being taken care of by mother and father, negative sero-status caretakers, and younger age at initiation of cART were the predictors of treatment failure. PMTCT service uptake was very low. There was a significant time gap between detection of treatment failure and initiation of second line cART. Half of the patients encountered regimen switching or substitution of cART due to treatment failure and replacement of stavudine (d4T).

WEAB0203

Dolutegravir containing regimens may need optimization for African youth failing ARTV.M. Kouamou¹, J. Manasa¹, A. McGregor¹, D. Katzenstein², C.E. Ndhlovu¹, T.A. Makadzange¹¹University of Zimbabwe College of Health Sciences, Parirenyatwa Hospital, Harare, Zimbabwe, ²Biomedical Research and Training Institute, Harare, Zimbabwe

BACKGROUND: Chronically infected youth receiving antiretroviral therapy (ART) struggle to maintain virologic suppression. In sub-Saharan Africa youth who are viremic on ART, have a high frequency of drug resistance mutations (DRMs) and limited affordable therapeutic options. The integrase strand inhibitor (INSTI) dolutegravir (DTG) combined with tenofovir (TDF) and lamivudine (3TC) (TLD) is a new single tablet regimen (STR) proposed for use in public ART programs in Africa.

METHODS: We established a cohort of HIV-1 infected youth on long-term 1st and 2nd line ART with confirmed virologic failure (VL>1000 copies/mL). A genotypic analysis of plasma virus was conducted and susceptibility scores to TLD and current 2nd line therapies were calculated.

RESULTS: Plasma virus from 160/185 (86%) participants was sequenced; 112(70%) on 1st line and 48 (30%) on 2nd line regimens. Median (IQR) age was 18 (15-19) years, and median duration on ART(IQR) was 6(4-8) years. Median (IQR) viral load was 4.51 (4.05-4.93) log₁₀ copies/ml. DRMs were present in 94% and 67% of 1st and 2nd line failures respectively (p< 0.001). The lower rate of DRMs on 2nd line therapy suggests PI use may reflect poor adherence and poor tolerance. Dual class resistance to NRTIs and NNRTIs was detected in 96 (60%) of 1st line failures; PI DRMs were detected in a minority (10%) of subjects failing 2nd line regimens. A total genotypic susceptibility score (tGSS) ≤2 that may potentially result in PI or DTG monotherapy, was observed in 11% and 42% of 1st line failures switching to current PI based 2nd line therapies and TLD respectively. The substitution of AZT for TDF in TLD could optimize 2nd line therapy to achieve a tGSS>2.

CONCLUSIONS: Current recommended PI based 2nd line therapies may provide effective treatment for viremic youth failing 1st line ART, but are poorly tolerated and demonstrate low rates of adherence. In 1st line failure, TLD in the absence of genotyping may not be an optimal choice. Drug resistance data will inform strategies for the implementation of TLD as 2nd and 3rd line ART, while novel combinations and/or new agents are needed for this hard to treat population that requires decades of ART.

WEAB0204

Cognitive function among cART-treated children and adolescents with HIV in Zambia: Results from the HIV-associated neurocognitive disorders in Zambia (HANDZ) studyS. Mwanza-Kabaghe^{1,2}, H. Adams³, E. Grecian Mbewe¹, P. Kabundula¹, M. Mwiya², C. Kankasa², G.L. Birbeck³, D.R. Bearden³¹University of Zambia, Department of Educational Psychology, Sociology and Special Education, Lusaka, Zambia, ²University Teaching Hospital - Paediatric HIV Center of Excellence, Lusaka, Zambia, ³University of Rochester Medical Centre, New York, United States

BACKGROUND: A number of studies have demonstrated that children with Human Immunodeficiency Virus (HIV) are at increased risk for impaired cognition. Prior studies have been limited by including a mix of treated and untreated subjects, focusing on a restricted age range, and/or failure to include an appropriate control group. As part of the ongoing HIV-Associated Neurocognitive Disorders in Zambia (HANDZ) study, we sought to evaluate cognitive function in virally suppressed cART-treated children and adolescents living with HIV in Zambia compared to demographically matched HIV-exposed uninfected controls

METHODS: A total of 400 participants were recruited for the study consisting of 200 cART-treated subjects with perinatally acquired HIV and 200 HIV exposed uninfected (HEU) controls, all 8-17 years old. Subjects with a history of CNS infection, pregnancy, epilepsy, or chronic kidney or liver disease were excluded. Demographics and subject characteristics were assessed using standardized subject and parent interviews, and comprehensive neuropsychological testing was performed using a com-

ination of standard testing and iPad-based performance measures using the NIH Toolbox. Cognitive impairment was defined using a global deficit score approach.

RESULTS: In comparison to the HEU group, children with HIV performed significantly worse on a composite measure of cognitive function (Global Cognition standard score 82.8 vs. 74.8, p=0.002), and were significantly more likely to be classified as impaired (34% vs. 5%, p=0.001). Cognitive domains that were most affected included Attention, Working memory, Processing speed and Psychomotor Speed. In a multivariable logistic regression model, risk factors for impairment included socioeconomic status (OR 0.78), history of advanced WHO clinical stage (OR 1.9), late initiation of antiretroviral therapy(OR 2.0), and growth stunting (OR 2.7).

CONCLUSIONS: Cognitive function remains significantly worse in children with HIV compared to demographically similar controls, even in a relatively healthy population of cART-treated virally suppressed subjects. There is a need for trials of interventions to improve development and cognitive function in children with HIV. This study suggests interventions to improve cognition in children with HIV might include earlier identification of subjects with HIV to initiate cART, and interventions to target lower SES families, such as cash transfers and nutrition support programs.

WEAB0205

Response to direct acting antivirals in vertically HIV/HCV co-infected youthsI. Carrasco¹, T. Sáinz², M.A. Frick³, S. Jiménez de Ory¹, M. Montero⁴, C. Gavilán⁵, M.D. Falcón⁶, J.A. Couceiro⁷, J.I. Bernardino⁸, R. Rubio⁹, O. Bisbal⁹, C. Guerrero⁹, M.T. Aldámiz-Echevarría¹, P. Miralles¹, J. Berenguer¹, M.L. Navarro¹, CoRISpe- Spanish National Cohort of HIV-infected Children and Adolescents¹IISGM - Gregoria Marañon University Hospital, Madrid, Spain, ²La Paz University Hospital, Madrid, Spain, ³Vall d'Hebron University Hospital, Barcelona, Spain, ⁴La Fe University and Polytechnic Hospital, Valencia, Spain, ⁵San Juan de Alicante Hospital, Alicante, Spain, ⁶Virgen del Rocío University Hospital, Sevilla, Spain, ⁷Pontevedra Hospital Complex, Pontevedra, Spain, ⁸12 de Octubre Hospital, Madrid, Spain, ⁹Miguel Servet University Hospital, Madrid, Spain

BACKGROUND: New direct acting-antivirals (DAA) have altered HCV treatment in recent years. The absence of authorized drugs in children along with the natural evolution of the infection in childhood, generally asymptomatic until adolescence, results in little treatment experience in the population of vertically HIC/HCV co-infected subjects. The objective of this study is to describe response to DAA treatment in this unique population.

METHODS: Longitudinal observational study within The Spanish National Cohort of HIV-infected children and adolescents (CoRISpe) including vertically HIV/HCV co-infected children that had received treatment against HCV when visiting adult units. Demographic, analytical, clinical and virological parameters were collected before, and 12 weeks after finishing HCV treatment.

RESULTS: From the 651 patients transferred to adult units, 80 were HCV co-infected. Thirty-four were excluded due to data unavailability and 46 were included in the analysis (3 of them lost to follow-up and 5 deceased). 52.2% were women, median age of 26.5 years (IQR 24-30). In total, 30 patients had received treatment, at a median age of 22 years (IQR 19.7-25). At HCV-treatment initiation, all patients were on ART, 92% virologically-suppressed, and a median CD4 T-cell count of 646 cel/ul (IQR 551-1039), 13.3% below CD4< 500cel/ul.

Genotypically, 60.6% were G1, 22.5%-G4 and 15%-G3. At treatment initiation, 24.1% presented fibrosis (F3-F4), 17.2% F2 and 55% F0-F1. Overall, 70% were treated with DAA; SOF/LED (14 patients), EBV/GZP (2p), OBV/PTR/r (2p), OBV/DSV/PTR/r (2p) y VLP/SOF (1p), plus RBV in 23%. Nine patients received interferon-therapies; IFNpeg+RBV (7p), IFN/DCV+RBV (1p) and IFN/TPV+RBV (1p). DAA-therapies were 8-12 weeks long while IFN therapies were from 12 to 48 weeks. The SVR rate with DAA was 100%, but 88.8% when IFNpeg+RBV regimens were used. After SVR at week 12 (SVR12), 38.5% improved their fibrosis stage, 15.4% worsened and 46.2% maintained their previous stage of fibrosis.

CONCLUSIONS: In our study, new DAA treatment guidelines achieved excellent cure rates (100%) in vertically HIV/HCV co-infected patients. However, 24.1% of these patients showed advanced fibrosis (F3-F4) at

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treatment initiation with no improvement despite treatment in 60%. To speed up access to new DAA treatments for pediatric populations is an urgent need.

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WEAB03 Deadly partners: HIV and co-infections

WEAB0301

Improved survival for people living with HIV, with and without tuberculosis, over time in Latin America

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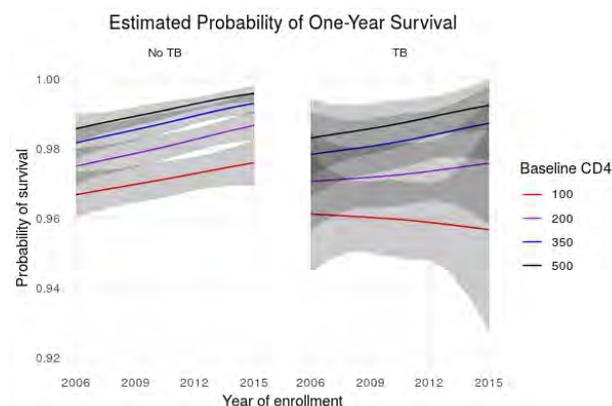
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BACKGROUND: In 2006, 2009, and 2013, ART was recommended for persons living with HIV (PLWH) with CD4 count < 200 cells/mm³, < 350 cells/mm³, and < 500 cells/mm³, respectively. In 2015, universal ART was recommended. Earlier ART initiation was also recommended for patients with TB. We previously found that time from enrollment to ART initiation in Latin America dramatically decreased during this period. Here we characterize temporal trends in one-year mortality, stratified by baseline TB status.

METHODS: The study included PLWH from clinic sites in Brazil, Chile, Haiti, Honduras, Mexico, and Peru participating in CCASAnet. We included all persons ≥18 years old who were ART-naïve at first clinic visit from 2006-2015. Baseline TB was defined as TB diagnosed within 30 days of enrollment. We estimated the probability of mortality within the first year of enrollment as a function of baseline TB status, CD4 count, and year of enrollment from a multivariable Cox regression model that included these variables, two-way interactions between these variables, sex, education, and age, stratified by study site. Continuous variables were fit with natural splines to relax linearity assumptions.

RESULTS: Of 19,197 patients, 1306 (7%) were diagnosed with baseline TB. Patients with TB were more likely to be male, older, less educated, have lower CD4 counts, and live in Haiti or Peru. Mortality was higher among patients with baseline TB ($p=0.003$) but both groups had improved survival with later year of enrollment ($p<0.001$). Survival was associated with higher baseline CD4 count (Figure) and improved over time for patients in all CD4 strata except for those with baseline TB and low CD4 counts, although the interaction between time and TB status was not statistically significant ($p=0.45$).

CONCLUSIONS: Among PLWH in Latin America, mortality rates were higher in persons who presented with baseline TB, although survival improved over time regardless of TB status.



[Estimated Probability of One-Year Survival]

WEAB0302

Social network characteristics are associated with prevalent tuberculosis infection among people living with and without HIV in nine communities in rural Uganda

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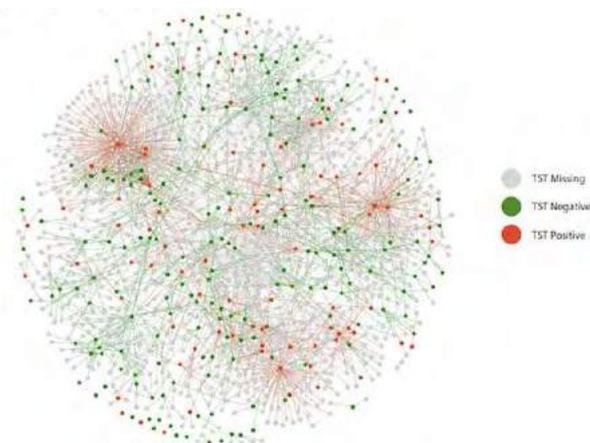
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BACKGROUND: Social network analysis (SNA) has the potential to elucidate tuberculosis (TB) transmission dynamics between community-based contacts, which are estimated to account for the majority of new TB cases.

METHODS: We assessed the associations between social network characteristics and prevalent TB infection among adults (≥15 years) living in 9 rural communities in Uganda participating in the SEARCH Trial (NCT01864603). We built community-wide social networks, excluding household members, using data from a baseline census from 2013-2014. Among individuals who received a tuberculin skin (TST) as part of a household survey enriched for persons living with HIV (PLWH), we evaluated whether network characteristics predicted prevalent TB infection, defined as a positive TST with induration ≥10mm or ≥5mm in PLWH, after adjusting for individual-level variables (age, sex, TB contact, wealth, and BCG vaccination) with Targeted Maximum Likelihood. Network clustering was assessed with a permutation test.

RESULTS: Among the 3,355 adults surveyed, 32% had a positive TST, 20% were PLWH, and 4% reported a household TB contact. 2,395 (75%) were linked in the non-household network (Figure 1). Clustering by TST status was statistically significant ($p<0.05$) in 4 communities. Adjusting for individual-level risk factors, individuals with the most connections (top 10%) were more likely than those in the bottom 90% to have prevalent TB (aRR: 1.3, 95% CI: 1.1-1.5). Persons with more (top 10%) contacts living with HIV and more (top 10%) male contacts had a higher risk of prevalent TB, aRR: 1.21 (95% CI 1.1-1.4) and aRR: 1.5 (95% CI: 1.4-1.8) respectively, compared to those in the remaining 90%.

CONCLUSIONS: A high network degree and characteristics of the people in one's network, specifically having more links with men and PLWH, are associated with a higher risk of prevalent TB. TB transmission within a social network may explain prevalent TB not associated with a household contacts.



[Figure 1. Visualization of a social network in one rural community in Eastern Uganda, by tuberculin skin test (TST) status. In this community, clustering by TST status (positive pairs and negative pairs) was statistically significant ($p<0.001$) using a permutation test.]

WEAB0303

HCV reinfection among HIV/HCV co-infected individuals in Europe

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BACKGROUND: While Directly Acting Antivirals (DAA) can clear HCV in nearly all HIV/HCV co-infected individuals, high rates of reinfection may hamper efforts to eliminate HCV in this population. This analysis aimed to examine reinfection after achieving sustained virologic response (SVR) in HIV/HCV co-infected individuals in Europe.

METHODS: Individuals from EuroSIDA that achieved SVR 12 or 24, with ≥ 24 months follow-up and ≥ 1 HCV-RNA test after SVR were included. Factors associated with the odds of reinfection were assessed using multi-variable logistic regression.

RESULTS: Overall, 675 individuals were included. The median age was 45.9 (IQR 39.8-51.5 years), 78.4% were male, 48.7% were IDUs, 30.2% were MSM, and the majority received an interferon-based regimen (610, 90.4%). Overall, 89 (13.2%, 95% confidence interval (CI) 10.6%-15.7%) individuals were re-infected by 24 months. Central-East Europe had the highest proportion of reinfections (20.0%), while Southern Europe had the lowest (8.0%; $p=0.0097$). Reinfections in MSM were 14.2%, similar to IDUs (13.5%; $p=0.67$). After adjustment, Central-West and Central-East Europe had higher odds of reinfection (compared to Southern Europe; Figure 1),

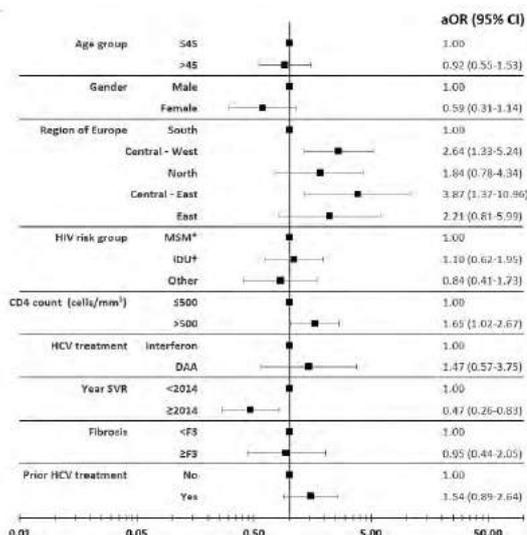


Figure 1 - Adjusted odds ratio (aOR) of being reinfected† after achieving SVR‡

* MSM - men who have sex with men

† IDU - injection drug users

‡ Reinfection was defined as being HCV-RNA positive, HCV genotyped or receiving HCV treatment within 24 months of achieved confirmed SVR following treatment

§ SVR was defined as a negative HCV-RNA result 24 or 12 weeks (for INF-based or INF-free regimens, respectively) after stopping treatment or later

Characteristics were measured at baseline (date of confirmed SVR)

The model included individuals with missing data for CD4 count and fibrosis by including missing categories which are not shown in the forest plot. We were not able to adjust for ethnicity as there were only reinfections among those of white or unknown ethnicity

[Figure 1]

as did those with CD4 count >500 cells/mm³. Those who achieved SVR ≥ 2014 had lower odds of reinfection. There was no statistically significant association between age, gender, prior use of treatment, use of DAAs and reinfection, although all had wide confidence intervals.

CONCLUSIONS: The proportion of reinfections among HIV/HCV co-infected individuals within 24 months of achieving SVR was 13%, with evidence suggesting this is decreasing over time. We cannot rule out that some late relapses could have been misclassified as reinfection, though this is unlikely, and that clinics have targeted testing to those at highest risk or with signs of reinfection. Active surveillance to detect early HCV reinfection with an offer of early treatment is essential as is harm reduction in those treated to reduce rates of reinfection.

WEAB0304

Evaluation of hepatitis C virus rapid diagnostic test in HCV mono- and HCV/HIV co-infected patients from low and middle income countries

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BACKGROUND: Hepatitis C Virus (HCV) rapid diagnostic tests (RDTs) for the detection of anti-HCV antibodies play an important role in reaching high risk populations in low and middle income countries (LMICs).

Past studies have compared performance of HCV RDTs mostly in HCV-mono infected patients, often located in high income countries. Although HIV is a commonly found co-infection in HCV-infected individuals, substantial data on RDT performance in HCV/HIV co-infected patients are lacking.

In the present study, we aimed to evaluate sensitivity, specificity and performance characteristics of thirteen RDTs on 1'800 HCV mono- or HCV/HIV co-infected samples collected in different geographic regions, to fill the data gap in LMICs and particularly the HIV co-infected population.

METHODS: This is an observational, retrospective multicentre laboratory study on archived EDTA plasma samples from Cambodia, Nigeria, Georgia and Belgium.

Sensitivity and specificity were evaluated in each of 400 samples of HCV mono-infected and HCV/HIV co-infected individuals and each of 500 samples of HCV-uninfected or HIV mono-infected individuals, respectively. Results were compared to a reference method composed of two Enzyme Immuno Assays and a Line Immunoassay.

Each sample was tested on two lots per RDT and each RDT result was read by three independent readers. Additionally, the rate of invalid runs was assessed.

RESULTS: This large head-to-head performance evaluation provides insightful information on the RDTs performance of sensitivity versus specificity in the HCV mono- and HCV/HIV co-infected sample cohorts. While some RDTs showed very high specificity (up to 100%), the sensitivity was variable (81-100%) in the HCV/HIV co-infected sample cohort. Conversely, where sensitivity was high, there was a clear compromise in specificity and once again, this effect was more pronounced in the HCV/HIV co-infected samples.

Inter-lot and inter-reader variability was mostly within an acceptable range ($\leq 3\%$), while the rate of invalid runs appeared to be related to the technical configuration of the test.

CONCLUSIONS: The results of our study provide a comprehensive picture of HCV RDT performance in patients from different LMICs, with and without HIV co-infection. Performance appeared impacted by HIV co-infection, which should be taking into consideration when deciding on the most suitable HCV RDT for screening.

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WEAB0305

Prevalence, characteristics and outcomes of patients with Cryptococcal meningitis in Maputo, MozambiqueR. Deiss¹, C. Loreti¹, A. Gutierrez¹, M. Tatia², H. Vivaldo¹, L. Molfino¹, N. Tamayo Antabak¹, S. Issufo³, I. Ciglienicki⁴¹Medecins Sans Frontieres, Maputo, Mozambique, ²Hospital Geral Jose Macamo, Ministerio da Saude de Mocambique, Maputo, Mozambique, ³Ministerio da Saude de Mocambique, Maputo, Mozambique, ⁴Medecins Sans Frontieres, Geneva, Switzerland

BACKGROUND: Cryptococcal meningitis (CCM) is a leading cause of HIV-related mortality in sub-Saharan Africa. Nonetheless, routine screening for serum cryptococcal antigen (CrAg) has not been widely implemented for patients with advanced HIV, despite World Health Organization (WHO) recommendations. Moreover, CCM treatment in Africa is often suboptimal with inadequate access to liposomal amphotericin (LAmB) and flucytosine (5-FC). We report outcomes following implementation of systematic screening, diagnosis and treatment of CCM at a tertiary level hospital in Maputo, Mozambique.

METHODS: We analyzed retrospective clinical data between March-December 2018. All HIV+ patients admitted to the emergency department underwent CD4 count screening; those with CD4 < 200 cells/ul received point-of-care serum CrAg testing (IMMY; Norman, OK, USA). Cerebrospinal fluid (CSF) was obtained on serum CrAg+ patients; those with CSF CrAg+ received 7 days of LAmB/5-FC followed by fluconazole. Post-discharge outcomes were obtained by telephone contact and/or review of ambulatory records.

RESULTS: Among 1,782 patients screened, the total prevalence of cryptococcal antigenemia was 5.6% (N=100). Of these, 61% were diagnosed with CCM, yielding a total prevalence of 3.4%. In the overall sample, 49.9% (N=890) of individuals had CD4 < 200 cells/uL; additional patient characteristics are highlighted in Table 1. Complete induction treatment data was available on 40/61 patients: 32 (80%) completed and eight (20%) died during hospitalization. At 12 weeks, 18% (11/61) patients remained in ambulatory care, 34% (21/61) had died, and 34% (21/61) could not be reached. An additional eight patients (13%) had not yet completed 12 weeks of follow-up.

	Serum CrAg+ (N=100)	Serum CrAg- (N=890)	CSF CrAg+ (N=61)	CrAg- CSF (N=27) ¹
Median Age (IQR)	38 (33, 43)	38 (32, 45)	38 (33.5, 43.5)	35 (30, 42)
Male [N; (%)]	53 (53)	423 (47.5)	33 (54.1)	12 (44.4)
Median CD4 (IQR)	32 (15.5, 75.5)	51 (22, 102)	34 (16.5, 82)	38 (14.5, 134)

[Characteristics of patients admitted to emergency department with CD4 < 200 cells/uL]

¹CSF not obtained in 12 serum CrAg+ patients.

CONCLUSIONS: This is the first report of CCM prevalence and treatment outcomes in Maputo, Mozambique. Introduction of serum CrAg screening and CCM diagnosis for advanced HIV disease in an emergency department was feasible. Treatment with LAmB/5-FC resulted in high early survival, but a high proportion of deaths occurred in the early post-hospitalization period, emphasizing the need for close outpatient monitoring following initial CCM treatment.

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WEAB0306

HPV genotyping is as important as cytology in anal cancer early diagnosisM. Digaetano^{1,2}, F. Spatafora³, C. Rogati¹, A. Farinetti³, R. Gelmini³, M. Pecorari⁴, S. Tagliazucchi⁴, R.P. Iachetta⁵, R.D. Villani⁶, C. Mussini^{1,3}¹AOU Policlinico di Modena, Infectious Diseases Clinic, Modena, Italy, ²Alma Mater Studiorum - Università degli Studi di Bologna, Scuola di Specializzazione in Malattie Infettive, Bologna, Italy, ³University of Modena and Reggio Emilia, Surgical, Medical and Dental Department of Morphological Sciences Related to Transplant, Oncology and Regenerative Medicine, Modena, Italy, ⁴AOU Policlinico di Modena, Unit of Microbiology and Virology, Modena, Italy, ⁵Nuovo Ospedale Civile di Sassuolo (Modena), Pelvic Floor Center, Department of Proctology, Sassuolo, Italy

BACKGROUND: Anal cancer is increasing among HIV+ men who have sex with men (MSM). Our study aims to identify the best method of screening.

METHODS: This prospective single centre study involved HIV+ MSM who underwent an anal cancer screening program using the anal Pap test, HPV genotyping and, in case of positive cytology or high risk HPV genotype detection, high resolution anoscopy (HRA).

RESULTS: 121 performed Pap tests were performed: 50 (41,3% of) were positive for HPV related lesions, 44 (88%) low grade squamous intra-epithelial lesions (LSIL) and 5 (10%) atypical squamous cells of undetermined significance (ASCUS), high grade lesions (HSIL) were found in 1 patient (2%). 71 of 121 screened (58,6%) performed also HPV genotyping: 3 resulted negative, 11 low risk HPV genotype carriers and 57 high risk HPV (HRHPV) genotype carriers. HPV16 was found in 13 patients (18,3%) and it was the most frequently identified genotype. HPV18 was found in 8 patients (11,2%). Only 21 HRHPV carriers (37%) had a positive Pap test. A total 86 screened (71,7%) had the indication for HRA (50 positive Pap tests plus 36 HRHPV with negative cytology). Among 42 HRAs performed until today (39 in Pap test + and 3 in HRHPV carriers with Pap test -), 21 (50%) showed LSIL and 8 HSIL (19%). 2 HSILs were found in HRHPV carriers with Pap test -, 6 in Pap test +. HRA confirmed cytology in 23 cases, showed a worsening in 7 cases and a lower grade lesion in 11 cases. 3 cases of clinical progression were detected at control, 1 with HRHPV but negative cytology became LSIL, 1 LSIL became HSIL and 1 carcinoma in situ was found in a patient treated for HSIL four months before.

CONCLUSIONS: HPV-related dysplasia is common among HIV+ MSM and is likely to evolve in a short period of time especially in the presence of high-risk genotypes. We recommend the association of HPV genotyping with cytology as first level of screening and HRA for treatment and follow up of lesions as this bundle allows to identify lesions in subjects with a negative PAP-test.

WEAC01 Interrupting transmission using new testing tools

WEAC0101

Transmission Linkages among persons with incident HIV-1 infection in North Carolina, 2014-2018A. Dennis¹, S. Frost², A. Cressman³, N. Adams⁴, J. Eron¹, W. Miller⁵, M. Cohen⁶, V. Mobley⁴, E. Samoff⁴¹University of North Carolina, Chapel Hill, United States, ²University of Cambridge, Cambridge, United Kingdom, ³UNC Chapel Hill, Chapel Hill, United States, ⁴North Carolina Division of Public Health, Raleigh, United States, ⁵The Ohio State University, Columbus, United States, ⁶University of North Carolina at Chapel Hill, Chapel Hill, United States

BACKGROUND: Despite widespread prevention, HIV incidence in the Southern US remain stable to rising among young MSM (YMSM, < 30 years) subgroups. Innovative strategies to increase engagement and retention in HIV care, such as through network-based recruitment, are needed. We evaluated features of transmission networks involving persons diagnosed during primary HIV infection (PHI) to assess network-based opportunities for intervention.

METHODS: We investigated genetic clusters involving persons diagnosed with PHI from 2014–2018 and reported to North Carolina (NC) surveillance. PHI is defined as acute (negative antibodies with detectable RNA) or recent infection (positive antibody within 3 months of seronegative testing). Pol sequences generated from resistance genotypes are routinely reported to surveillance and analyzed for clustering. Clusters were defined as groups with < 1.5% genetic distance between all sequences and involving ≥1 PHI case. Assortativity coefficients (r) were calculated to estimate mixing among cluster features in the network.

RESULTS: Of 296 persons (7.2%) reported with PHI among 4,105 HIV diagnoses 2014–2018 with sequences, most were male (89%), black (64%), young (44% 18–24 years), and reported MSM risk (78%). Most PHI cases ($n=209$; 71%) had a sequence linked to another sequence. These cases were in 152 clusters involving 1202 persons (PHI members: median 1, range 1–5). Of cluster members diagnosed during established infection, a substantial number were prior diagnoses ($n=297$; 30% diagnosed < 2014).

Among prior diagnoses, factors associated with membership in PHI clusters compared to persons not in a PHI cluster included: MSM risk (78% vs. 38%), age 18–24 years at diagnosis (54% vs. 22%), more recent HIV diagnosis (median 2011 vs. 2005), greater percentage time spent viremic (2014–2018: estimated mean 42% vs. 37% days above viral load 1500 copies/mL) [$P < 0.01$]. Positive assortativity was found for geographic region ($r=0.44$), race ($r=0.22$), risk (0.14), and age ($r=0.22$).

CONCLUSIONS: We identified the transmission linkages for a high proportion of YMSM with PHI through statewide molecular surveillance. YMSM with prior diagnoses are frequently identified in these PHI clusters with high assortativity by demographic features. Enhanced partner services for YMSM to support retention in HIV care and facilitate further case finding may have a high impact on reducing onward transmission.

WEAC0102

Applications of HIV genetic networks in Mexico: Implications for prevention

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BACKGROUND: HIV genetic networks might help to understand HIV transmission dynamics and design more effective interventions. We present two examples of the use of HIV networks in different epidemiological contexts within Mexico: A state-level molecular surveillance system in Jalisco and adolescents and young persons within the network of the Mexico City metropolitan area.

METHODS: HIV *pol* Sanger sequences were obtained from 671 persons starting first-line ART in Jalisco, 01/2017–11/2018. HIV *pol* sequences were obtained by next generation sequencing from 2,447 individuals initiating first-line ART at Condesa Clinic, 09/2016–06/2018. Genetic networks were inferred with HIV-TRACE, establishing putative transmission links with genetic distances < 1.5%. Newman's assortativity coefficients were estimated using igraph.

RESULTS: In the case of Jalisco, putative links with at least one other sequence were found for 258/671 (38.5%) sequences, forming 89 clusters from 2 to 9 individuals (57% dyads). The network was assortative by risk factor for HIV acquisition ($p=0.001$) and municipality of residence ($p < 0.001$). Clustering individuals were younger (mean age: 31 vs. 33, $p=0.01$),

included a higher proportion of MSM (78% vs. 65%, $p=0.01$), and were diagnosed more frequently by COESIDA community testing programme (69% vs. 61%, $p=0.02$).

In the case of Mexico City, putative links were found for 963/2,447 (39%) sequences, forming 326 clusters from 2 to 20 individuals. A higher proportion of young persons (≤ 21 yo) was observed within clusters (51% vs. 38%, $p < 0.001$). Of all putative links in the network (1158), 24% (278) included at least one young person. Within links including young persons, 42% (117/278) included one 22–25 yo, 38% (106/278) one 26–40 yo, 6% (16/278) one person >40, and 23% (63/278) were between two persons ≤ 21 yo. Importantly, the inferred transmission network was not assortative by age ($p=0.6$), suggesting frequent putative links between persons of diverse age groups.

CONCLUSIONS: We observed frequent HIV transmission among young MSM in a geographically assortative network in Jalisco. We also observed higher detection of transmission chains through community testing, underscoring the importance of NGO participation in focused interventions. The inferred Mexico City HIV genetic network demonstrates the importance of persons ≤ 21 yo in putative transmission chains, with frequent links with older persons.

Funding: This work was supported by grants from the Mexican Government (Comisión de Equidad y Género de las Legislaturas LX–LXI y Comisión de Igualdad de Género de la Legislatura LXII de la H. Cámara de Diputados de la República Mexicana) [GRT], CONACYT SALUD-2017-01-289725 (SAR), and the US National Institutes of Health AI093163 (SRM).

WEAC0103

High burden of recent and prevalent HIV infection among men who have sex with men (MSM) in Hanoi, Vietnam

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BACKGROUND: HIV in Vietnam is concentrated in key populations, including MSM. The Asian Epidemic Mathematical model estimated a prevalence of 4.8% and annual incidence of 0.36% among MSM in Hanoi. Using a validated, novel rapid test to detect recent infection, we directly estimated and characterized HIV incidence in this population.

METHODS: In 2017, we recruited 800 MSM aged ≥ 16 years into the Hanoi MSM cohort using time-location sampling based on comprehensive mapping of all MSM venues in the city. We collected baseline data on demographics, sexual and risk behaviors, healthcare seeking practices and performed HIV and STI testing. HIV positive cases underwent Asanté™ HIV-1 Rapid Recency® Assay testing and viral load testing. We used data on recent HIV infection (defined as Asanté recent and HIV ≥ 1000 copies/ml); a mean duration of recent infection (MDRI) of 161 [141–174] days; and a positive false rate (PFR) of 0 to derive annual incidence. We conducted weighted stratified analysis and logistic regression, taking into account variability of the venue size and selection probability.

RESULTS: Of 80 HIV cases, 75 underwent Asanté testing. The HIV prevalence was 10.9% [7.4%–15.8%] of which 21.6% [9.5–42.0%] were recently infected, yielding a weighted, annual HIV incidence of 5.8% [0.8%–10.6%]. Nearly all (92.8% [72.5–98.4%]) recently-infected MSM were ≤ 24 years old, with an average last-month income of 232 \pm 55 USD; 95.2% [79.9–99.0%] reported having sex with partners met via websites or mobile applications; 89.4% [69.5–96.9%] experienced STI symptoms in last six months.

Few recently infected MSM had syphilis (12.2% [3.1–37.8%]) and reported using amphetamines during sex (chemsex) in the past six months (0.9% [0.1–6.0%]). Compared to long-term infection, recent infection was associated with lower income of 130 USD (AOR 28.0 [1.0–774.2]); it's negatively associated with syphilis (AOR 0.04 [0.00–0.47]) and chemsex in the past six months (AOR 0.03 [0.00–0.48]).

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CONCLUSIONS: Using a novel recency test, we found double the HIV prevalence and 16 times the HIV incidence than predicted by mathematical modelling for MSM in Hanoi. Our findings highlight the urgent need for enhanced prevention including routine HIV and STI screening, partner notification services and PrEP, especially in lower income MSM.

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WEACO104

Acute HIV infection among individuals who start PrEP: The ImPrEP experience, a demonstration project in the context of combination prevention in Brazil, Mexico and Peru

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BACKGROUND: Pre exposure prophylaxis (PrEP) is recommended as part of combination prevention for individuals at high risk for HIV infection. Before initiating PrEP, individuals must test HIV negative to avoid including HIV positives, thereby preventing resistance, and assure adequate care. During early acute HIV infection (AHI), neither antibodies nor antigens can be detected by serologic tests, but virus is detectable with molecular methods. Therefore, some individuals with AHI may be enrolled in PrEP, as molecular methods are not included in conventional PrEP screening. ImPrEP is a PrEP demonstration study to assess feasibility of daily oral PrEP provided to MSM and transgender people at risk for HIV in Brazil, Mexico and Peru.

METHODS: Individuals with AHI were defined as those enrolling with a negative HIV rapid test (4th generation in Mexico and Peru, 3rd generation in Brazil) with detectable virus using molecular methods. At enrollment, all participants provide data related to potential factors for HIV acquisition (number of sexual partners, condomless anal sex, STIs, among others), use of post-exposure prophylaxis in the last year and signs or symptoms suggestive of AHI in the last 30 days. At enrollment, participants only receive 1 month of PrEP, to assure the exclusion of individuals with AHI.

RESULTS: From January-December 2018, 3,433 individuals were enrolled, 2160 in Brazil, 702 in Mexico and 571 in Peru. Nine individuals with AHI were identified. The overall prevalence of AHI visit was 0.26%, of which 0.28% in Brazil, 0.35% in Peru and 0.14% in Mexico. All AHI cases had 2 or more HIV risk factors and 3/9 had used PEP in the last year. PrEP exposure was short (8 - 30 days). In Brazil, 5/6 started ART the day they stopped taking PrEP. In Peru and Mexico all the cases were referred to treatment and care facilities the day they stopped PrEP. Only one AHI case presented symptoms of potential acute infection at enrollment.

CONCLUSIONS: AHI is a rare event among ImPrEP participants, and initiation of PrEP the same day of screening is safe, only exposing those with AHI for a limited period, decreasing the theoretical risk of resistance.

WEACO105

HIV incidence among men who have sex with men and transgender women in Tijuana, Mexico

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BACKGROUND: Accurate estimates of HIV incidence among men who have sex with men (MSM) and transgender women (TW) in Tijuana, Baja California, Mexico are unavailable despite being the most heavily impacted risk populations (HIV prevalence: MSM/TW=20%, persons who inject

drugs=4%, female sex workers=6%), with 89% of MSM/TW unaware of their infection. Without HIV incidence data, we cannot evaluate the impact of current interventions. This study estimates and characterizes recent HIV infection among a cohort of newly diagnosed HIV-positive MSM/TW in Tijuana.

METHODS: Recency was determined using Limiting Antigen (LAG)-Avidity testing (detects infection ~130 days) for the Enlaces cohort of newly-diagnosed HIV-positive MSM/TW (n=195) recruited via venue-based and respondent-driven sampling in Tijuana (03/2015-11/2018). Logistic regression was used to determine characteristics associated with recent infection. We also examined whether recent infections clustered using HIV-1 partial *pol* sequences generated from blood samples from 141 participants. We used HIV-TRACE to measure TN93 genetic distances between all pairs of sequences and infer putative transmission links between participants whose sequences had genetic distances $\leq 1.5\%$. Clustering was defined as having ≥ 1 putative transmission link within the inferred HIV transmission network.

RESULTS: Twenty-two (11%) of the 195 participants tested had recent HIV-infections. Of those with sequence data, 64% (9/14) of recent infections clustered, compared with 33% (38/116) of chronic infections. Two recent infections belonged to the same cluster (maximum cluster size:15). In the adjusted analysis, those with recent infection lived in Tijuana longer (OR 1.05; 95% CI 1.01-1.09) and were more likely to use cocaine (past month) (OR 8.57; 95% CI 2.18-33.69).

CONCLUSIONS: A high proportion of newly diagnosed MSM/TW in Tijuana were recently infected. The low clustering between the recent infections suggests continued onward HIV transmission, rather than a network outbreak. Given the majority of HIV-positive MSM/TW in Tijuana are unaware, this estimate serves as a starting point for resource allocation.

Characteristic	Incident Infection n (%) n=22	Chronic Infection n (%) n=173
Age, years (median, IQR)	33 (23, 44)	31 (26, 39)
Education > High School	12 (57)	82 (49)
Unemployment	1 (6)	26 (16)
Duration of residence in Tijuana, years (median, IQR)	19 (9, 23)	8 (2, 18)
Sexual Orientation		
Gay / Homosexual	11 (52)	95 (57)
Straight / Heterosexual	0	19 (11)
Bisexual	8 (28)	52 (31)
Questioning	2 (9)	1 (<1)
Number of Sexual Partners (median, IQR)	3 (1.5, 4.5)	4 (1, 10)
Substance Use (past month)		
Marijuana	10 (48)	51 (30)
Cocaine	5 (24)	8 (5)
Methamphetamines	4 (19)	61 (37)
Amyl Nitrate (poppers)	4 (19)	17 (10)
Intravenous Drugs	1 (5)	20 (12)

*4 cases were missing survey data

Adjusted Logistic Regression: Factors Associated with Recent HIV Infection (n=187)*

	OR	95% CI	p-value
Age ^a	0.99	0.22-4.56	0.99
Years lived in Tijuana ^b	1.05	1.01-1.09	0.03
Cocaine Use (past use) ^c	8.57	2.18-33.69	0.002

OR=Odds Ratio, CI=Confidence interval

^aModel includes Age, adjusted for recruitment method

^bModel includes years lived in Tijuana, adjusted for recruitment method and age

^cModel includes cocaine use, adjusted for recruitment method and age

[Estimated number of recent infections among MSM/TW, characteristics of those with recent infections.]

WEAC02 Self-testing: Going the final mile

WEAC0201

Does the use of HIV self-testing kits lead to unintended effects? Evidence from female sex workers in Malawi

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BACKGROUND: In Malawi, undiagnosed HIV has been highly prevalent among female sex workers (FSW). HIV self-testing (HIVST) can be highly accurate, safe and effective when well supported, but concerns remain about unintended consequences particularly for vulnerable groups. Here we explore FSW experiences during the introduction of peer-based HIVST services.

METHODS: Existing peer-educators were trained to provide oral kits and support HIVST and subsequent linkage to care and prevention by FSWs. Between March and September 2017, FSWs were recruited by the peer-educators and given up to 2 HIVST kits. Interviews were conducted with FSWs at recruitment and 3-months, including questions on coerced HIVST use or results disclosure, intimate partner violence (IPV), regrets about taking the HIVST and relationship problems.

RESULTS: Of 131 SWs who completed both interviews and reported having used the HIVST, 11(8.4%) were first time testers. 87(12.6%) reported that HIVST had been initiated by themselves. 44 (22.7%) reported being pressured to self-test or to share results, 42 by peer distributors and 2 by partners or spouses; of these, 5(3.8%) were also pressured to share their self-test result. Immediate regrets about HIVST were expressed by 21(16.0%) and by 12(9.2%) 3-months later, respectively, most commonly in FSWs who had not initiated HIVST themselves and for those aged < 26 years or >36 years.

Variable	Category	Total	Immediate regret about HIVST		Regret now about HIVST		Relationship problems caused by HIVST	
			%	p-value	%	p-value	%	p-value
Test initiator	Self	87	12.6	0.20	9.2	1.0	3.4	0.06
	Other	44	22.7		9.1		13.6	
HIVST result	Positive	45	15.6	1.00	6.7	0.54	8.9	0.25
	Negative	86	16.3		10.5		5.8	
Age in years	16 - 25	66	18.2	0.40	16.7	<0.01	9.1	
	26 - 35	53	11.3		0.0		3.8	0.51
	> 36	12	25.0		8.3		8.3	
	TOTAL	131	16.0		9.2		6.9	

[Reports of regret and relationship problems at the 3 month interview]

High rates of IPV in the previous 3-months were reported (48.4% at enrolment and 30.5% at 3-months).

CONCLUSIONS: Introducing HIVST through peer-distributors in Malawi led to frequent experiences of FSWs feeling pressurised into testing and sharing results, and frequent expression of regrets and relationship difficulties - although regrets diminished over time. Background rates of IPV were high. Care needs to be taken when introducing HIVST to ensure uptake is voluntary. Alternative strategies to the use of peer-distributors among FSW should be explored.

WEAC0202

Closing the testing gap: High uptake of HIV self-testing among men in rural and peri-urban KwaZulu-Natal, South Africa

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BACKGROUND: In South Africa, HIV-infected men are less likely than women to test and know their status (the first UNAIDS "90-90-90" target), and men have worse outcomes across the HIV care cascade. HIV self-testing (HIVST) has the potential to address this testing disparity but questions remain over the venues for distribution and linkage following a positive test result.

METHODS: We conducted an implementation study of multi-venue HIVST kit distribution targeting men in two rural and peri-urban regions in KwaZulu-Natal (KZN), South Africa. We distributed HIVST kits at community points, workplace, and social venues for either on-site or take-home use. Clients could choose blood or oral fluid tests and elect to watch an in-person or video demonstration. We provided a USD2 incentive to facilitate reporting test results by phone or SMS. Persons with positive screen results were provided immediate (if used HIVST on-site) or were referred to confirmatory testing (if took HIVST home) with linkage to care.

RESULTS: Between July-November 2018, we distributed 4355 HIVSS kits in 2 regions of KZN (96% to men, median age 28 (IQR 23-35)). A majority (N=2488, 57%) chose blood-based HIVST and (N=1867, 43%) chose oral-swab kits. 11% of men were testing for the first time and 40% had last tested more than 12 months ago. 2692 (62%) of testers reported their test result to the study team to date, with 244 (9%) screening positive. 1279 (48%) used the kit at home. 25% of testers reported receiving assistance using the kit. 10% of kit users reported they would have preferred a different type (oral vs blood) of kit than the type they used.

CONCLUSIONS: HIVST is acceptable to men and rapid distribution feasible (>1000 kits per month) in rural and peri-urban settings. HIVST kits successfully reached the key population of younger men and identified undetected infections. A majority chose blood-based HIVST. Scaling up HIVST distribution and guidance may increase the number of first-time testers among men and help achieve the first UNAIDS "90" for men in South Africa.

Total kits distributed	Peri-urban area (N=1870)	Rural area (N=2485)
Atomo i-Test, OraQuick	984 (53%), 886 (47%)	1504 (61%), 981 (40%)
HIVST results reported	1490 (80%)	1202 (48%)
HIVST result: Positive, Negative	145 (10%), 1345 (90%)	99 (8%), 1103 (92%)

[HIV self-testing (HIVST) kits distributed in KwaZulu-Natal regions, Jul-Nov 2018]

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WEAC0203

Peer-mobilized HIV self-testing increases case detection and linkage to ART among key populations in BurundiD. Gashobotse¹, T. Lillie², G. Kamariza¹, A. Nkuzimana¹, E. Cooper², D. Boyee²¹Family Health International 360 (FHI360), Bujumbura, Burundi, ²Family Health International 360 (FHI360), Washington, DC, United States

BACKGROUND: In June 2018, the USAID- and PEPFAR-funded LINKAGES Burundi project initiated HIV self-testing (HIVST) for FSWs and MSM using OraQuick to increase HIV case detection. HIVST is led by peer outreach workers, who persuade peers who never or rarely access HIV testing in their social and sexual networks to be tested for HIV through HIVST. Those who screen reactive are given a confirmatory test, and those confirmed positive are linked to treatment.

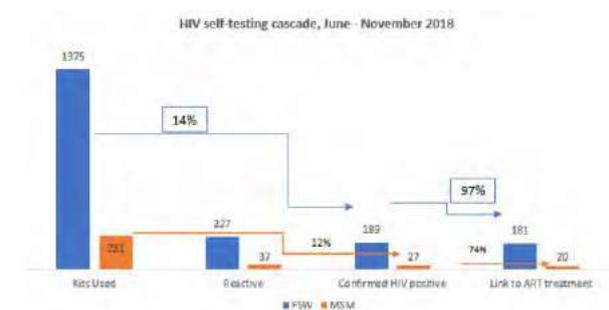
METHODS: We conducted a descriptive analysis of data from a six-month pilot of HIVST in three of five provinces where LINKAGES Burundi works. Chi-squared test was used to compare case detection rates in HIVST and other modalities. Prior to the intervention, peer educators (PEs) and health care workers were trained on HIVST. The test kits were directly distributed to never/rarely tested KP individuals, assisted testing was done with a PE's support, and confirmatory testing was conducted in a health clinic.

RESULTS: A total of 1,606 test kits were used (1,375 FSWs, 231 MSM). Two hundred sixty-four people (16%) were reactive to HIV screening (227 FSWs, 37 MSM), 216 (13%) were confirmed HIV positive (189 FSWs, 27 MSM), and 201 (93%) (181 FSWs, 20 MSM) were initiated on treatment. (Figure 1, Table 1). HIV case identification rates were significantly higher among HIVST compared to other testing modalities for both populations (FSWs: OR=1.6 [95% CI: 1.4 - 1.9; p < 0.01; MSM: OR = 5.6 [95% CI: 3.4 - 9.3; p < 0.01].

CONCLUSIONS: These results demonstrate the potential effectiveness of HIVST in identifying FSWs and MSM living with HIV and initiating them on treatment. More widespread implementation of HIVST with high-risk populations could accelerate progress toward 95-95-95 goals.

Population	Kits used	Number (%) reactive	Number (%) confirmed +ve	Number (%) initiated on treatment
FSW	1375	227 (16.5%)	189 (13.8%)	181 (97%)
MSM	231	37 (16.0%)	27 (11.8%)	20 (74%)
Total	1606	264 (16.4%)	216 (13.5%)	201 (93%)

[HIVST Cascade among FSW & MSM in Burundi]



[HIV Self-Testing Cascade in Burundi]

WEAC0204

Community-led HIV self-testing, with and without assistance, successfully reaches key populations and their partners in Viet NamT.V. Nguyen¹, C.T. Duong², H.S. Vo³, K.A. Le Ai⁴, D.L. Nguyen⁵, T.L. Truong⁴, A.T. Pham Nguyen⁶, R. Baggaley⁶, C. Johnson^{6,7}¹World Health Organization, Country Office in Viet Nam, Ha Noi, Vietnam, ²National Institute for Hygiene and Epidemiology, Hanoi, Vietnam, ³Vietnam Authority of HIV/AIDS Control, Ha Noi, Vietnam, ⁴Thai Nguyen Provincial Centre for Disease Control, Thai Nguyen, Vietnam, ⁵Can Tho Provincial AIDS Centre, Can Tho, Vietnam, ⁶World Health Organization, Geneva, Switzerland, ⁷HIV Department, Geneva, Switzerland, ⁸London School of Hygiene and Tropical Medicine, Clinical Research, London, United Kingdom

BACKGROUND: HIV in Viet Nam is concentrated in key populations (KP), including people who inject drugs (PWID), men who have sex with men (MSM), sex workers (SWs) and their partners. Despite KP being disproportionately affected, uptake of HIV testing services remains low. To address this gap, community-led HIV self-testing (HIVST) was introduced and evaluated.

METHODS: Between January and November 2018, KP and their partners were offered HIVST by peer-educators at drop-in houses or coffee shops in Thai Nguyen and Can Tho provinces. Self-testers were given the choice to test with or without assistance. Community-led outreach and social networks (MSM dating apps, Facebook, Zalo) were used to promote HIVST and follow-up with self-testers. During distribution, peer educators collected client demographics and self-reported risk behaviour. Peer educators contacted all those taking a kit; recording client-reported self-test results and linkage-to-care.

RESULTS: 50% (2009/4014) opted for HIVST; 80.5% (1618/2009) were first-time testers, 5.1% (103/2009) was confirmed HIV positive and 98.1% (101/103) initiated ART. MSM (76.0%, 1526/2009) and young KP (aged ≤25) (69.4%, 1394/2009) accounted for greatest proportion of self-testers, compared with other KP and older groups (Table 1).

Given the choice, KP and partners chose assisted (66.0%, 1325/2009) over unassisted HIVST (34.0%, 684/2009, P < 0.001). Those selecting un-assisted HIVST were more likely to be female (17% vs 8.1%, P < 0.001); < 25 years (87.4% vs 60.1%; P < 0.001); MSM (82.0% vs 72.8%, P < 0.01); or partner of HIV-positive self-testers and KP (6.3% vs 3.5%, P < 0.001) [table_1].

CONCLUSIONS: Community-led HIVST with and without assistance successfully reached KP and their partners; including those never tested and undiagnosed HIV. Offering HIVST with different support may increase testing uptake among KP and their partners. Unassisted HIVST may be particularly beneficial for reaching young KP especially MSM, and partners of HIV-positive self-testers and KP.

Clients' characteristics		Assisted HIVST n (%)	Unassisted HIVST n (%)	χ ² test
Gender	Male	1200 (90.6)	568 (83.0)	χ ² = 44, P < 0.001
	Female	107 (8.1)	116 (17.0)	
	Transgenders	18 (1.4)	0 (0.0)	
Age	≤25	796 (60.1)	598 (87.4)	χ ² = 158, P < 0.001
	>25	529 (39.9)	86 (12.6)	
Key populations	PWID	221 (16.7)	31 (4.5)	χ ² = 65, P < 0.001
	MSM	965 (72.8)	561 (82.0)	
	FSWs	92 (6.9)	49 (7.1)	
	Partner of HIV-positive self-testers and KP	47 (3.5)	43 (6.3)	

[Uptake of HIV self-testing with and without assistance]

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WEACO205

Social-media based secondary distribution of HIV self-testing among Chinese men who have sex with men: A pilot implementation program assessment

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BACKGROUND: HIV self-testing (HIVST) is increasingly used in low- and middle-income countries for testing scale-up. Social media and secondary distribution through individuals' networks each show strong promise to improve test uptake among men who have sex with men (MSM). The application of these two methods in combination may further accelerate HIVST use in this key population. However, the approach has not been empirically tested. We assessed a pilot implementation program in Zhuhai, China, which focused on promoting HIV test uptake through distributing HIVST kits by index MSM via social media.

METHODS: Men who were aged 16 or above, born biologically male, and ever had sex with another man were recruited. Banner ads on a social media platform invited MSM to apply for up to five kits per three-month period. Consenting applicants completed a baseline online survey, agreed to be contacted for a follow-up survey in three months, and provided shipping information for delivery of the test kit(s). Test kits could be mailed to the applicant under a pseudonym. They also provided a deposit of USD14.7/kit that was refundable upon receiving a photograph of a completed test via an online submission system. They were encouraged to not only use the kits for self-testing but also to distribute the remainder to partners or friends (referred to as "alters"). A short online survey was also administered for alters when they sent in their photographic evidence of a completed test.

RESULTS: Between June and December 2018, 427 men successfully applied for 759 kits (mean_{age}=29.0, SD=7.1). By December 2018, 586 valid results were returned. Among them, 434 tests(74.1%) were from 340 index men (93 indexes tested more than once), and 152 tests(25.9%) were from 137 alters (16 alters tested more than once). Compared to index MSM, a higher rate of alters never tested for HIV (40.8% VS. 20.4%, $P < 0.001$). In total, 12 individuals were found to be HIV positive, with the rate being significantly higher in alters than among indexes (8.0% VS.0.3%, $P < 0.001$).

CONCLUSIONS: Integrating social media with secondary distribution of HIVST kits may hold promise to increase HIV testing coverage and case identification among MSM.

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WEPDB01 Resistance: We must care!

WEPDB0101

Evolution of HIV drug resistance surveillance in Brazil: A declining trend to celebrate

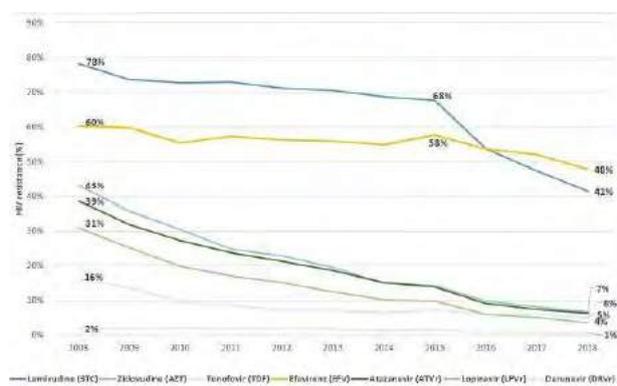
R.E.G. Gonçalves Pinho, N.M.C. Veras, A.R.P. Pascom, J.B. Alonso, F.M. Rick, A.S. Benzaken, G.F.M. Pereira
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BACKGROUND: In 1996, Brazil's Ministry of Health implemented a program for people living with HIV/AIDS, offering free, universal access to antiretroviral drugs (ARV). However, ARV resistance remains an obstacle to sustaining HIV suppression during antiretroviral therapy (ART). This study describes HIV drug resistance (DR) between 2008 and 2018 in Brazil.

METHODS: HIV protease (PR) and reverse transcriptase (RT) sequences from 2008-2018 were selected from 18+ ARV-experienced individuals. The presence of HIV DR (Stanford HIVdb Program) was characterized for main PR and RT inhibitors used in first- and second-line regimens in Brazil. HIV subtype (Rega HIV Subtyping) and ART history data were assessed.

RESULTS: We analyzed 52,658 PR-RT sequences. For all analyzed ARVs, HIV DR shows a continuous decline over the years, with a comprehensive drop of 39.7% for EFV and 29.3% for 3TC from 2015 on (Figure 1). The most common mutations occurred at codons M46 and I54 for PI, M184 for NRTI and K103 for NNRTI. Higher levels of resistance were observed in individuals exposed to 8+ ARVs, except 3TC and EFV, to which resistance was higher for those using 2-4 ARVs. From 2015 on, resistance to TDF increased in the last group when compared to those who used 5+ ARVs. Overall, subtype B was most prevalent, varying from 72%, in 2008, to 64% in 2018. Subtype C increased 183%, from 6% to 17%. Subtype F and recombinant forms remained around 11% and 9%, respectively. HIV resistance to PI was lower for subtype C, but no remarkable difference was observed for RT inhibitors across subtypes.

CONCLUSIONS: HIV DR decreased over the decade, reflecting ART improvement within Brazil's program. In 2018, viral suppression was 92% for individuals on ART. Differences in HIV resistance to PIs highlight the importance of monitoring subtype distribution. The latter must also be considered for HIV treatment policy implementation.



[HIV resistance to protease and reverse transcriptase inhibitors in Brazil, 2008-2018.]

WEPDB0102

Thresholds of pre-treatment HIV-1 drug resistance indicate regions for priority actions in the antiretroviral therapy program of Cameroon

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BACKGROUND: The "Treat-All" strategy ensures safer-life among HIV-infected individuals. Conversely, on-going threats of HIV drug-resistance (HIVDR) might vary by settings and impairs differently the benefit of first-line antiretroviral therapy (ART). Our objective was to ascertain the thresholds and patterns of pre-treatment drug resistance (PDR) by region and its possible association with subtype-diversity.

METHODS: A sentinel surveillance of PDR was conducted in seven regions of Cameroon from 2014-2018. Sequencing of HIV-1 protease and reverse transcriptase was performed, drug resistance mutations (DRMs) was interpreted using Stanford HIVdb.v.8.7, and statistical analyses performed using EPI-Info v7.2.2.6, with $p < 0.05$ considered statistically significant.

RESULTS: A total of 282 sequences (1 per patient) were generated in patients initiating antiretroviral therapy. The number of sequences per region was: 61, 53, 43, 41, 30, 30, and 24 for the Northwest, Centre, East, Littoral, West, Southwest, and North, respectively. The overall prevalence of PDR was 12.41% (35/282), distributed by drug-class as follow: 10.28% (29/285) for NNRTIs, 7.45% (21/282) for 1st generation NNRTIs (NVP and EFV), 7.09% (20/282) for 2nd generation NNRTIs (RPV and ETR), 2.84% (8/282) for NRTIs and 1.42% (4/282) for PIs (Fig.1A). The predominant mutations were: K103N (10), E138K/A/G (8), A98G (3), Y181C (2), G190A (2) for NNRTIs; M184V/I (3), K219N / E (3), T215S (2), K65R (2), M41L (2) for the NRTIs and M46L, L90M, V82F, L89V and G73S for the PIs. There was a disparity of the PDR between regions (North: 0%, Littoral: 9.76%, Centre: 7.55%, Northwest: 11.48%, West: 10.00%, Southwest: 23.33% and East: 23.26%), with similar regional trend of NNRTIs-DRM (North: 0%, Littoral: 9.76%, Centre: 7.55%, North-West: 9.84%, West: 6.67%, South-West: 16.67% and East 18.60%), as depicted in Fig.1B. Overall, recombinants were predominant (237/282, 84.04%), CRF02_AG being having 68.09% (192/282), as shown in Fig.1C. No statistically significant difference was observed between the PDR in recombinant forms and the pure strains (12.66% vs 11.11%) as well as between CRF02_AG and non-AG subtype (11.46% vs 14.44%, $p = 0.56$).

CONCLUSIONS: The heterogeneous PDR reveals two regions with EFV/NVP-PDR beyond 10%, thus requiring either closer monitoring, transition to Dolutegravir-based first-line ART-regimens, or affordable HIVDR-testing for patients initiating ART in these country-regions.

WEPDB0103

Prevalence and predictors of etravirine resistance mutations in HIV-positive individuals failing second-line antiretroviral therapy in Uganda

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BACKGROUND: Uganda's guidelines recommend HIV drug resistance (HIVDR) genotyping for patients failing protease inhibitors (second line). WHO recommends Etravirine (ETR) as one of the three backbone drugs for

third-line antiretroviral therapy (ART). Individuals failing second-line therapy may have resistance mutations hindering use of ETR for effective third line. This analysis assesses prevalence and predictors of ETR resistance in HIV patients failing second-line therapy in Uganda.

METHODS: Dried blood spots (DBS) from upcountry facilities and plasma from peri-urban facilities were sent to central public health laboratories for routine viral load (VL) testing. HIVDR genotyping for clients failing second line began June 2017. All 6-month repeat VLs ≥ 1000 copies/ml were sent for genotyping. Genotypes were used to determine third-line regimens by the National Third Line Committee. A retrospective cross-sectional review of de-identified data for patients failing second line June 2017 to November 2018 was conducted. ETR resistance-associated mutations (RAMs) were scored using Tibotec genotypic weighting scale, ETR Score (ETR-S) >2.5 was considered ETR resistance.

RESULTS: Genotype results for clients failing second line during the study period numbered 267, with two excluded for missing data were reviewed. Females were 114 (43.0%), children < 15 years 104 (39.2%). Overall, 146 (55.1%) had prior Nevirapine (NVP) exposure, 71 (26.8%) EFV, 37 (14%) both, and 11 (5%) neither. Those with NVP as first line had a mean ART duration of 4.8 years, versus 4.5 years for EFV ($p=0.512$). Median initial detectable VL for prior NVP exposure was 19,904 copies/ml versus EFV 66,084. Median repeat VLs were 13,900 copies/ml (NVP) versus 30,257 (EFV). Altogether, 225 (84.9%) clients had non-nucleoside reverse transcriptase inhibitor (NNRTI) mutations. The mean ETR-S was 1.5 (SD ± 0.66). Overall, 176 (66.4%) had a score of < 2.5 , while 89 (33.6%) had a score ≥ 2.5 . The mean ETR-S for children was 1.64, while that of adults was 1.49 ($p=0.477$). The mean ETR-S for past NVP was 1.7 versus 1.1 for past EFV ($p=0.0031$).

CONCLUSIONS: ETR resistance among patients needing third-line ART was high, with one-third of eligible clients already resistant. NVP exposure predicted ETR resistance, with implications for third-line ART in Uganda and beyond.

WEPDB0104

HIV-1 drug resistance and third-line outcomes among children and adolescents failing second-line therapy in Malawi

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BACKGROUND: Children and adolescents living with HIV are more likely than adults to have poor adherence and fail treatment. Using routinely collected data from a Médecins Sans Frontières supported project in rural Malawi, we report second-line resistance and third-line outcomes among children and adolescents failing second-line treatment.

METHODS: We conducted a retrospective cohort analysis on child and adolescent patients (< 20 years old) failing second-line (an ART regimen that includes a PI) who received a genotype between 2014-2018. Treatment failure was defined as two consecutive high viral loads (VL). Third-line was defined as an ART regimen that changes at least two drugs and includes one integrase inhibitor. Resistance to an ARV was defined as a score of 30 or above according to Stanford algorithms.

RESULTS: Among 99 patients that received a genotype, 85 were receiving LPV/r and 14 ATV/r. Median time on second-line was 26 months [IQR 14,43]. 28 patients were resistant to at least one PI; 75 to at least one NRTI; 86 to at least one NNRTI. PI resistance was higher among those on second-line for more than two years (35% vs. 20% for less than 2 years), but the difference was not significant using multivariate analysis (aOR 2.25; 95%CI 0.89,5.71).

Among 33 patients switched to third-line (25 on DTG, 8 on RAL, 21 on DRV), retention in care at 12 months was 97% (95%CI: 80%,100%). VL suppression at 6 and 12 months following 3rd line initiation were 86% (19/22) and 85% (11/13), respectively. Among 66 patients remaining on second-line, retention in care 12 months following the genotype was 88% (95%CI: 74%,95%). VL suppression at 6 and 12 months following the genotype were 39% (17/44) and 33% (8/24), respectively.

		No. of patients (n=99)	No. with PI res	Adjusted Odds Ratio	95% CI
Months on 2nd line before genotype	Less than 24 months	45	9 (20%)	ref.	
	24 months or more	54	19 (35%)	2.25	[0.89,5.71]
Age at genotype	3-11 years	50	15 (30%)	ref.	
	12-19 years	49	13 (27%)	0.84	[0.34,2.05]
Patient Sex	Female	41	9 (22%)	ref.	
	Male	58	19 (33%)	1.78	[0.64,4.54]

[Association between PI resistance and risk factors among children and adolescents failing 2nd line ART treatment in Malawi, multivariate logistic mode]

CONCLUSIONS: ARV resistance among children and adolescents failing second-line was common, making access to genotypes important. Additional studies are needed on children and adolescents failing second-line but not switched to third-line. Third-line pediatric formulations should be developed.

WEPDB0105

HIV-1 drug resistance surveillance among parturient women on anti-retroviral therapy in the Eastern Cape, South Africa: Implications for elimination of mother-to-child transmission

Q.V. Adeniyi^{1,2}

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BACKGROUND: HIV drug resistance poses threat to the goal of elimination of mother-to-child in South Africa. In this study, we assessed the burden of HIV-1 drug resistance mutations (DRMs) within the public sector prevention of mother-to-child transmission (PMTCT) programme in Eastern Cape, South Africa. We also examined the potential transmissibility of mutant viruses within the cohort.

METHODS: We conducted genetic analysis on viral isolates (n=80) from plasma samples of women with virologic failure at delivery between January and May 2018 from two large maternity centres in the Eastern Cape. Partial pol gene sequences were amplified and sequenced according to standard protocol. DRMs were determined by submitting the generated partial pol sequences to the Stanford drug resistance database for query as well as to the IAS guidelines for DRMs interpretations. These curated algorithms provide an online software for determining genotypic resistance associated mutations in HIV pol sequences.

RESULTS: The age of parturient women ranged from 16 - 43 years. The majority of the parturient women were in WHO clinical stage 1 (62.0%), currently on Efavirenz-based regimen (first line ART) (82.5%) and had been on ART for more than 12 months (65.0%). The prevalence of DRMs was 72.5% (n=58). The CD4 count demonstrated a negative linear association with the DRMs ($p=0.002$). Sub-type C accounted for nearly all the DRMs (98.3%; n=78). We found a CRF02_AG and URF. The predominant DRMs were K103N (n=43; 74.1%), M184V (n=28; 48.3%) and K65R (n=11; 19%). Among the parturient women on current treatment of EFV-based regimen; 79.1% already had K103N while nine patients on protease inhibitor-based regimen still harbors K103N. Other mutations conferring resistance to NNRTIs include: V106M (15.5%) and P225H (17.2%). The majority of the M184V mutations were observed in parturient women on first line regimen (n=23; 82.1%). The mean viral load (transmissibility risks) in DRMs was significantly higher than the wild type (174515 versus 52426).

CONCLUSIONS: We found a high prevalence of DRMs in women delivering at high viral loads in Eastern Cape, South Africa. Surveillance system for tracking pregnant women on ART will assist in identifying those with virologic failure and drug resistance for interventions.

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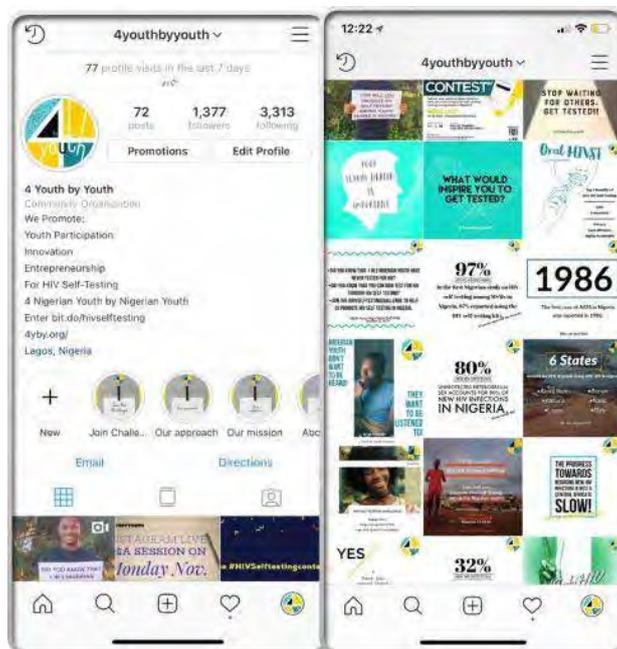
Going beyond guidelines: HIV-1 drug resistance testing at low-level viremia, a South African experienceA. Bangalee^{1,2}, K. Steegen^{3,4}, S. Carmona^{3,4}, L. Hans^{3,4}¹University of Witwatersrand, Medical Virology, Johannesburg, South Africa, ²National Health Laboratory Service, Medical Virology, Johannesburg, South Africa, ³University of Witwatersrand, Haematology and Molecular Medicine, Johannesburg, South Africa, ⁴National Health Laboratory Service, Haematology and Molecular Medicine, Johannesburg, South Africa**BACKGROUND:** A subset of patients on antiretroviral treatment (ART) present with viral load (VL) levels that range between 50-1000 cp/mL, termed low-level viremia (LLV). LLV has been associated with drug resistance mutations (DRMs) across drug classes. We identified a need for investigation of LLV DRMs in South African patients as national guidelines recommend referral for drug resistance (DR) testing only at VLs >1000 cp/mL, as well as for an evaluation of genotyping assay success rate at this level**METHODS:** We conducted an observational, retrospective, cohort study on patient samples with LLV referred for routine DR testing at a Johannesburg laboratory from August 2017 - October 2018. Genotyping was performed using a previously validated nested RT-PCR assay. The genotyping success rate was evaluated for different viremia ranges. HIV-1 drug resistance analysis was done using Sanger sequencing and sequences were loaded onto the Stanford HIVdb genotypic resistance tool (v 8.7) for drug resistance interpretation.**RESULTS:** Plasma samples from 123 HIV-1 infected, treatment-experienced adults were analysed. Most patients were female (53.7%), median age was 42.7 years (IQR: 49-37). Assay success rate was 75.6% of which 75.8% (72/95) had DRMs. The in-house assay performed best for samples with a VL 401-999 with an overall genotyping success rate of 88%.

ART regimen at the time of HIVDR testing was available for 100(81%) patients of which 12(12%) and 88(88%) were on a NNRTI and PI-based regimen respectively.

DRMs were commonly encountered in patients with LLV ranging from 401-999 cp/mL. Mutations detected were: NNRTIs at 47% (45/95), most commonly K103N/Q (84%); NRTIs at 68% (65/95) with M184V/I at 89%, TAMs at 86%, as well as the Q151M complex coupled with the K65R in 2 patients, indicating multinucleoside resistance. Finally major PI mutations including M46I/L/V and V82A were detected in 9 out of 95 (9%) patients. Eight patients with PI mutations were known to be on a PI-based regimen at the time of genotyping.

CONCLUSIONS: Virological failure guidelines may keep patients on failing regimens for longer. Our data suggests that genotyping at LLV is feasible and implementation could result in earlier identification and referral of patients requiring third line regimensTuesday
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cused social media campaign to promote HIV self-testing (HIVST) among young people in Nigeria.

METHODS: Between October-December 2018, we disseminated messages emphasizing HIV self-testing through social media platforms such as Facebook, Instagram, WhatsApp, digital channels and social media influencers in Lagos, Nigeria. We used social media metrics to examine the reach of a social media campaign focused on HIVST among Nigerian youth.**RESULTS:** With over 89.5% of output being original HIV self-testing content, the social media campaign reached over 3.5 million people with an estimated 17.2 million impressions. Majority of the engagement content across our various social media platforms (Facebook, Instagram, WhatsApp) were grouped into the following themes: 1) Informational (55%) (e.g. provided youth with facts, statistics on HIVST and HIV testing in general); Collaborative (31%) (e.g. collaborated with youth to promote HIVST; and 3) Empowerment (14%) (e.g. delegated youth with decision-making to promote HIVST).**CONCLUSIONS:** Findings show the dynamics and potential utility of using social media platforms for meaningful youth engagement, effective messaging and real-time monitoring of campaigns to promote HIV self-testing among young people in Nigeria. Additional HIV self-testing social media campaigns led by and promoted by young people themselves should be attempted and evaluated.

[Figure 1. Social Media Campaign on Instagram]

WEPDC01 Digital engagement: The future of HIV prevention?

WEPDC0101

#HIVSelfTest: A social media campaign to promote HIV self-testing among young people in NigeriaJ. Iwelunmor¹, O. Ezechi², C. Obiezu-Umeh¹, U. Nwaozuru³, T. Gbajabiamila², F. Falodun⁴, A. Eklus⁵, C. Ihidero⁶, J. Tucker⁷¹Saint Louis University, College for Public Health and Social Justice, Saint Louis, United States, ²Nigerian Institute of Medical Research, NIMR, Lagos, Nigeria, ³Saint Louis University, College for Public Health and Social Justice, Saint Louis, Nigeria, ⁴ID Africa, Lagos, United States, ⁵ID Africa, Lagos, Nigeria, ⁶Pinpoint Media, Lagos, Nigeria, ⁷Nigerian Institute of Medical Research, NIMR, Lagos, United States**BACKGROUND:** Despite a persistent HIV incidence among young people in Nigeria, HIV testing remains low among this population. Novel and youth-centered strategies are needed to increased uptake of HIV testing among this population. The objective of this study was to evaluate a youth-foc-

WEPDC0102

Developing a novel mobile app to support HIV testing and PrEP uptake among young MSM: The LYNX StudyA. Liu^{1,2}, K. Coleman¹, J. Vinson¹, R. Muench^{3,4}, K. Bojan^{3,4}, P.A. Serrano^{3,4}, T. Oyedele^{3,4}, A. Garcia⁵, E. Enrique-Bruce⁵, P. Emmanuel⁵, J. Jones⁶, K. Muessig⁷, C. Horvitz⁷, S. Mullin⁶, J. Roberts⁷, S. Buchbinder^{1,2}, P. Sullivan⁶, L. Hightow-Weidman⁷, H. Scott^{1,2}¹San Francisco Department of Public Health, San Francisco, United States, ²University of California - San Francisco, San Francisco, United States, ³Ruth M. Rothstein CORE Center, Chicago, United States, ⁴John H. Stroger Hospital, Chicago, United States, ⁵University of South Florida, Tampa, United States, ⁶Emory University, Rollins School of Public Health, Atlanta, United States, ⁷University of North Carolina at Chapel Hill, Chapel Hill, United States**BACKGROUND:** Young men who have sex with men (YMSM) have the highest HIV incidence and lowest uptake of HIV testing and pre-exposure prophylaxis (PrEP) in the US. Nearly universal mobile phone ownership among youth provides an opportunity to leverage mobile-health apps to increase testing and PrEP uptake among YMSM.

METHODS: Using the Information, Motivation, Behavioral Skills Model, we developed the LYNX app (available on iOS/Android) which features an electronic diary to track sexual behaviors, a personalized SexPro score to promote accurate risk perception, testing reminders and access to home-based HIV/STI test kits and geospatial testing/PrEP sites, and bi-directional chat support (Figure). Within the Adolescent Trials Network iTech U19, we conducted iterative focus groups among YMSM in Chicago and Tampa to refine the app, followed by a two-month open pilot to optimize usability; preliminary feasibility and acceptability were assessed through app analytics and the System Usability Scale (SUS).

RESULTS: 30 YMSM participated in two focus groups (mean age 20, 43% Latino, 43% Black). Overall, the app was well-received, especially the sexual diary and gamification features (sex-positive badges). They recommended making the goal of LYNX (to "marry pleasure with prevention") clear during app onboarding. Regarding SexPro, they suggested adding information on behaviors contributing to their risk scores and how to improve them. In the open-pilot with 16 YMSM (median age 22, 44% Latino, 19% Black), 93% used the app ≥ 2 times, with an average of 9 login sessions and 9/16 features accessed. Median SUS score was 72/100 ("good" range). Overall, 85% were very satisfied with LYNX, and 86% would recommend the app to a friend for HIV/STI testing or accessing PrEP.

CONCLUSIONS: The LYNX app, developed through iterative feedback from YMSM, was found to be feasible and acceptable in early testing. Additional studies are underway to assess acceptability and efficacy in broader youth populations.



[Screenshots of LYNX app]

WEPDC0103

Stigma and online sex-seeking among men who have sex with men and transgender women in Tijuana, Mexico

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BACKGROUND: Stigma toward sexual and gender minorities is an important structural driver of HIV epidemics among men who have sex with men (MSM) and transgender women (TW) globally. Sex-seeking websites and applications are popular among MSM and TW. Interventions that harness these online platforms may be particularly effective for engaging MSM and TW in HIV prevention and treatment services in settings with widespread stigma towards these vulnerable populations.

To assess the feasibility of this approach, we determined the prevalence of online sex-seeking and examined the effect of factors that shape or are influenced by stigma toward sexual and gender minorities on online sex-seeking among MSM and TW in Tijuana, Mexico.

METHODS: From 2015-2018, 529 MSM and 32 TW were recruited through venue-based and respondent-driven sampling. Interviewer-administered surveys collected information on online sex-seeking (past 4 months) and factors that shape or are influenced by stigma toward sexual and gender minorities (traditional *machismo*, internalized stigma related to same-sex sexual behavior or gender identity, outness related to same-sex sexual behavior or gender identity; MSM only: sexual orientation, history of discrimination related to same-sex sexual behavior). Logistic regression was used to examine the association between each stigma measure and online sex-seeking.

RESULTS: Twenty-nine percent of our sample reported seeking sex partners online. Online sex-seeking was negatively associated with greater endorsement of traditional *machismo* values (adjusted odds ratio [AOR]=0.37, 95% confidence interval [CI]: 0.19-0.71) and greater levels of internalized stigma (AOR=0.96, 95% CI: 0.94-0.99). Online sex-seeking was positively associated with identifying as gay (AOR=2.04, 95% CI: 1.30-3.21), greater outness (AOR=1.17, 95% CI: 1.06-1.28), and a history of discrimination (AOR=1.85, 95% CI: 1.10-3.14).

CONCLUSIONS: Online sex-seeking is relatively common among MSM and TW in Tijuana, suggesting that it may be feasible to leverage online platforms to engage these vulnerable populations in HIV prevention and treatment services. However, such interventions may still poorly engage those most affected by stigma toward sexual and gender minorities (i.e., those who express greater endorsement of traditional *machismo* values, greater levels of internalized stigma, less outness, and non-gay identification) given that within our sample they were least likely to seek sex online.

WEPDC0104

Transgender-led social media interventions effectively identify transgender woman subpopulations with substantial risk of HIV acquisition and successfully link to HIV prevention, care and treatment services

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BACKGROUND: Transgender communities are often neglected in mainstream health care facilities due stigma, discrimination, and unavailability of transgender-specific and transgender-friendly services. Transgender people are therefore more likely to seek health information online, and to rely on gender-affirming hormone treatment (GAHT) experience from

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transgender peers and transgender social influencers. We utilized transgender-led, targeted social media interventions to raise health awareness and facilitate uptake of HIV testing, syphilis testing, pre-exposure prophylaxis (PrEP), and post-exposure prophylaxis (PEP) through integrated GAHT services among transgender women (TGW) in Thailand.

METHODS: The Tangerine Community Health Center in Bangkok provides HIV and other sexual health services integrated with GAHT services for TGW. Beginning in August 2017, transgender social media influencers conducted Tangerine Facebook Live Sessions as the primary online demand generation platform to transform online networking to offline health care services. Characteristics of TGW who were reached through social media and who subsequently accessed HIV and related health services at Tangerine were recorded.

RESULTS: Of 1,360 TGW who attended the Tangerine Community Health Center between August 1, 2017, and December 25, 2018, 999 (73%) were reached through the Tangerine Facebook Live Sessions. Among those, the median age was 25 years, 54% had education below a bachelor's degree, 15% were unemployed, and 14% engaged in sex work. GAHT services were the primary purpose of clinic visits for 63%. Among the 999, 928 (93%) received HIV testing and 67 (7%) tested HIV-positive, of whom 62 (93%) successfully initiated antiretroviral treatment. Of the 928 who received HIV testing, 333 (36%) were first-time HIV testers. Among the 999, 372 (37%) received syphilis testing, and 64 (17.2%) tested reactive to syphilis. Fifty-eight (6%) were prescribed PrEP, and 88 (9%) were prescribed PEP.

CONCLUSIONS: Transgender-led social media interventions reached vulnerable TGW subpopulations, identified those TGW at substantial risk of HIV acquisition, and facilitated linkages to HIV testing and treatment. As GAHT services were the primary entry point into care for most TGW reached online, addressing specific transgender health needs through virtual engagement should be brought to scale in order to increase the uptake of HIV prevention, care and treatment services among transgender populations.

WEPDC0106

Pilot study of a gamified, social networking app shows improvements in PrEP adherence among YMSM in the US

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BACKGROUND: P3 (Prepared, Protected, emPowered) is a theory-based, comprehensive social networking PrEP adherence app designed for young men who have sex with men (YMSM) and transwomen (YTW), which includes game-based elements to encourage engagement. Strengths-based adherence counseling delivered by a centrally-located adherence counselor via in-app messaging addresses individuals' unique barriers to PrEP adherence.

METHODS: We conducted a one-month field trial of P3. At baseline and follow-up, participants completed a computer-assisted survey and dried blood spots were collected for PrEP adherence measurement (i.e. TFVdp/FTCtp concentrations). Descriptive analyses of baseline variables are presented. A Wilcoxon signed-rank test was used to assess changes in adherence measures between visits.

RESULTS: We enrolled 16 participants newly starting or reporting PrEP adherence challenges at three US cities. Mean age was 21.3 years, 25% were Black and 69% Hispanic. All identified as male and 15 (93.8%) as gay. Length of time on PrEP was >3 months (25%), 1-3 months (50%), and < 1 month (25%). At baseline, half reported prior PrEP usage and discontinuation, half reported an STI diagnosis and 43.8% reported condomless anal sex with an HIV+ or unknown status partner in the prior 3 months.

Retention was 94%. Self-reported adherence (i.e. mean percent of time taken PrEP in the past month) improved from 72.5% to 89.3% between visits ($p=0.010$). Median TFVdp and FTCtp increased by 44% and 62%, respectively between visits, although the increase was not statistically significant ($p>0.1$). All measures of PrEP self-efficacy improved, with significance detected in ability to follow a PrEP plan, take PrEP on a weekend, at a social outing or party, and take PrEP when having medication side effects.

CONCLUSIONS: While our pilot results should be interpreted cautiously, the observed improvements in both self-reported and biologically-confirmed adherence measures are encouraging. While some participants recently started PrEP, self-reported time on PrEP was not correlated with baseline TFVdp/FTCtp concentrations. Thus, it is unlikely that the trend of increased concentration is an artifact of accumulation to steady-state. A randomized controlled efficacy trial of P3 will begin Spring 2019 at seven US Adolescent Trials Network sites.

WEPDC0107

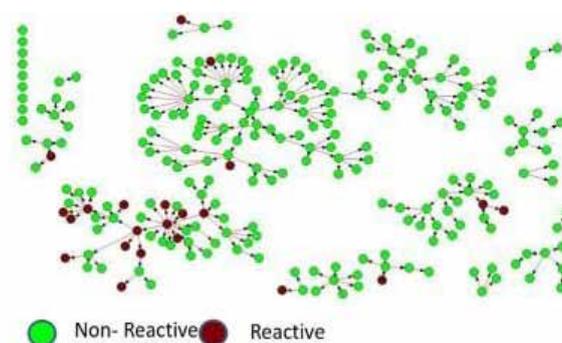
Digitizing interventions: An internet-based approach to reach out to the 'hidden network of men who have sex with men' in Mumbai, India

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BACKGROUND: Enhanced Peer Outreach Approach (EPOA) is an important strategy to reach the unreached key populations (KPs). We conducted an internet based EPOA to reach out to high-risk men-who-have sex with men (MSM) who solicit through dating apps in Mumbai, India.

METHODS: 240 MSM (25 seeds and 215 wave participants) were recruited using an internet-based snowball sample during 2017-18. Information on demographics, sexual behaviors and preferences, exposure to targeted interventions was collected.

RESULTS: Of the 240 MSM enrolled, 25 (10%) were seeds, 52 (22%) in wave one, 64 (27%) in wave 2, 33 (18%) in wave 3 and 4, 17 (7%) in wave 5, and 15 (6%) in wave 6. Nine seeds didn't recruit any MSM; the values ranged from 2 to 80 in the other seeds. The mean age (SD) was 23.9 (5.5) years; there was no difference in mean ages across different waves ($p=0.32$). Though most MSM in seeds and initial waves were students, a higher proportion of working MSM were recruited in subsequent waves (after 3) compared with seeds ($p=0.02$). None of the individuals after wave four knew about the targeted prevention interventions (TI) under national program; this was significantly lower compared with earlier waves (10%) ($p=0.04$). Grinder (44%) was most common source to find partners, followed by Facebook (25%) and Whatsapp (21%); the preferences differed significantly across waves ($p<0.001$). About 3% were HIV infected and 9% were reactive for syphilis. Most of the MSM infected by syphilis were recruited by one seed (30% vs. 4%, $p<0.001$) (Pic_01).



[Figure showing the network and VDRL reactivity in EPOA from 25 seeds]

CONCLUSIONS: Internet-based EPOA is useful to reach hidden & unreached MSM networks. Thus, these EPMs should be integrated into MSM interventions in India to reach the hidden population, where social framework is not conducive for MSM to 'come-out' and become a part of HIV prevention programs.

WEPDC02 Engaging providers to improve PrEP access

WEPDC0201

Healthcare providers' attitudes and experiences delivering oral PrEP to adolescent girls and young women: Implementation research to inform PrEP rollout in Kenya, South Africa, and Zimbabwe

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BACKGROUND: Oral PrEP is offered to populations at substantial HIV risk in Kenya, South Africa, and Zimbabwe, including adolescent girls (AG) 15-17 and young women (YW) 18-24. We examined providers' attitudes and experiences delivering PrEP to AGYW to inform provider training and service delivery.

METHODS: We surveyed providers (Kenya=290, South Africa=192, Zimbabwe=127) and conducted follow-up qualitative interviews (Kenya=40, South Africa=48, Zimbabwe=27). Participants included clinicians, nurses, counselors, pharmacists, and community-based workers at public and private facilities; 334 had experience with PrEP delivery, and 274 did not. We descriptively analyzed survey data in STATA 13 and thematically analyzed interviews using NVivo 11.

RESULTS: Although PrEP delivery differs across countries, providers shared similar attitudes. While some survey participants agreed "it's better to tell sexually active unmarried women (AG 49%, YW 36%) to abstain from sex rather than give her PrEP," providers in interviews acknowledged that many girls engage in sex before 18 and could benefit from PrEP. More providers (75%) believed YW were responsible enough to take PrEP consistently compared to AG (49%), stating that delivering services to YW is easier because they are "more mature" while some AG "don't listen." Providers delivering PrEP to AGYW reported that clients' lack of PrEP knowledge and lack of disclosure were barriers to uptake, adherence, and retention. Side effects, lack of relationship power, and access barriers were also cited in Kenya. Providers thought AGYW should disclose PrEP use to parents (34% AG) and partners (52% AG, 57% YW; highest in Kenya, lowest in South Africa) to facilitate adherence but were concerned about negative reactions from parents/partners because of low PrEP awareness and HIV stigma. Providers shared strategies they used to help AGYW use PrEP successfully, including intensive adherence and relationship counseling, phone follow-ups, home visits, peer counseling, and community awareness-raising. Additional differences between countries and AG/YW will be presented.

CONCLUSIONS: Providers were generally supportive of PrEP for AGYW, with more reservations about AG. Results are informing provider training in these countries to address these reservations. Additional community sensitization about PrEP as a prevention option for AGYW—particularly targeting parents and partners—could make it easier for AGYW to use PrEP.

WEPDC0202

Providers' attitudes towards and experiences with oral pre-exposure prophylaxis (PrEP) implementation in the SEARCH trial in Kenya and Uganda

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BACKGROUND: Understanding the attitudes and experiences of pre-exposure prophylaxis (PrEP) providers is critical for informing global implementation, yet to date limited research in Africa has explored providers' views.

METHODS: SEARCH (NCT01864603), a population-based HIV test-and-treat trial, implemented a PrEP intervention in which providers received didactic training and ongoing support from local senior clinicians. In this qualitative study, researchers conducted semi-structured interviews with providers and counselors (n=19) in 5 communities in Kenya and Uganda from January-September 2017 to explore perceptions and experiences with PrEP delivery. Transcripts were inductively coded using a framework developed by an 8-person team.

RESULTS: Providers had heterogeneous attitudes towards PrEP: some expressed enthusiasm for PrEP and others ambivalence. Some doubted patients' ability to adhere, and feared being blamed for PrEP 'failures' (i.e. HIV seroconversions) in their communities. Offering PrEP presented a moral dilemma for some who feared that PrEP could lead to increased 'immorality', HIV and STI incidence, and mistrust within couples. Providers supported PrEP in HIV-discordant couples, where mutual support for daily pill-taking facilitated harmony and protection for seronegative partners. However, even providers supportive of PrEP struggled to communicate messages about usage and adherence, particularly identifying 'seasons of risk' and explaining complex guidelines for safely stopping and restarting PrEP. Assessing HIV risk was often difficult; providers accepted clients' self-referral for PrEP even when risk was not evident. Providers felt that PrEP uptake was hampered for women by difficulties negotiating use with partners, and for youth due to the need for parental consent; and that barriers to PrEP continuation included transportation costs, stigma, daily pill burden and side effects. Providers felt that continuation was facilitated by counseling, proactive management of side effects, and home or community-vs. clinic-based PrEP provision.

CONCLUSIONS: Providers are not neutral 'implementation actors'; but rather should be the first-line targets of interventions to promote adoption of new evidence-based practices and technologies such as PrEP, as their attitudes and social roles affect dissemination. Providers need training and opportunities to build networks of mutual support to address the complex challenges of PrEP implementation. Their perspectives can and should inform PrEP policy frameworks and communications strategies.

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WEPDC0203

Implementation challenges and strategies in integration of PrEP into maternal and child health and family planning services: Experiences of frontline healthcare workers in KenyaK. Beima-Sofie¹, A. Wagner¹, J. Pintye¹, F. Abuna², H. Lagat², J. Baeten^{1,3,4}, J. Kinuthia⁵, G. John-Stewart^{1,3,4}, G. O'Malley¹¹University of Washington, Department of Global Health, Seattle, United States, ²University of Washington in Kenya, Nairobi, Kenya, ³University of Washington, Department of Epidemiology, Seattle, United States, ⁴University of Washington, Department of Medicine, Seattle, United States, ⁵Kenya National Hospital, Nairobi, Kenya**BACKGROUND:** Delivering PrEP to adolescent girls and young women (AGYW) through maternal and child health (MCH) and family planning (FP) clinics in Africa may substantially reduce HIV acquisition in this population. Evaluation of implementation challenges and strategies within health systems are critical to inform future scale-up.**METHODS:** We conducted focus group discussions (FGDs) with healthcare workers (HCWs) offering PrEP in MCH and FP clinics as part of the PrEP Implementation for Young Women and Adolescents (PrIYA) Program in Kisumu, Kenya. Topic guides were based on the Consolidated Framework for Implementation Research (CFIR). An analysis of FGD audio and debrief reports was conducted to identify implementation challenges and employed strategies.**RESULTS:** Overall, 50 HCWs from 26 facilities participated in 8 FGDs. HCWs felt that PrEP met the needs of AGYW by providing a female controlled prevention strategy, and aligned with policy priorities of elimination of mother-to-child HIV transmission. They were universally enthusiastic about PrEP provision to AGYW through MCH clinics, noting the relative advantage of this approach because it:

- 1) enabled high coverage,
- 2) harmonized PrEP and MCH visits, and
- 3) lowered stigma compared to PrEP offered through HIV care clinics.

HCWs noted implementation challenges including:

- 1) increased workload and documentation burden amid healthcare workforce shortages,
- 2) physical space constraints,
- 3) drug and paperwork stockouts,
- 4) multiple implementing partners with different PrEP priorities and documentation practices at the same site, and
- 5) increased HIV testing sessions.

HCWs employed various implementation strategies to overcome implementation challenges, including task shifting from nurses to HIV Testing Service (HTS) providers, facility-specific patient flow modifications (including fast-tracking PrEP clients to reduce wait times), PrEP demand-generation and myth-busting during health talks, provider education, dedicated PrEP delivery rooms, and coordination with adolescent friendly services. Additional suggested strategies to improve PrEP integration included community education to increase broader PrEP awareness and enable shorter counseling sessions, and task-shifting data entry and client risk assessments.**CONCLUSIONS:** HCWs were enthusiastic about the feasibility, acceptability, and potential sustainability of integrating PrEP services into MCH and FP clinics. Challenges and strategies focused on overcoming provider time and space constraints, and addressing provider and client knowledge.Tuesday
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WEPDC0204

Surmounting PrEP delivery challenges through adaptation of implementation guidelines: Lessons learned from HIV care clinics in KenyaE. Irungu^{1,2}, K. Ngure^{2,3}, K. Mugwanya², N. Mugo^{1,2}, E. Bukusi^{1,2}, J. Odoyo¹, E. Wamoni¹, J. Morton², G. O'Malley², J. Baeten², for the Partners Scale-Up Project¹Kenya Medical Research Institute, Nairobi, Kenya, ²University of Washington, Seattle, United States, ³Jomo Kenyatta University of Agriculture and Technology, Juja, Kenya**BACKGROUND:** Roll out of pre-exposure prophylaxis (PrEP) has begun in several African countries. In Kenya, PrEP delivery is largely in public health facilities, which successfully provide services to large numbers of clients in spite of facing multiple challenges including understaffing, long waiting times, poor infrastructure, and commodity stock outs. The Partners Scale-Up Project is an on-going prospective implementation science evaluation that aims to catalyze integration of PrEP in 24 public HIV care clinics in Kenya using existing facility infrastructure and personnel. As of December 2018, participating clinics have initiated 4000 clients on PrEP. We describe how public clinics are adapting PrEP implementation guidelines to facilitate successful delivery.**METHODS:** To understand the service integration process, we conducted qualitative interviews with health providers and documented clinic observations in technical assistance (TA) reports over eighteen months. Using a combination of deductive and inductive approaches, we analyzed 71 health provider interviews and TA reports from the 24 clinics to identify clinic level adaptations to national PrEP implementation guidelines.**RESULTS:** Clinics tried multiple adaptations to facilitate PrEP delivery. First, renal function testing is recommended (but not required) by Kenyan guidelines but due to unavailability of creatinine tests, clients were often initiated on PrEP without such testing if otherwise healthy. Second, to address long waiting times, almost all clinics reported fast-tracking PrEP users. Third, some clinicians reported dispensing PrEP medication from the clinical room, saving PrEP users time associated with waiting at the pharmacy, a practice that also mitigated the stigma associated with being seen at a pharmacy that predominantly serves HIV infected persons. Fourth, while Kenyan guidelines recommend monthly refill appointments, the majority of clinics issued PrEP users 2-3 months of pills at a time, depending on client request and adherence; this adaptation also eased provider workload. Finally, when stock outs of tenofovir/emtricitabine (TDF/FTC) occurred, clinics readily dispensed tenofovir/lamivudine (TDF/3TC) as PrEP.**CONCLUSIONS:** Health providers in public HIV care clinics instituted practices and made innovative adaptations to recommendations in order to overcome PrEP delivery challenges and reduce barriers for clients and staff. Enabling clinic level adaptations to national implementation guidelines will facilitate the scale-up of PrEP delivery.

WEPDC0205

Training, communication, and prescribing patterns of pre-exposure prophylaxis (PrEP) among a sample of nurse practitioners in the United States: Important gaps and opportunitiesM. Ellis^{1,2}, S. Scroggins³, E. Shacham³, K. Moore³¹Saint Louis University, College for Public Health and Social Justice, Saint Louis, United States, ²Washington University School of Medicine, Saint Louis, United States, ³Saint Louis University, Saint Louis, United States**BACKGROUND:** Currently, nurse practitioners (NPs) provide a significant proportion of primary healthcare, which is anticipated to increase amidst current and future expected shortages of primary care physicians. Given their prominence in delivering healthcare and prevention, it is important to know the extent to which NPs are trained, communicate on and prescribe the effective HIV prevention medication, pre-exposure prophylaxis (PrEP), which is not well understood. The purpose of this study was to evaluate these factors in a national sample of NPs in order to identify gaps in the delivery of PrEP that may impact provision of care to persons at risk of HIV.

METHODS: A cross-sectional survey was completed by a national subset of NPs in attendance at their annual American conference (n=271). Sociodemographics were collected in addition to a history of training on PrEP, communication of PrEP to patients, prescribing patterns, and associated self-confidence. Descriptive statistics present the scope and magnitude of these PrEP-related issues.

RESULTS: The majority of the sample identified as white (n=214, 79%), female (n=223, 82.3%), and middle age (46.0±11.34 years), with 16% (n=44) identified as a sexual minority. Nearly two-thirds of NPs (60.1%, n=163) reported having no prior PrEP training or education. A similar proportion of NPs (62.4%) reported never initiating a conversation about PrEP. Only half of NPs reported being 'confident' in discussing PrEP efficacy with patients, discussing PrEP as an option with a patient, monitoring side effects of PrEP, or testing PrEP patients for HIV. In terms of prescribing practices, 66.8% of NPs reported that they were currently not prescribing PrEP to any patients.

CONCLUSIONS: Studies continue to find a lack of provider communication or promotion of PrEP to be a key barrier in its uptake. In our study, we found that the majority of NPs: 1) had no PrEP training/education PrEP; 2) had never initiated a conversation with a patient about PrEP; 3) had low confidence in delivering PrEP-related care; and 4) had no patients being prescribed PrEP. Developing and delivering educational and training interventions for Nurse Practitioners and their institutions in international settings could serve to dramatically increase HIV preventative care.

WEPDC0206

Attitudes, confidence and knowledge towards antiretroviral pre-exposure prophylaxis (PrEP) prescription among healthcare providers in Thailand

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BACKGROUND: HIV pre-exposure prophylaxis (HIV-PrEP) is one of effective methods for preventing HIV transmission and is recommended for high risk populations. Attitudes, confidence and knowledge towards HIV-PrEP prescription among healthcare providers have not been investigated in Thailand where HIV-PrEP is a novel issue for the healthcare system.

METHODS: A questionnaire-based descriptive study was administered to Thai healthcare providers during May-September 2018.

RESULTS: A total of 500 questionnaire paper survey was distributed. The reply rate was 92% (460 participants). The study participants included 336 physicians (48 infectious disease (ID) physicians and 288 non-ID physicians) and 124 non-physicians (70 nurses, 35 pharmacists and 19 others). Eighty-one percent of participants had positive attitudes towards HIV-PrEP. Non-ID physicians, taking care < 100 HIV-infected patients/month, having prior HIV-PrEP knowledge, believing in HIV-PrEP efficacy and believing that HIV-PrEP is not associated with higher incidence of sexually transmitted infections were significant factors associated with positive attitudes towards HIV-PrEP. The most concerning issue for participants who had negative attitudes towards HIV-PrEP was the patient's adherence to antiviral drugs. Only 57% of participants had confidence to prescribe HIV-PrEP. Factors associated with confidence to prescribe HIV-PrEP were ID physicians, believing in HIV-PrEP efficacy, believing in safety of antiviral drugs and believing that HIV-PrEP is not associated with developing of HIV drug resistance. The results of knowledge testing about HIV-PrEP by set of 8 questions were categorized into good score (≥7/8) and fair score (≤6/8). Fifty-five percent of participants had a good score result. Factors associated with a good score result were ID physicians, having experience of HIV-PrEP prescription and believing in HIV-PrEP efficacy.

CONCLUSIONS: Most of Thai healthcare providers had positive attitudes towards HIV-PrEP but the major concerning barrier was the patient's adherence to medication. Moreover, only about half of participants had confidence to prescribe HIV-PrEP and a good score result in HIV-PrEP knowledge testing. Successful HIV-PrEP implementation in Thailand will require continuing education and improving experience of healthcare providers to strengthen knowledge and confidence to prescribe HIV-PrEP.

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Viral mechanisms of HIV/SIV persistence and latency

WEPEA041

In-depth transcription profile comparison of multiple primary cell HIV latency models

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BACKGROUND: Multiple HIV latency models have been developed by infecting primary cells in vitro. However, latency reversing agents have varying effects in different models. To investigate whether the mechanisms of HIV latency differ between primary cell models, we compared the HIV transcription profile in CD4+T cells from 3 primary cell models and patients.

METHODS: Read-through, total (TAR), 5'elongated, polyadenylated, and multiply-spliced (Tat-Rev) HIV RNA per provirus were quantified in latent and reactivated (anti-CD3/CD28) or productive CD4+ T cells from 3 models (Greene_{Cherry-Luc} NL4.3], Verdin[HIV_{GRO}], and revised Bosque/Planelles_{wt} NL4.3]; 3-5 donors/model) plus blood CD4+ T cells from ART-suppressed patients (n=14).

RESULTS: Total HIV DNA decreased after activation in the Greene and Bosque models (fold changes: 0.24, 0.30), suggesting a cytopathic effect on reactivated latently infected cells. HIV transcriptional initiation (TAR RNA/HIV DNA) was higher in latent cells from all models compared to patient cells (fold differences: 5.4, 5.0, 2.2; all p < 0.05). HIV transcriptional elongation (elongated/total HIV RNA) was higher in latent cells from all models (0.74, 0.53, 0.46) compared to patients (0.07) [all p < 0.05]. In patient cells, activation caused successive increases in total, elongated, polyadenylated, and multiply-spliced HIV RNA per provirus (2-, 7-, 42- and 69-fold), suggesting reversible blocks to initiation, elongation, completion, and multiple-splicing. In both blood and tonsil cells from the Greene model, activation increased only multiply-spliced HIV RNA (5-fold), suggesting regulation of latency solely by a reversible block to multiple-splicing. In the Verdin model, productive and latent cells differed in total (7-fold) and multiply-spliced (14-fold) HIV RNA, suggesting differences in initiation and multiple-splicing. In the Bosque model, activation caused 6-, 8- and 15-fold increases in total, elongated, and multiply-spliced RNA, suggesting reversible blocks to initiation and multiple-splicing.

CONCLUSIONS: All 3 primary cell latency models recapitulate the block to multiple splicing seen in patient cells, suggesting that this may be a key feature of HIV latency in primary CD4+T cells. Blocks to initiation, elongation, and polyadenylation were observed more variably among the models. Further study of these models may reveal specific proteins involved in regulating HIV latency and may inform the field on how best to employ these models to test new therapies.

WEPEA042

Clonal integration site expansion of infected cells is a main contributor of HIV persistence in more differentiated T cell subsets during suppressive ART

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BACKGROUND: In HIV-infected individuals on antiretroviral therapy (ART), HIV persists in long-lived and proliferating CD4+ T-cells. HIV can infect CD4 T-cells at different stages of differentiation. These cells turn over at diverse rates. We aimed to characterise HIV integration sites (IS) and clonal expansion in CD4 T-cell subsets in blood from HIV-infected individuals on suppressive ART.

METHODS: From 24 individuals on ART, DNA from 0.2 - 2 million sorted naïve (TN:CD3*CD4*CD45RA*CCR7*CD27*CD57*CD95⁻), stem cell memory (TSCM:CD3*CD4*CD45RA*CCR7*CD27*CD57*CD95⁺), central memory (TCM:CD3*CD4*CD45RA*CCR7*CD27⁺), transitional memory (TTM:CD3*CD4*CD45RA*CCR7*CD27⁺), effector memory (TEM:CD3*CD4*CD45RA*CCR7*CD27⁻) or terminally differentiated (TTD:CD3*CD4*CD45RA*CCR7) cells was randomly fragmented and amplified by barcoded nested PCR before Miseq sequencing. Chromosomal alignment was determined using (GRCH38/hg38). Clonal IS expansion was defined if identical IS differed >2 base pairs in PCR-product length and ≥3 PCR-products were present. Differences in clonal IS expansion were assessed by Wilcoxon test, gene ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (Kegg) enrichment by False Discovery rate using TOPPGene. Epigenomic markers associated with IS were assessed using the NIH Roadmap Epigenomics Mapping Consortium by Fishers exact test.

RESULTS: The highest frequency of clonally expanded IS was observed in TEM and TTD (p < 0.04) and lowest in TN and TSCM (< 0.01) compared to more differentiated subsets (TTM-TTD). We observed the same clonally expanded IS in different T-cell subsets from the same participant with larger clones in more differentiated cells. GO and Kegg demonstrated distinct patterns of enrichment in the T-cell subsets with genes and pathways enriched for immune function in TTM and TEM. Furthermore, clonally expanded IS compared to non-clonal were enriched for proliferation, cell survival and immune function (p < 0.05). Clonally expanded IS were found in more accessible parts of the genome, more associated with transcriptionally active transcription start sites and less quiescent genes compared to non-clonal IS (p < 0.05).

CONCLUSIONS: There is more clonal IS expansion of infected cells with differentiation consistent with antigen induced proliferation. In addition, we show evidence that infected cells can differentiate and retain the same IS. The clear difference in IS between non-clonal and clonally expanded infected cells supports a model of two distinct mechanisms for HIV persistence in T-cells on ART.

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Host cellular factors and latency

WEPEAO43

Galectin-1 promotes HIV-1 latency reactivation

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BACKGROUND: Galectin-1 (Gal-1) is an endogenous lectin with important immunomodulatory functions acting on both innate and adaptive immune cells. HIV-1 infects mainly CD4+ T lymphocytes and macrophages causing CD4+ T cell depletion, ultimately leading to acquired immunodeficiency syndrome (AIDS). Implementation of combination antiretroviral therapy (cART) significantly improves the prognosis of HIV-infected individuals. Nevertheless, chronic inflammation and the maintenance of latently infected cells-viral reservoir- represent two major barriers to achieve the cure of HIV infection. Herein, we analyzed the role of Galectin-1 on HIV-1 latency reactivation and chronic immune activation.

METHODS: Five clones of Jurkat T cells (J-LAT) were stimulated with recombinant Gal-1 and viral reactivation was assessed by analyzing GFP expression. The levels of Gal-1 in the plasma of HIV+ patients (N=62) classified in four groups (Baseline, chronic under treatment, chronic treatment naïve and elite controllers) was analyzed and compared with healthy donors (N=14). Cell-associated HIV DNA and unspliced (US)-RNA were quantified in purified CD4+ T cells by real-time PCR. Data were analyzed using nonparametric statistics.

RESULTS: Extracellular Gal-1 reverses HIV latency and activates viral replication in latently infected J-LAT cells by promoting NF-κB activity and cell activation. In addition, *in vitro* treatment of CD4+

T cells with Gal-1 increases the secretion of proinflammatory cytokines (IFN-γ, TNF-α and IL-6). Furthermore, we show that HIV-infected patients have increased plasma levels of Gal-1 as compared to healthy donors ($p < 0.001$). Longitudinal analysis of plasma samples confirmed the increased serum levels of Gal-1 during cART. Interestingly, we observed a positive correlation between Gal-1 levels and HIV reservoir size, as determined by US-RNA copy number ($p < 0.01$). Finally, we show that circulating extracellular vesicle induces the secretion of Gal-1 by macrophages, suggesting that this cell type could be responsible for the increase in plasma Gal-1.

CONCLUSIONS: Gal-1 is capable of reversing HIV latency and this effect could be mediated by promotion of CD4+ T cell activation. Increased plasma levels of Gal-1 in patients and its correlation with reservoir size suggest that Gal-1 plays an important role in reservoir dynamics and in the pathogenesis of HIV-1 infection.

WEPEAO44

Cellular modulation and HIV reactivation in response to serial treatment of latently HIV-infected CD4 T cells with Histone Deacetylase inhibitors (HDACi)

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BACKGROUND: Histone deacetylase inhibitors (HDACi) are widely studied HIV latency reversing agents. Vorinostat, a pan-HDACi, induces histone acetylation, modulates cellular gene expression, and reactivates HIV; however, the relationship between these events is poorly defined and clinical studies suggest diminished HIV reactivation with daily exposures. To interrogate this, we investigated genes and pathways modulated by HDACi in various cellular models and the susceptibility of primary cells to reactivate latent HIV virus following vorinostat treatment.

METHODS: Histone acetylation (measured by ELISA) and cellular mRNA levels were evaluated in Jurkat-derived HIV latency cells, HCT116 colon cancer cells and resting primary uninfected and HIV-infected CD4+ T-cells following interval treatment with vorinostat. Transcriptional modula-

tion was evaluated by RNASeq, Ampliseq and qPCR. HIV reactivation was quantified by luciferase activity from an HIV-1/luciferase reporter virus in a primary latency cell model.

RESULTS: Following single vorinostat treatment, ~1500 genes were modulated using low stringency cutoff in all 3 cell models and returned to baseline following drug washout. Five genes were strongly modulated by HDACi treatment: 3 up-regulated (H1FO, IRGM, WIP149) and 2 down-regulated (PHF15 and PRDM10). Serial exposures of vorinostat led to comparable increases in histone acetylation and consistent daily modulation of the mRNA biomarkers. Daily reactivation of latent HIV genomes was also observed following repeat HDACi *in vitro*.

CONCLUSIONS: We identified genes and transcriptional pathways modulated in response to clinically-relevant exposures of vorinostat. A targeted gene set was selected and confirmed by qPCR to be robust biomarkers of HDACi pharmacological activity. Longevity of the transcriptional response to vorinostat *in vitro* is short-lived (< 24 hours). Serial vorinostat exposure in resting primary CD4+ T-cells from uninfected donors results in a repeated pattern of comparable gene modulation followed by return to baseline, suggesting the transcriptional machinery can "respond and reset". Similarly, latently infected primary T-cells also responded daily to vorinostat treatment, indicating the lack of a refractory period *in vitro*. Collectively, our gene expression, histone acetylation and HIV reactivation results suggest comparable host response to serial treatment of HDACis. Studies are progressing to evaluate the relationship between cellular transcriptional response and HIV reactivation *in vivo*.

WEPEAO45

Cell-penetrating inhibitors of the Hsp70 chaperone activity can prevent HIV-1 reactivation from latency

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BACKGROUND: *In vivo*, when HIV-1 persists in cellular reservoirs, its state of latency allows the virus to avoid eradication and be reactivated afterwards. It was previously shown that functioning of heat shock protein 90 (Hsp90) is required for HIV-1 reactivation from latency, so that inhibitors of the Hsp90 chaperone function can suppress this reactivation and be considered as anti-AIDS agents. Taking into account that the other major intracellular chaperone, Hsp70, usually works as an indispensable partner of Hsp90 in the protein folding machinery, we hypothesized that cell-permeable inhibitors of the Hsp70 chaperone activity have to suppress the post-latency HIV-1 reactivation occurring in cellular reservoirs. Moreover, we supposed that such Hsp70 inhibitors are able to enhance the suppressive effect of Hsp90 activity inhibitors on the HIV-1 reactivation. Those our ideas were examined in the present study.

METHODS: The process of HIV-1 reactivation was investigated in cultured J-Lat cells. Such known inhibitors of the Hsp70 chaperone activity as 2-phenylethanesulfonamide (PES) and VER-155008 were used to repress Hsp70-dependent pathways in the target cells. In turn, two characterized inhibitors of the Hsp90 activity, 17AAG and AUY922, were here employed for comparison and combining with the Hsp70 inhibitors.

RESULTS: It was found that targeting the intracellular Hsp70 chaperone activity with PES or VER-155008 does lead to suppression of the HIV-1 reactivation in the drug-treated cells; the achieved suppressive effects were drug-dose-dependent and quite comparable with those induced by the Hsp90 inhibitors (17AAG or AUY-922). The additively increased suppression of the HIV-1 reactivation from latency was observed in J-Lat cells subjected to co-treatments with both the chaperone inhibitors (PES or VER-155008 + 17AAG or AUY922), if compare with the action of only one Hsp70 inhibitor or only one Hsp90 inhibitor.

CONCLUSIONS: The chaperone activity of Hsp70 in cellular reservoirs contributes to the HIV-1 reactivation from latency and, therefore, appropriate cell-permeable inhibitors of the Hsp70 activity may be used in fight against AIDS. In the case of co-treatment, the assorted combination of Hsp70- and Hsp90-inhibiting drugs may have the enhanced suppressive effect on the HIV-1 reactivation from latency.

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WEPEA046

Specific characteristics of certain CD4 T cell subsets are related to HIV reservoir size

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BACKGROUND: A recent study has revealed the importance of evaluating the specific characteristics of the different cellular compartments involved in HIV reservoir to improve therapeutic strategies aimed at achieving HIV remission (García et al., Rev Med Virol 2018). Specific phenotypic properties of different CD4 T-cell subsets involved in HIV reservoir could favor HIV long-term persistence. Herein, we have characterized the phenotype of two different CD4 T-cell subsets involved in HIV persistence, their HIV reservoir size, and their potential correlations.

METHODS: Two groups of chronic HIV-infected patients were included: 10 elite controller (EC group) patients with undetectable HIV plasma viremia (pVL) in the absence cART; and 10 cART-suppressed patients maintaining undetectable pVL (TX group). Immunophenotypic characterization was carried out by multiparametric flow cytometry using FlowJo software. Levels of activation, senescence, apoptosis, exhaustion, as well as expression of some cytokine receptors, were measured in purified resting memory (Trm) and peripheral follicular helper (pTfh) CD4-T cells. HIV reservoir size was measured in these cell subsets by ddPCR. Inter-group and intra-group differences were tested by non-parametric tests and associations by Spearman's rho coefficient.

RESULTS: In the whole population of patients, the phenotype of Trm and pTfh cells showed differences in senescence (CD57+CD28-) and apoptosis (CD95+CD28-) being significantly higher in Trm compared to pTfh cells ($p=0.001$ and 0.034 , respectively). Also in cellular mobilization (CCR6+) being significantly lower in Trm compared to pTfh cells ($p=0.002$). However, there were no significant differences in the phenotype of Trm and pTfh cells when comparing EC vs TX patients. Interestingly, after adjusting by group of patients we found some interesting correlations: CCR6 expression on pTfh cells with HIV reservoir size in pTfh cells ($r=-0.569$, $p=0.034$); and level of senescence (CD57+CD28-) on Trm cells with HIV reservoir size in Trm cells ($r=0.465$, $p=0.052$).

CONCLUSIONS: Our results show that each cell compartment involved in HIV reservoir exhibited particular phenotype features that are associated to HIV reservoir size, and that potentially promote long-term viral persistence. These findings support the importance of evaluating the specific characteristics of the different cellular compartments involved in HIV reservoir as one of the keys to understand and attack the HIV persistence.

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Cellular and tissue reservoirs of HIV/SIV

WEPEA047

Two decades of antiretroviral therapy provide no evidence for re-seeding of the HIV DNA reservoir by ongoing viral replication

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BACKGROUND: Despite suppression of viral replication by antiretroviral therapy (ART), HIV persists as a DNA reservoir which forms the major obstacle to HIV cure. Ongoing low-level viral replication and especially its potential to re-seed the persistent viral reservoir, is currently highly debated. To obtain insight in the size, dynamics and potential re-seeding of the viral reservoir we conducted a longitudinal study in 7 patients who initiated ART over two decades ago.

METHODS: PBMCs and plasma were obtained before ART initiation, and PBMCs were obtained every few weeks during the first year on ART, and by large blood draws 10 and 20 years after ART initiation. DNA isolated from PBMCs and T-cell subsets (Tn, Tscm, Tcm, Ttm, Tem) was quantified using digital PCR and together with viral RNA isolated from pre-therapy plasma, the viral envelope (gp120-V3) was deep-sequenced.

RESULTS: HIV DNA load in PBMCs declined significantly during the first two months (3,261 HIV LTR c/million PBMCs to 913 HIV LTR c/million PBMCs; $p=0.03$) and remained stable for two decades thereafter (1139 and 934 HIV LTR c/million PBMCs). HIV DNA load in T-cell subsets also remained unaltered between 10 and 20 years on treatment, with relatively most HIV DNA in the central memory and transitional memory T-cells. Phylogenetic and root-to-tip distance analyses of HIV DNA sequences over time revealed no evidence suggesting ongoing evolution in any of the effectively treated patients. In one patient, genetic variation accumulated during a period of non-adherence and thereafter disappeared during prolonged re-suppression.

CONCLUSIONS: This is the first systematic analyses of the HIV DNA reservoir over two decades of ART. We provide no evidence for re-seeding of the HIV reservoir and therefore no support for ongoing viral replication as a mechanism to maintain the HIV reservoir. We observed that the size and overall composition of the HIV DNA reservoir becomes fixed as early as 4 weeks after ART initiation. Further investigations into the first few days following ART initiation may enhance our understanding of the fixation of the reservoir and thereby aid the development of therapeutic options that can impact its establishment.

WEPEA048

Effector memory cells are the main contributors to the replication-competent HIV reservoir in ART-suppressed individuals

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BACKGROUND: Integrated HIV genomes persist in stem memory cell (SCM), central (CM), transitional (TM) and effector memory (EM) CD4⁺ T cells in individuals taking suppressive antiretroviral therapy (ART). However, only a few studies have evaluated the relative contribution of these subsets to the replication-competent reservoir.

METHODS: Enriched CD4⁺ T cells from 6 ART-suppressed individuals collected by leukapheresis were sorted by flow cytometry to obtain naïve (CD45RA+CCR7+CD27+CD95⁻), SCM (CD45RA+CCR7+CD27+CD95⁺), CM (CD45RA-CCR7+CD27+), TM (CD45RA-CCR7-CD27+) and EM (CD45RA-CCR7-CD27-) subsets. Integrated HIV DNA was measured in each subset by real-time PCR. Replication-competent HIV was assessed by a modified quantitative viral outgrowth assay (mQVOA), when enough cells were available.

RESULTS: Naïve and CM cells represented the vast majority of CD4⁺ T cells (median frequency of 40% [15-50] and 32% [20-42], respectively), SCM, TM and EM were less frequent (1.9% [1.6-3.3], 4.1% [3.8-7], and 7.6% [3.5-23.1], respectively). EM cells displayed the highest levels of integrated HIV DNA (median frequency 3151 [1281-12327] copies of HIV DNA/10⁶ cells), followed by CM and TM (1986 [920-3177] and 1486 [801-4831] copies of HIV DNA/10⁶ cells, respectively). Naïve cells were rarely infected while SCM had intermediate levels of integrated HIV DNA (469 [142-941] copies of HIV DNA/10⁶ cells). Due to their high frequency, CM cells represented the main contributor to the pool of cells with integrated genomes, followed by EM and TM subset (median 58%, 26.7% and 7%, respectively). Despite the high contribution of CM to the HIV DNA reservoir, cells with replication competent HIV were found at higher frequencies in the EM subset than in any other subset in 5/6 participants (median IUPM 0.7 [0.21-1.1]), followed by the TM and CM compartment (median IUPM 0.2 [0-1] and 0.1 [0-0.7], respectively, EM vs. CM p=0.06 and EM vs. TM p=0.2). EM cells represented the main contributor to the replication-competent reservoir, followed by CM and TM subset (median 66%, 9.7% and 9.3%, respectively, EM vs. CM p=0.16, and EM vs. TM p=0.06).

CONCLUSIONS: The large CM compartment is the main contributor to the pool of cells carrying HIV DNA, whereas the majority of replication competent HIV was detected in EM cells.

WEPEA049

ICOS is preferentially expressed by productively infected cells in the blood and lymph nodes from HIV-infected individuals

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BACKGROUND: The inducible T-cell costimulator (ICOS) is an immune checkpoint molecule expressed at the surface of activated T cells and follicular helper T cells (T_{fh}) which are major cellular reservoirs for HIV. Because ICOS is known to exert anti-apoptotic functions, infected cells expressing this molecule may have a selective advantage to survive over time.

METHODS: Lymph node (LN) cells collected by fine needle aspirates and matched blood samples were obtained from 2 HIV-infected viremic individuals (viral loads > 60,000 HIV RNA copies/ml), as well as from 5 virally suppressed participants on ART. A novel p24 flow-cytometry based assay (HIV-Flow) was used to measure the frequency of cells harbouring translation competent proviruses and to assess their expression of ICOS. Productively infected cells were identified in the absence of stimulation. Latently infected cells were revealed by PMA/ionomycin stimulation.

RESULTS: The frequency of CD4⁺ T cells expressing ICOS was higher in LN compared to the blood in both viremic (median = 31% vs 21% in LN vs blood, respectively) and aviremic participants (median = 23% vs 14% in LN vs blood, respectively). Productively infected p24⁺ cells from viremic individuals were enriched in the ICOS⁺ subset both in LN and in the blood (median fold enrichment = 3.6x and 3.8x, respectively). On average, 71% and 40% of all p24⁺ cells expressed ICOS in LN and in the blood, respectively. In LN from virally suppressed individuals, limited cell numbers did not allow us to detect p24⁺ cells by HIV-Flow, even after stimulation. Circulating latently infected cells (identified following reactivation) from these participants did not express ICOS, suggesting that ICOS is not preferentially expressed by latently infected cells, in contrast to productively infected cells.

CONCLUSIONS: Our results show that productively infected cells frequently express ICOS in the blood and LN during untreated HIV infection. In contrast, ICOS was not preferentially expressed by latently infected cells in the blood from virally suppressed participants. Further studies are required to determine if ICOS is expressed by persistently infected cells in LN from virally suppressed individuals, which may contribute to the development of novel strategies to target HIV reservoirs.

WEPEA050

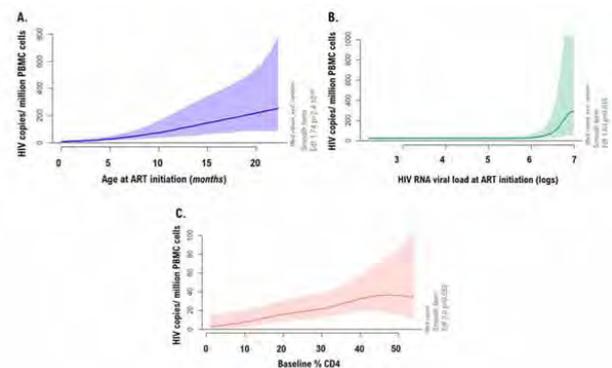
The CARMA study - children on early suppressive therapy: Total HIV-1 DNA quantitation 12 years post ART initiation

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BACKGROUND: Future strategies aimed at achieving antiretroviral therapy (ART)-free HIV remission are likely to target individuals with a limited size of viral reservoir. We investigated factors associated with a low reservoir measured as total HIV-1 DNA in PBMCs in perinatally infected children (PaHIV) from 5 European centers in the EPIICAL consortium.

METHODS: 40 children with PaHIV commenced ART < 2 years of age, suppressed within 12 months of start and remained suppressed (viral load, (VL) < 50 copies/ml) for at least 5 years. Total HIV-1 DNA was measured in isolated PBMCs by quantitative PCR per million PBMCs. Factors associated with total HIV-1 DNA were analyzed using generalized additive mixed models. Age and VL at ART initiation, and baseline %CD4 effects were tested including smoothing splines to test non-linear association.

RESULTS: Of 40 perinatally infected children, 27(67.5%) female, 21(52.5%) Black/Black African, 13(32.5%) Caucasian, 10 were seronegative on 4th generation HIV antibody/antigen, median [IQR] age 12.2 [8.03;15.6] years. Total HIV-1 DNA measured at 12 [7.3;15.4] years after ART initiation was below level of detection in 5 children, with a median of 50.9 [25.3, 117.3] copies/10⁶ PBMC in the remaining 35. DNA levels were positively associated with age and VL at ART initiation and baseline CD4% (Figure1).



[Figure 1. Total HIV-1 DNA by baseline CD4 %, age and viral load at ART initiation]

While ART initiation presented a quasi-linear association (coef=0.15(0.6), p=< 0.001), the effect of VL (coef=0.35(0.16), p=0.032) is only noticeable when >6logs. The effect of baseline CD4% (coef=0.03(0.01), p=0.049) was not maintained above 40%.

CONCLUSIONS: In this early treated PaHIV cohort on sustained suppressive ART for more than a decade, total HIV-1 DNA was undetected in one eighth. Lower DNA levels were associated with younger age at ART initiation, VL < 6logs at ART initiation, and low CD4%, supporting current global guidelines of early ART initiation for all infants.

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Characterizing HIV/SIV reservoirs and rebounding virus

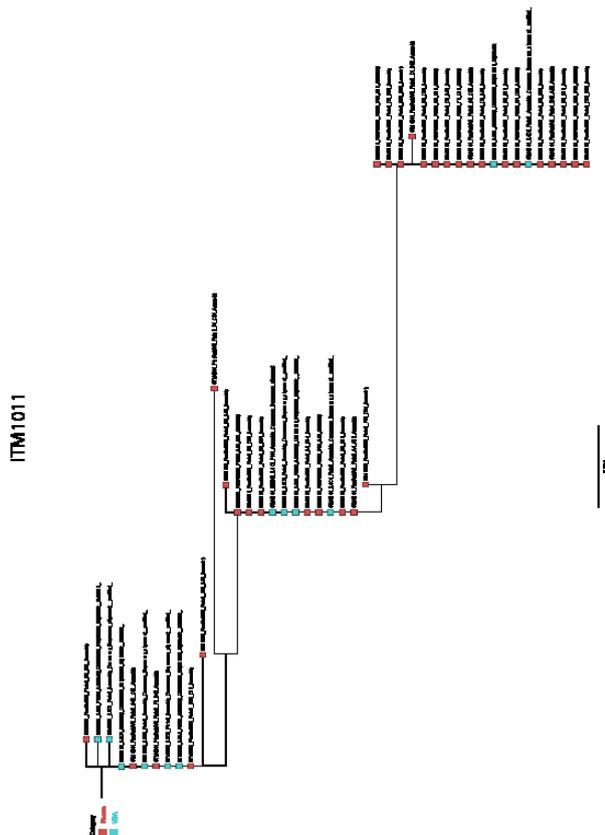
WEPEA051

Variable overlap in HIV-1 env sequences obtained from plasma virus after analytical treatment interruption and viral outgrowth assay

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BACKGROUND: Despite an era of successful viral suppression on cART and case series of post-treatment control (PTC), we have not yet identified a biomarker that can predict viral rebound after treatment interruption. Furthermore, there is still a lot of debate about the predictive value of viral outgrowth assay (VOA) sequences on the viral rebound dynamics and the correct assessment of the replication-competent HIV reservoir.

METHODS: Within the ISALA trial (NCT02590354), we selected 3 participants (ITM1011, UMC4012 and UZG3034) and compared V1-V3 env sequences derived from positive VOA wells to V1-V3 env sequences derived from plasma at viral rebound (VR). The participants rebounded respectively at W4, W6 and W2. We obtained approximately 30 sequences per patient at viral rebound and phylogenetically compared those to sequences from positive VOA wells, resp. 13, 11 and 3 wells, by single genome sequencing. Viral load levels at VR were respectively 4020, 3330 and 27 300 copies/ml. From participant UMC4012, we obtained additional sequences from early rebound at 32 copies/ml at W4.



[ML phylogenetic tree representing the sequences from both VOA and plasma viral rebound.]

RESULTS: In ITM1011, we found 3 dominant viral clones that overlapped between VOA and VR sequences, whereas UMC4012 showed a dominant clone in the VOA that could not be retrieved at viral rebound at two different timepoints (W4-W6). The third participant, UZG3034, had only limited

positive VOA wells and consequently, we could not identify clonality in the VOA wells. The obtained sequences were different compared to viral rebound, although one sequence showed close relationship to a cluster of plasma virus.

CONCLUSIONS: We confirm that viral rebound is random and that VOA can in specific cases predict viral rebound dynamics with respect to dominant sequences, although a potential sampling bias and other immunovirological parameters may explain the heterogeneity within these results.

WEPEA052

Kansui, an ingenol-containing herbal supplement, safely induced CD8, NK, and monocyte activation in three ART-suppressed SIVmac251-infected rhesus macaques

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BACKGROUND: HIV eradication strategies aim to combine agents that reverse viral latency with therapies that boost the host immune response. We performed a non-human primate study evaluating the safety and *in vivo* biological response to that used in traditional Chinese medicine, given for an increasing number of consecutive days: (1) 5 mg/kg x 1, (2) 20 mg/kg x 1, (3) 20 mg/kg x 2 days, and (4) 20 mg/kg x 3 days. Each dose was followed by a 2-week washout period, and blood was drawn at the end of each dosing period. Markers of T-cell, NK-cell, and monocyte activation were characterized by flow cytometry, and SIV total DNA and unspliced RNA from PBMCs were quantified by real-time PCR. Data were analyzed using multivariate mixed effects regression.

RESULTS: There were no adverse events observed at any given dose/frequency of kansui administered. There was a trend for increased activation levels in treated vs. control monkeys over time. Statistically significant kansui effects on CD8+ T (HLA-DR+CD38+; 8.5-fold increase, P=0.015), NK cell (CD3-CD8+; 6.0-fold, P=0.001), and monocyte (HLA-DR+CD14^{hi}CD16+CD80+; 27-fold, P=0.023) activation were observed at time point 4. Comparisons by treatment group were uninformative for SIV DNA and RNA, because 2 control animals had SIV RNA and DNA levels below the limit of detection, providing limited information on relative changes over time. Within treated animals, there was no statistically significant association between timepoint and SIV RNA or DNA.

CONCLUSIONS: Kansui was well tolerated in three ART-suppressed, SIVmac251-infected RM. Statistically significant increases in CD8+ T-cell, NK-cell, and monocyte activation markers were observed at the highest dose/frequency of kansui compared to controls. These are important preliminary data for a currently enrolling human clinical trial of *Euphorbia kansui* and support a potential role for ingenols in future HIV cure strategies.

WEPEA053

Large *in vivo* expansion and subsequent partial contraction of a T cell clone carrying a defective HIV genome reflect the dynamics of the HIV reservoir during ART

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BACKGROUND: Latently HIV-infected CD4⁺ T cells can survive and proliferate, thereby ensuring the long-term stability of the viral reservoir. Here we report the unique case of an HIV-infected individual on suppressive ART with a massive expansion and subsequent contraction of an HIV infected T-cell clone.

METHODS: A 57-year-old African American man was continuously virally suppressed for 9 years and underwent 2 leukaphereses 6 years apart. CD4⁺T cell subsets were isolated by flow cytometry. Reservoir measures included integrated HIV DNA (Alu-real time PCR) and QVOA for replication competent HIV. Near full-length viral sequences were obtained by FLIPS assay, integration sites by next-generation sequencing of the 3'-LTR-linker PCR products and TCR clonotypes by deep-sequencing.

RESULTS: An unusually high frequency of cells carrying integrated viral genomes (31,070 copies/10⁶ CD4⁺ T cells) was measured at the first-time point. 44% of effector memory (EM) cells harbored integrated HIV DNA, contributing to 97% of all integrated viral genomes in the blood of this participant. Sequencing showed that 83% of HIV genomes in EM cells were identical and lacked the 5'-LTR to Pol region.

The low frequencies of CD4⁺ T cells harboring replication competent proviruses (0.87 cells /10⁶ CD4⁺ T cells) confirmed that most proviruses were defective. Proviral clonality was consistent with the overrepresentation of an integration site in gene RPS6KA5 in chromosome 14.

The massive expansion of a defective provirus was confirmed by TCR sequencing; 60% of EM cells shared the same rearranged CDR3 Vβ2.1 TCR. Cell sorting of Vβ2.1⁺ EM cells confirmed that 96% of these cells carried integrated HIV genome.

After 6 years of ART, the frequencies of CD4⁺ T cells and EM cells harboring integrated HIV DNA decreased by almost 3-fold (from 3.1% to 1.2% in CD4⁺ T cells and from 44.6% to 16.3% in EM cells). Similarly, the Vβ2.1 clonotype contracted from 60% to 18% of the EM cells.

CONCLUSIONS: These results indicate that massive clonal expansion followed by a partial contraction of a single defective genome can occur *in vivo* suggesting that antigen-driven T cell dynamics influence the HIV reservoir during ART.

WEPEA054

Viral dynamics during suppressive ART - Towards HIV elimination from reservoirs

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BACKGROUND: The continuing global HIV-related health crisis requires new approaches for sustainable therapy and towards a cure. The recent strategies on latency reversal have garnered high interest but remained disappointing until here.

Our strategy takes a different approach by following the changing viral properties over the course of infection and during suppressive therapy. Recently, we demonstrated that envelope properties of HIV correlate with immunologic recovery and disease outcome. In particular, effective combination therapy appears to facilitate a superior control of CXCR4-tropic HIV [Bader, CID 2016]. Based on this unexpected activity, this study aims

at a detailed characterization of HIV inside the key T-cell populations during ART to identify critical lymphoid compartments responsible for the selective elimination of X4-tropic proviruses and cells.

METHODS: Peripheral blood from HIV-positive patients within the Swiss HIV cohort study was used applying MACS technology. Non-relevant CD8⁺(CTLs) and CD19⁺(B-cells) were depleted, and CD8-CD19- cells were selected for CD4 and Integrin B7 (gut homing) or CCR7 (lymph node homing). Proviral load (pVL) was determined by qPCR. For multi-dimensional data visualization a customized tSNE tool was applied.

RESULTS: Taking total HIV DNA per 10e6 cells as a proxy for reservoir size, MACSorted fractions achieved the expected significant proviral enrichment in CCR7⁺/B7⁺(CD8-CD19-) cell fractions, enabling a detailed analysis of CD4⁺ and CD4⁻ fractions. Our study focuses in the retention/re-establishment of crucial immune compartments.

Selective FACS sorts, using highly-specific marker antibodies, revealed that ≥90% of cells with gut homing also have properties compatible for Lymph node homing. First analyses applying tSNE identify homing properties in detail and a depth down to individual cells where we find a significant tissue contribution beyond the circulation, evidencing active compartments.

CONCLUSIONS: The chosen cell selection allows to address key markers of viral sanctuaries. Currently, we are expanding the marker panel to include HIV Envelope (surface) and intracellular Gag-expression as proxies for viral intactness, following patient samples (suppressed but high pVL) during cART therapy-episodes. Virus reactivation from sorted cell fractions will determine viral phylogeny and tropism and potential links to compartmentalization and viral dynamics. We believe, this approach can contribute to directed strategies for immunological virus elimination and HIV eradication.

Eliminating and silencing latency

WEPEA055

Latency reactivating agents: Impact on human macrophages physiology and susceptibility to HIV-1 infection

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BACKGROUND: Long term persistence of HIV-1 is thought to be the consequence of viral latency in some T CD4⁺ cell populations. It is postulated that viral reactivation combined with antiretroviral treatment would allow clearance of these latently infected cells by the immune system while limiting viral spreading. This so-called „shock and kill“ strategy relies on the use of latency reversing agents (LRAs). These non-discriminant agents were reported not to activate T cells *in vivo* but knowledge regarding their effect on other cell populations such as macrophages is scarce. Therefore we aim to monitor the impact of 3 different classes of LRA agents on macrophages physiology and their susceptibility to HIV-1 infection.

METHODS: Primary human monocyte-derived macrophages (MDMs) were exposed for 6 or 24h to optimal doses of LRAs either used alone or in dual combinations. Studied LRA were bryostatin-1 (protein kinase C agonist), JQ-1 (Bromodomain inhibitor) and romidepsin (histone deacetylase inhibitor). Secretion and gene expression of CCL2, CCL5, IL-8, IL-10, TNF, CCR5, and CD4 were evaluated by qRT-PCR, ELISA, reporter cell line or flow cytometry. Susceptibility to infection was assessed using a molecular clone of HIV-1 expressing the HSA reporter gene detected by flow cytometry, or via an ELISA of the viral capsid. Viability was determined by fluorescent dye incorporation using flow cytometry.

RESULTS: Treatment of MDMs with LRAs did not alter cell viability. Bryostatin-1 induced a potent secretion of pro-inflammatory molecules such as IL-8, CCL5, CCL2 and TNF. Treatment of MDMs with bryostatin-1 or romidepsin prior to infection was associated with a 90% and a 50% decrease in infection, respectively. This could be explained by the downregulation

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of CD4 and CCR5 expression induced by bryostatin-1 and romidepsin, respectively. Furthermore, treatment with bryostatin-1 after HIV-1 infection induced a strong decrease in HIV-1 production.

CONCLUSIONS: Our data suggests that a macrophage proinflammatory phenotype could be induced upon LRA treatment which might exacerbate the state of immune activation, inflammation and viral spreading. Hence this study provides evidence that the safety of the "shock and kill" approach needs to be further investigated in immune and non-immune cells.

WEPEA056

Discovery and mechanistic study of novel suppressors of post-integrated HIV expression from African natural products

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BACKGROUND: Despite effective antiretroviral therapies (ART) that prevent viral replication and progression to AIDS, HIV infection is incurable due to the presence of latent reservoirs harbouring transcriptionally-silent but replication-competent proviruses. Latent HIV is not targeted by ART or the immune system but can reactivate and begin replicating when treatment is suspended. One proposed strategy for drug-free remission, frequently termed "Block-and-Lock", involves the use of Pro-Latency Agents (PLAs) to durably suppress viral reactivation from latency, even in the presence of proviral stimuli. However, compounds that can definitively cause a "Block-and-Lock" phenotype are rare and early in development, indicating a likely need for the discovery of additional PLAs.

METHODS: We screened 181 compounds from the pan-African Natural Products Library (pANAPL) for inhibitors of HIV-1 replication using CEM-GXR_s, an HIV-1 LTR-driven GFP-reporter cell line. We used J-Lat cells latently infected with an HIV-NL43Δenv/ΔnefGFP provirus to test for PLA activity. Tat-dependant and independent reporter cell lines and other *in vitro* assays were used to explore PLA mechanisms. Finally, we examined PLA activity in primary CD4+ T cells from HIV+ donors.

RESULTS: We identified a series of structurally similar flavonoids that inhibit HIV replication and block latency reversal at low micromolar concentrations in both cell lines and primary cells. Effective flavonoids selectively antagonize Tat-dependent and/or independent pathways, suggesting multiple antiviral targets involved in post-integrated HIV expression. Inhibition of Tat function is a major feature of several identified flavonoids, but not all require Tat inhibition to block latency reversal. Slight variations in structure are responsible for different target affinities and thus a range in antiviral potency and even antiviral mechanism. Interestingly, we have also identified a subset of flavonoids that promote latency reversal by acting synergistically with known Latency Reversing Agents (LRAs).

CONCLUSIONS: We identified a series of flavonoids that potently inhibit HIV latency reversal. Their ability to block multiple pathways of post-integrated HIV expression underscores their potential as therapeutic agents. By analyzing the specific structural differences that convey each activity, we can potentially design more specific and potent PLAs.

WEPEA057

Development of Cytotoxic Enhancing Agents (CEAs) to improve shock-and-kill strategies

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BACKGROUND: Elimination of the latent reservoir is crucial towards efforts to eradicate HIV. Therapeutic interventions against latent HIV have been mainly focused on 'shock and kill' strategies. These strategies are based on the transcriptional activation of latent HIV with a Latency-Reversing Agent (LRA) with the consequent killing of the reactivated cell by either the cytopathic effect of HIV or an arm of the immune system. Several clinical trials targeting the latent reservoir with LRAs have resulted in limited to no clinical effect on the size of the latent reservoir. Some potential explanations to the failing of these strategies are: a reduced effector function of immune cells; reactivation of defective proviruses that do not produce necessary viral antigens; or a survival advantage of latently infected cells. To that end, strategies that can reactivate latent HIV and also enhance immune responses against HIV may overcome some of the disadvantages of current cure efforts.

METHODS: We have developed a primary cell model to identify cytotoxic enhancing agents (CEAs) that will enhance the killing capacity of CD8T cells. This method relies on a mix-lymphocyte reaction (MLR) in which polyclonally activated CD8T cells are co-cultured with allogeneic polyclonally activated CD4T cells from a different donor. CD4T cells are activated in conditions to generate central memory CD4T cells (T_{CM}) cells, as this cell subset is the major contributor to the latent reservoir and is more resistant to apoptosis than other subsets of CD4T cells. Cell death in both CD4 and CD8 subsets is measured by flow cytometry.

RESULTS: We have characterized two potential CEAs. The first one is the LRA HODHBT, a STAT SUMOylation inhibitor. HODHBT enhances the cytotoxic capacity of CD8T cells by increasing their cytolytic potential. The second one, ABT-199, is a Bcl-2 inhibitor that increases the sensitivity of CD4T cells to the killing machinery of CD8T cells.

CONCLUSIONS: We have developed a reliable primary cell paradigm to study and screen strategies that will enhance the cytotoxic capacity of CD8T cells. This new primary cell model will help in the development of effective 'shock and kill' strategies to reduce or eliminate the latent reservoir.

WEPEA058

Human endogenous retrovirus expression landscape in models of HIV-1 latency

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BACKGROUND: Antiretroviral therapy (ART) potently suppresses HIV-1, but viral eradication remains unachievable due to the persistence of reservoirs. Human endogenous retroviruses (HERVs) are ancient retroviral elements that integrated into genetic material hundreds of generations ago and comprise about 8% of the human genome. The most recently acquired HERVs have been found to be transcriptionally active during normal embryonic development, diseases and infections, likely serving as regulators of the transcriptome. During HIV-1 infection, HERV-K mRNA transcripts and viral proteins can be detected.

METHODS: Our group has recently published Telescope, a novel bioinformatic pipeline which allows the relative quantification and mapping of HERV elements with single locus resolution using RNA-seq data. Here, we use Telescope to investigate the retrotranscriptome of *in vitro* latently HIV-1 infected cells.

We analyzed the retrotranscriptome of latently infected CD4+ T cells that were generated using the Planelles-Bosque model. Total RNA-seq datasets representing the following 4 different conditions: Uninfected, Latently

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Infected, Uninfected and Activated and Latently Infected and Activated were analyzed. Datasets were publicly available through the Sequence Read Archive.

RESULTS: We found that HERV loci were differentially expressed in Activated vs. Resting cells. A total of 641 HERV loci were upregulated in activated cells and 550 loci were downregulated in activated cells. We also found that HERV-K11_8p23.1b was statistically differentially expressed ($p=0.015$) in Infected and Activated vs. Uninfected and Activated cells. Most important, when comparing Latently Infected vs. Uninfected Latent we found 7 statistically differentially expressed HERV loci. Furthermore, we also identified 3 HERV loci differentially expressed between Infected and Uninfected regardless of their activation status.

CONCLUSIONS: Our results reveal an important and unreported finding that suggests a role for HERVs during HIV-1 latency. The differential expression of HERV derived transcripts in HIV-1 latent infected cells may shed light into new strategies for the efficient eradication of latently infected cells. These novel insights could be explored to develop clinical therapeutic approaches to effectively eradicate HIV-1.

WEPEA059

CD8 depletion plus signaling of the non-canonical NF- κ B pathway reverses latency in SIV-infected, ART-suppressed rhesus macaques

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BACKGROUND: Latently-infected resting memory CD4⁺ T-cells represent the main barrier to HIV eradication. One strategy to reduce viral reservoirs aims to reverse HIV latency with subsequent immune clearance as a result of viral antigen expression or virus-induced cell death. Latency reversal agents (LRAs) tested to date have been only modestly effective. Targeting the non-canonical NF- κ B pathway (ncNF- κ B) with small molecule mimetics of the second mitochondrial activator of caspases (SMACm) is a promising LRA approach *in vitro*. Furthermore, as CD8⁺ T-cells are required for maintaining viral suppression on antiretroviral therapy (ART), experimental depletion of CD8⁺ T-cells may act synergistically with LRAs in reactivating virus production.

METHODS: We compared the *in vivo* LRA activity of the SMACm AZD5582 in ART-suppressed SIV-infected rhesus macaques (RMs) in the presence or absence of CD8⁺ T-cells. Eighteen SIVmac239-infected RMs on ART for 593-595 days were administered weekly i.v. doses of AZD5582 at 100 mg/kg. Six RMs also received 50 mg/kg of the CD8 α -depleting antibody MT-807R1 24h prior to AZD5582 treatment. On-ART plasma viral loads were monitored to assess for latency reversal.

RESULTS: SIV infection resulted in peak viremia of $2-27 \times 10^6$ SIV RNA copies/ml of plasma at day 7-21 after infection that was suppressed on ART within 2-20 weeks. Experimental CD8⁺ T-cell depletion was successful with >95% of peripheral CD8⁺ T-cells depleted by day 5 after antibody administration. On-ART viremia was observed in 6/6 (100%) RMs treated with AZD5582 after CD8⁺ T-cell depletion versus 5/12 (42%) RMs treated with AZD5582 only. Following AZD5582 treatment, episodes of viremia above 60 copies/ml were seen in 24.2% versus 20.8% of viral load measurements for the CD8-depleted+AZD5582 group vs. the AZD5582 only group, respectively. Treatment with AZD5582 alone resulted in increased SIV-RNA in resting CD4⁺ T-cells isolated from lymph nodes. Similar analyses are ongoing in CD8⁺ T-cell-depleted animals. No major adverse events were seen with AZD5582 treatment in the presence or absence of CD8⁺ T-cells.

CONCLUSIONS: These studies show that activation of ncNF- κ B signaling pathway via AZD5582 results in SIV-RNA expression in the blood and tissues of SIV-infected, ART-suppressed RMs and that the LRA activity of AZD5582 can be potentiated by CD8⁺ T-cell depletion.

WEPEA060

The SMAC mimetic AZD5582 reverses HIV latency as a single agent in resting primary CD4⁺ T cells

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BACKGROUND: The leading strategy towards eradication of human immunodeficiency virus (HIV) infection is the depletion of viral reservoirs through reversal of viral latency, followed by clearance of infected cells. To date, a latency reversing agent (LRA) that reactivates HIV expression without significant off-target effects has not been identified.

METHODS: We studied a novel class of LRA, SMAC mimetics, in cell line models of HIV latency as well as in primary patient-derived cells to measure the induction of HIV expression using a luciferase reporter or HIV RNA expression, respectively. We studied activation of the nc-NF- κ B pathway using western blot and RT-qPCR. Transcriptional response was studied using RNAseq.

RESULTS: We verified that SMACm activate the non-canonical NF- κ B pathway as exemplified by degradation of cellular inhibitor of apoptosis protein 1 (cIAP1) and conversion of the p100 form of NF- κ B2 into the active p52 transcription factor. We found that a representative SMACm, AZD5582, activates an HIV reporter with an EC50 of 8nM and leads to prolonged activity after even short pulsed exposure. AZD5582 also increases cell-associated HIV RNA expression and induces expression of replication competent HIV in resting CD4⁺ T cells from ART-suppressed, HIV-infected donors at concentrations relevant to *in vivo* administration. Importantly, AZD5582 alters the expression of only a restricted number of human genes.

CONCLUSIONS: We show here SMACm reverse HIV latency *in vitro* and *ex vivo* without the pleiotropic cellular effects seen with other LRA. These findings represent the first demonstration that SMACm used as a single agent have LRA activity in cells from treated, aviremic HIV-infected donors and support evaluation of this class of molecules in preclinical animal models.

WEPEA061

Regulation of Cas9 by viral proteins REV and TAT for *in vitro* inactivation of HIV-1 proviral DNA

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BACKGROUND: HIV-1 infection has stimulated the development of various strategies for infection control, such as the administration of antiretroviral drugs; however, treatment dependence and persistent infection problems have led to the design of new molecular strategies specifically targeting the editing of the viral genome through the use of nucleases. Currently CRISPR/Cas9 based system has become a simple and efficient tool used for editing the HIV-1 genome.

The regulation of Cas9 gene expression could be a powerful tool to induce mutations capable of inactivating the viral genome only in infected cells, making this gene therapy efficient, simple and safe, in order to avoid at the maximum induction of non-specific mutations which could jeopardize the integrity of healthy cells.

Here we present a design of a CRISPR/Cas9 coupled to HIV-1 LTR5', INS, RRE and LTR3', to regulate its expression by Tat and Rev proteins for *in vitro* inactivation.

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METHODS: 8E5 cell line was used to obtain HIV-1 LTR, INS and RRE sequences, were amplified separately by PCR and were used to regulate Cas9 expression and green fluorescent protein (GFP) in HEK293 cells in the presence and absence of HIV-1 Tat and Rev proteins. Guide RNAs (gRNAs) were designed to target mutations in conserved regions of the HIV-1 regulatory genes *tat* and *rev*. GFP expression was quantified by flow cytometry.

RESULTS: We demonstrated the regulation of Cas9 gene expression in the presence and absence of HIV-1 Tat and Rev proteins. Cas9 nuclease gene was inactivated by gRNAs targeted to HIV-1 *tat* and *rev* genes which promote Cas9 gene expression, leading to self-regulation of the gene editing, suggesting that this editing could be mediated by the virus.

CONCLUSIONS: The addition of the LTR-INS-RRE-LTR sequences can regulate Cas9 gene expression and make it dependent on Tat and Rev viral proteins, as well as gRNAs capable of regulating the expression of the proposed system.

Immunotherapy

WEPEA062

Vedolizumab-mediated integrin $\alpha 4\beta 7$ blockade does not control HIV-1_{SF162} rebound after cART interruption in humanized mice

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BACKGROUND: The combined cART and anti- $\alpha 4\beta 7$ RM-Act-1 antibody therapy allows macaques to durably control SIV rebound after withdrawal of the interventions. Here, we aimed to investigate whether vedolizumab (VDZ), a clinical-grade humanized anti- $\alpha 4\beta 7$ antibody, would have similar effects in controlling live HIV-1 infection in humanized mice.

METHODS: The integrin $\alpha 4\beta 7$ blockade by VDZ was evaluated on human primary memory CD4⁺ T cells and retinoic acid (RA)-induced gut-homing $\alpha 4\beta 7^+$ memory CD4⁺ T cells ($\alpha 4\beta 7^+$ _{MEM} T) *in vitro*. The antiretroviral activity of VDZ was determined using pseudotyped R5-tropic HIV-1_{SF162} which displays binding activity to $\alpha 4\beta 7$. The preventive and immunotherapeutic efficacies of VDZ were further investigated in humanized mice using the live HIV-1_{SF162} strain compared with RM-Act-1.

RESULTS: VDZ effectively and dose-dependently blocked the binding of MAdCAM-1, the native ligand of $\alpha 4\beta 7$, to $\alpha 4\beta 7^+$ _{MEM} T cells. HIV-1_{SF162} not only displayed binding capacity to $\alpha 4\beta 7$ -expressing cells, but also showed an increased infectivity in RA-induced $\alpha 4\beta 7^+$ _{MEM} T cells pre-treated with VDZ. Moreover, VDZ failed to prevent live HIV-1_{SF162} infection and did not reduce the peak viral load when administered prior to viral challenge in humanized mice. Lastly, in immunotherapeutic settings, the withdrawal of combined cART with either VDZ or RM-Act-1 resulted in an uncontrolled HIV-1_{SF162} rebound in humanized mice while the $\alpha 4\beta 7$ molecules remained significantly blocked on circulating CD4⁺ T cells.

CONCLUSIONS: VDZ neither prevents nor controls HIV-1_{SF162} infection both *in vitro* and in humanized mice. Our findings have significant implications to the clinical application of VDZ in HIV-1 preventive and immunotherapeutic interventions.

Gene therapy

WEPEA063

A glycosyl phosphatidylinositol-anchored anti-HIV antibody neutralizes HIV-1 replication in dendritic cell-T cell cocultures through both cis and trans mechanisms

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BACKGROUND: HIV-1 spreads through target cells via cell-free or cell-to-cell viral transmission, although the latter mechanism of infection has been reported to be 100- to 1,000-fold more efficient. Neutralizing antibodies and entry inhibitors effectively block cell-free HIV-1. However, with few exceptions, they display much less inhibitory activity against cell-mediated HIV-1 transmission.

Previously, we showed that genetically linking single-chain variable fragments (scFv) of antibodies to a glycosyl phosphatidylinositol (GPI) attachment signal directs GPI-anchored scFv into lipid rafts of plasma membranes.

Moreover, when a GPI-scFv based on the X5 anti-Env antibody (GPI-X5) is expressed in CD4⁺ cells, it potently blocks their infection by cell-free virions as well as virus transmitted by immature dendritic cell (iDC).

In this study, we further examined the inhibitory effect of GPI-X5 on infection in DC-target cell cocultures.

METHODS: Primary CD4⁺ T cells and CD4⁺ cell lines transduced with lentiviral vectors expressing GPI-X5 or control GPI-scFv were cocultured with monocyte-derived iDCs or mature DCs (mDCs) pulsed with HIV-1 (wild type or Env pseudotyped HIV-luc vector). Cocultures of cells were either in contact or separated by a transwell insert. Infection was monitored by ELISA or intracellular staining for p24 and flow cytometry (wild type virus), or by detecting a single-round of infection in cells by luciferase assay (Env-pseudotyped HIV-luc vector).

RESULTS: Surface expression of GPI-X5 in transduced CD4⁺ cell lines and human primary CD4⁺ T cells efficiently blocked infection of the GPI-X5-modified cells mediated by iDCs or mDCs with captured HIV-1. Unexpectedly, GPI-X5 modified CD4⁺ T cells also inhibited R5-tropic HIV infection of iDCs, significantly contributing to effective suppression of HIV-1 replication in iDC-CD4⁺ T cell cocultures. The inhibitory effect was dependent on contact between GPI-X5 transduced CD4⁺ T cells and iDCs, as transwell separation of the cells abolished neutralization of viral replication in iDCs.

CONCLUSIONS: GPI-X5 on the surface of transduced CD4⁺ cell lines or human primary CD4⁺ T cells not only potently blocks cell-to-cell mediated infection of modified CD4⁺ cells by DCs, but it also inhibits infection of iDCs *in trans* in a cell-contact dependent manner. Our findings suggest that GPI-scFvs may be effectively used in genetic intervention of HIV-1 infection.

WEPEA064

CRISPR/Cas9 targeting HIV-1 regulatory genes inactivates latent proviral DNA and prevents new infection in T cell culture with inhibition of viral escape

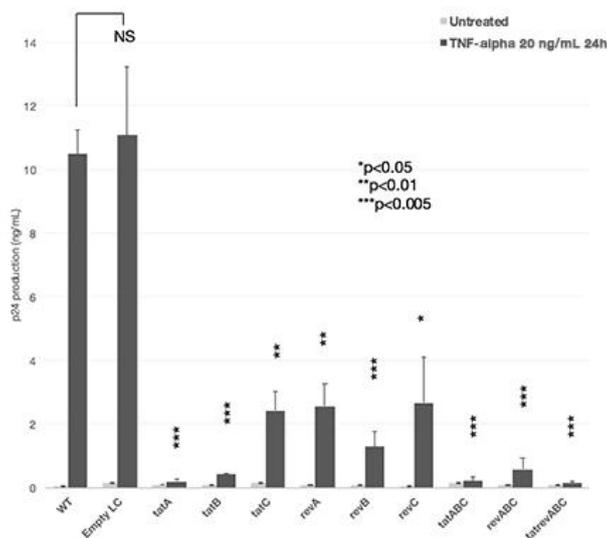
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BACKGROUND: HIV-1 is incurable due to permanent integration of proviral DNA. CRISPR/Cas9 is a powerful tool to cut DNA, and application to HIV-1 may lead to a novel cure method.

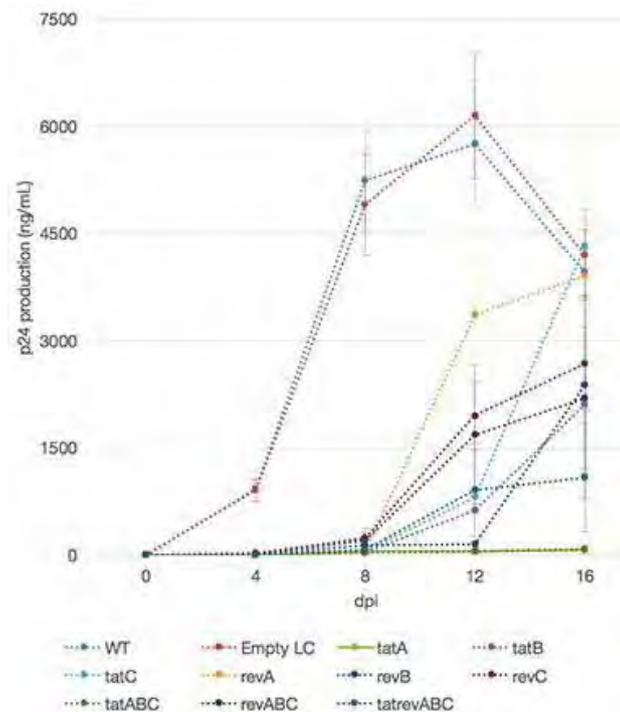
METHODS: We designed CRISPR/Cas9 targeting HIV-1 regulatory genes *tat* and *rev*. Six guide RNA (gRNA) sequences (*tat-A/B/C*, *revA/B/C*) was selected based on on-target specificity and sequence homology across six major HIV-1 subtypes. Cas9/gRNA was loaded onto lentiviral vector and transduced into T cells either in single gRNA or combination of three (*tat-ABC*, *rev-ABC*) or six (*tatrev-ABC*).

RESULTS: CRISPR/Cas9 abolished expression and function of Tat and Rev in cells stably expressing both proteins. Sequencing confirmed high frequency (>94% of clones) of mutations inside *tat* and *rev*, with concurrent mutations in multiplex gRNAs, while off-target screening showed no mutations and T cell viability is maintained. Transduction to persistently- and latently-infected T cells suppressed viral p24 production as high as 225-fold in persistent ($p=0.001$) and 53-fold in latent infection after TNF α reactivation ($p=0.003$). Next, CRISPR/Cas9 was transduced into uninfected T cells before challenged with HIV-1 NL4-3; p24 measurement in 4 days post-infection (dpi) showed reduction as high as 354-fold ($p=0.005$). Infected cells were cultured for 16 days. p24 level rebounded after 8 dpi in most samples, suggesting viral resistance; however, p24 suppressions were maintained in *tat-A* and *tat-ABC* transduction samples until 16 dpi, indicating inhibition of escape mutants.

CONCLUSIONS: CRISPR/Cas9 targeting HIV-1 regulatory genes inhibits viral replication, prevents new infection, and inhibits viral escape up to 16 days; warranting further study to approach clinical application.



[HIV-1 replication in CRISPR/Cas9-transduced latently infected T cells]



[HIV-1 replication kinetics in CRISPR/Cas9-transduced infected T cells]

WEPEA065

Allogeneic stem cell transplant in HIV-1 infected individuals; An update of the IciStem Consortium

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BACKGROUND: Allogeneic Stem Cell Transplantation (SCT) in HIV infected individuals has the potential to cure HIV as has been observed in the Berlin patient. Although this high-risk procedure is only indicated for certain hematological malignancies, the strategy raised tremendous scientific potential to gain profound insight in the mechanisms of HIV eradication.

METHODS: The IciStem consortium aims to guide clinicians of HIV-infected patients who require an SCT in donor search and CCR5 screening, ethical regulations, the SCT procedure, sampling procedures and in depth investigations to study HIV persistence. The patients are registered to the IciStem observational cohort. Viral tropism, the remaining HIV reservoir and cellular and humoral immunity are investigated thoroughly.

RESULTS: As part of IciStem efforts, 32,000 cord blood units and 2,200,000 bone marrow adult donors have been genotyped for CCR5 in multiple blood banks around Europe to increase CCR5 Δ 32 donor availability. 44 HIV-positive patients with diverse hematological malignancies have been registered to the IciStem cohort. 38 patients have been transplanted with CCR5 Δ 32 (n=9), heterozygous (n=3) or CCR5 WT donors. So far, 19 patients have successfully passed the 12 months follow-up after transplantation, and 13 patients have died after transplantation, despite achieving full donor chimerism in most cases. Preliminary analysis of virological and immunological data from blood and tissue samples shows a systematic reduction of HIV-1 reservoirs and a diminishing humoral immunity with (partial) seroreversion. Out of the 4 patients with a CCR5 Δ 32 homozygous donor that are still on follow up, two patients have interrupted antiviral therapy and did not rebound during the observation time. Five CCR5WT participants with proven undetectable viral reservoirs are in the process of initiating a combination of an immune therapy (bNAb: 10-1074+3BNC117) with ATI.

CONCLUSIONS: IciStem is the largest registry studying in depth the HIV reservoir and the respective immune system after allo-HSCT. A potential eradication of the reservoir is currently evaluated by treatment interruption alone or in combination with bNAbs.

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WEPEA066

Rapamycin immune tolerization enables gene transfer following subcutaneous delivery of AAV6 but not CD4-retargeted AAV6 vectors in AAV-seropositive rhesus macaques

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BACKGROUND: Gene therapeutics targeting HIV require delivery vectors with CD4+ T cell tropism. Adeno-associated virus (AAV) vectors offer a safe platform with the potential to transduce circulating and tissue-resident CD4+ T cells throughout the body. Unfortunately, AAV is sequestered in non-target organs following systemic delivery, impeding gene delivery to target CD4+ T cells. Furthermore, pre-existing humoral and cellular immunity against AAV is detrimental to efficient gene delivery. A retargeted AAV vector with tropism for CD4 has the potential to transduce CD4+ T cells throughout the body, and possibly evade pre-existing immunity.

METHODS: AAV6 vectors with ablated native tropism were retargeted to CD4 using designed ankyrin repeat proteins (DARPs). An AAV6-DARPin-CD4 vector was compared with an AAV6 vector for the ability to transduce CD4+ T cells in vitro and in AAV6-seropositive rhesus macaques. Animals were immune suppressed with daily rapamycin dosing pre and post AAV administration. Animals received PBS (n=1, SC), AAV6 alone (n=1, 10¹⁵vg, IV), or an equal dose of AAV6 plus AAV6-DARPin-CD4 (n=3, 10¹⁵vg, SC). Vector biodistribution, gene transfer and treatment safety were monitored longitudinally in blood, day 7 tissue biopsies, and day 28 necropsy tissue.

RESULTS: AAV6 and AAV6-DARPin-CD4 efficiently transduced primary CD4+ T cells ex vivo. In rhesus macaques, AAV vectors were detected in many organs by qPCR. AAV levels were highest in liver, spleen, lymph nodes, and muscle. In PBMCs, up to 0.16% (AAV6-DARPin-CD4) and 3.2% (AAV6) of CD4+ T cells were transduced. AAV6-DARPin-CD4 gene transfer was not seen in any lymphoid or non-lymphoid tissue. Low-level gene transfer from AAV6 was seen in spleen, lymph nodes, and liver. Some liver damage, and immune cell infiltration was detected at day 28. Efficient gene transfer was seen in the trapezius muscle of animals receiving AAV6 subcutaneously.

CONCLUSIONS: Although well tolerated, AAV6 and retargeted AAV6 vectors transduce rhesus macaque CD4+ T cells inefficiently in vivo. Interestingly, rapamycin treatment allows efficient AAV6 transduction of trapezius muscle following local subcutaneous delivery, offering a possible strategy to deliver HIV neutralizing antibodies. Our study provides important safety and efficacy data that will aid study design for future anti-HIV gene therapies.

HIV-1 controllers (including post-treatment controllers) and long-term non-progressors

WEPEA067

HLA B27 and HLA B57 alleles in HIV-infected long term non progressor children

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BACKGROUND: HIV infected patients with HLA B27 and HLA B57 alleles have been found to have better HIV disease control and delayed progression of disease. However, limited data are available on prevalence of these HLA alleles in children who acquire the disease perinatally especially from the Indian subcontinent.

METHODS: This cross-sectional study was conducted in a tertiary care hospital in North-West India. HLA B27 and HLA B57 alleles were detected by PCR in 30 long term non progressor(LTNP) HIV infected children and

was compared with the prevalence of these alleles in 30 HIV positive children with normal-rapid progression of disease. LTNP were defined as ART-naive HIV-1 infected individual who were asymptomatic for >10 years with CD4+T cell count >500 cells/mm³ and free of opportunistic infections. While normal-rapid progressors were patients with CD4+T cell percentage <20% for the age in absence of ART in <5 years of age and CD4+T cell count <350 cells/mm³ in absence of ART in >5 years.

RESULTS: Mean age at enrollment in LTNP group was 14 years (±3.13) and for normal progressor group was 9.53 years (±2.69). Mean CD4+T cells count at diagnosis in LTNP group was 790 cells/ul (±319) and in normal-rapid progressor group was 445 cells/ul (±563). Both HLA B27 and HLA B57 alleles had equal frequency in the LTNP group, with 4 out of 30 (13.3%) being positive for either of the two HLA alleles. Three children in normal progressors (10%) were positive for HLA B57 and the same number for HLA B27 also. However, none of the patients in either group were positive for both the alleles.

CONCLUSIONS: We did not find any statistically significant increase in frequency of HLAB27 and HLA B57 alleles in LTNP or normal-rapid progressor group in the cohort of perinatally acquired HIV infected children from north-west India.

WEPEA068

High frequency of activated Treg and Th17 cells in HIV elite controllers

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BACKGROUND: HIV-Controllers (HCs) are individuals with spontaneous control of viral replication. However, there are discordant results about immune activation and frequency of different T-cell subsets, including Tregs and Th17 cells, in these individuals.

METHODS: We evaluated immune activation profiles in two groups of HCs: Elite controllers (EC; Viral load < 50 copies/ml; n=15) and Viremic controllers (VC; Viral load < 2000 copies/ml - n=13). cART-treated individuals (cART; >5 years of effective cART; n=18) and HIV-1-negative individuals (HIVneg; n=18) were evaluated as control groups. For all individuals, we analyzed the frequencies of: activated T cells (CD38⁺HLA-DR⁺); naive (TN; CD45RA⁺CD27⁺CD95⁻), stem-memory (TSCM; CD45RA⁺CD27⁺CD95⁺), central-memory (TCM; CD45RA⁺CD27⁺CD95⁺), effector-memory (TEM; CD45RA⁺CD27⁺CD95⁺) and effector (TEFF; CD45RA⁺CD27⁺CD95⁺) T-cell subsets; Th17 cells (IL-17⁺); and activated (CD45RA⁺Foxp3^{high}), resting (CD45RA⁺Foxp3^{low}), and non-suppressive (CD45RA⁺Foxp3^{low}) Treg cell subsets.

RESULTS: ECs demonstrated similar levels of CD4⁺ and CD8⁺ activated T-cells in comparison to HIVneg, while cART (p=0.0003) and VC (p<0.0001) displayed elevated T-cell activation. When we evaluated CD4⁺ T-cell subsets, no significant alterations were observed for ECs compared to the other groups. However, VCs had higher frequencies of TN (p=0.003) and TEFF (p=0.008) cells than HIVneg. For CD8⁺ T-cell subsets, we observed a lower frequency of TN in VCs (p=0.010), and a higher frequency of TSCM (p=0.041) and TCM (p=0.015) in ECs compared to HIVneg. EC and VC presented lower frequencies of total Treg compared to HIVneg (p=0.0018 and p=0.0001, respectively) and cART (p=0.032 and p=0.006, respectively). EC also presented a higher frequency of activated (p=0.037 vs cART; p=0.003 vs HIVneg) and a lower frequency of resting (p=0.008 vs cART; p=0.036 vs HIVneg) Treg cells. Furthermore, we observed a higher frequency of Th17 cells in EC compared to HIVneg (p=0.048) and cART (p=0.009). Higher Th17/Treg ratios were also observed for EC (p=0.007 vs cART; p=0.002 vs HIVneg) and VC (p=0.004 vs cART; p=0.001 vs HIVneg).

CONCLUSIONS: Our data showed that EC display low levels of activated T-cells and a high frequency of activated Treg cells, which can limit the chronic immune activation in these individuals. In addition, the high frequency of Th17 cells in ECs can be an indicative of preserved mucosal response.

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Highly exposed seronegative individuals (HESN)

WEPEA069

Breastfeeding and mother-to-child transmission of HIV: Contribution of breast milk miRNA

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BACKGROUND: Breast milk is made up of several components among which micro RNA. Breast milk can also contain viruses like HIV. Cumulated data from the early Infant Diagnosis showed that MTCT depends also on the feeding options: 4.9% with exclusive breastfeeding, 10.82% in mixed feeding and 3.22% in artificial feeding. WHO nevertheless recommends maternal exclusive and protected (with ARV) feeding until 6 months of age. ARV is very potent in reducing the risk of HIV transmission even under breastfeeding. Advantages of breastfeeding are undeniable. Besides antibodies, they may be other factors that help protect infant from infections. The rate of transmission among breastfeeding mother under Art is 5% and that without ARV this rate is 20%. This means that in most of the cases, even without ART, transmission does not occur (80% of cases). In this study we sought out factors that may explain the non transmission.

METHODS: Breast milk was collected from consenting mother. miRNA content was investigated among these mothers, classified as transmitters (13), non transmitters (56) and control (non infected women-15). The expression profile of seven miRNAs were explored in breast milk using real time quantitative PCR where the 16sRNA was used as reference gene. A student test was used to compare the groups and a p value ≤ 0.05 was considered significant

RESULTS: The following results were obtained: HsamiR 195-5p and miR191-5p were upregulated in non transmitters compared to transmitters ($p=0.009$ and 0.04 respectively). This implies that these two miRNAs protect babies from acquiring the HIV infection. MiR 195-5p was capable to distinguish the two groups with an area under the curve of 70.8%, std of 0.102 and a p value of 0.04. The predicted mechanism of these miRNAs is the targeting of DNA helicase DDX3 with as consequence inhibition of HIV-1 replication.

CONCLUSIONS: Breast milk composition could play a role in protecting infants from being infected with HIV. Studying the variation of these components could help understand HIV transmission in infant over long time of breastfeeding, and thus help a better formulation of recommendation about breastfeeding.

WEPEA070

Sterol metabolism modulates susceptibility to HIV-1 infection in HESNs

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BACKGROUND: The biosynthesis of sterols plays an important role in the modulation of innate immunity-mediated antiviral responses. This effect is achieved through the activation of the inflammasome and via the stimulation of the IFN α pathway. We verified whether natural resistance to HIV-1 infection in HIV-1-exposed seronegative (HESN) individuals is at least partially mediated by particularities in sterol biosynthesis.

METHODS: Fifteen sexually-exposed HESNs, their HIV+ partners and 15 healthy controls (HCs) were enrolled to analyze:

1) the percentage of IFN α -producing plasmacytoid Dendritic Cells (pDCs);

2) Lipoprotein Signaling and Cholesterol Metabolism RNA expression by Real Time PCR in peripheral blood mononuclear cells (PBMCs) and monocyte-derived macrophages (MDMs) in basal condition as well as 3-days post *in vitro* HIV-1-infection;

3) ASC-speck formation and NLRP3-complex assembly by 344 FlowSight in unstimulated and 24-hour HIV-exposed monocytes. Susceptibility to HIV-1 infection was assessed by p24 viral antigen quantification.

RESULTS: In HESN compared to HC we observed a significant increase in: 1) cholesterol-25-hydroxylase (CH25H) expression and a number of genes involved in cholesterol efflux (LXR, ABCA1, SCARB, HMGCS1, PPAR α) in unstimulated as well as in *in vitro* HIV-1-infected PBMCs and MDMs;

2) IFN α -producing pDCs in both unstimulated and *in vitro* HIV-infected PBMCs ($p < 0.001$ in both cases);

3) NLRP3 inflammasome activation in HIV-exposed monocytes;

4) inflammasome derived proinflammatory cytokines IL-1 β and IL-18 in HIV-exposed monocytes.

Notably, this resulted in a significantly reduced susceptibility to *in vitro* HIV-1-infection in PBMCs and MDMs of HESNs ($p < 0.01$).

CONCLUSIONS: Results herein show that in HESNs enhanced sterol metabolism might be particularly efficient. This could favor the assembly of the inflammasome and the activation of the IFN α pathway, resulting in a reduced susceptibility to *in vitro* HIV-1 infection. Further analyses are needed to ascertain the cholesterol-inflammasome axis involvement in natural resistance to HIV-1 infection. These results, nevertheless, suggest a possible basis for therapeutic interventions to control of HIV-1 infection.

Correlates of immune protection

WEPEA071

Endoplasmic reticulum associated aminopeptidases 2 (ERAP2) is released in the secretome of activated MDM and reduces *in vitro* HIV-1 infection

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BACKGROUND: Haplotype-specific alternative splicing of the endoplasmic reticulum (ER) aminopeptidase type 2 (ERAP2) gene results in either full-length (FL, haplotype A) or alternatively spliced (AS, haplotype B) mRNA. HapA/HapA homozygous (homoA) subjects show a reduced susceptibility to HIV-1 infection, probably secondary to the modulation of antigen processing/presenting machinery. As it was recently reported that ERAP1 can be secreted from plasma membrane in response to activation, we investigated if, also ERAP2 can be released and if the secreted form still retains its antiviral function.

METHODS: Human monocyte-derived macrophages (MDM) from 15 homoA healthy controls were stimulated with IFN γ and LPS for 24h. ERAP2-FL secretion was evaluated by mass spectrometry. PBMCs from 15 homoA and 15 homoB were *in vitro* HIV-1-infected with or without adding different doses of recombinant human protein ERAP2-FL (rhERAP2-FL) and p24 viral antigen quantification was used to assess viral replication. Seven-days post *in vitro* HIV-1-infection perforin and granzyme-producing CD8+ T Lymphocytes and HLA-ABC-expressing cells were analyzed as well; these two parameters were shown to correlate with endogenous ERAP2 activity.

RESULTS: Results showed that, beyond its physiological function in the ER, ERAP2 may be secreted from human MDMs in response to LPS and IFN γ stimulation. Addition of recombinant ERAP2 to *in vitro* HIV-infected cells did not affect cell viability. As previously shown homoA subjects were less susceptible to *in vitro* HIV-1 infection ($p < 0,01$). Notably the addition of rhERAP2-FL to cell cultures resulted in reduction of viral replication

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in both homoA and homoB individuals with a peak effect observed using 100 ng/ml of the protein ($p < 0.01$ in both cases). This protective effect was independent from an increase of HLA-ABC expression and/or of perforin and granzyme expression by CD8+ lymphocytes.

CONCLUSIONS: To our knowledge this is the first report providing evidence for the release of ERAP2 in the secretome of immunocompetent cells. Furthermore, data herein suggest that once added to cell culture ERAP2-FL preserves its protective function against HIV-1 infection, even in homoB subjects who do not genetically produce it. Presumably, this defensive feature is mediated through an unconventional mechanism, distinct from immune system modulation.

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Novel animal models to test interventions (vaccines, cure, antiretrovirals)

WEPEA100

Oral cART hu-PBMC mouse model to study HIV persistent infection

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BACKGROUND: Persistent HIV infection despite suppressive combination antiretroviral therapy (cART) is the major barrier to finding a cure for HIV. To study and find curative options, animal models that can model HIV persistence are needed. Humanized mice models are commonly used in HIV research and many mouse models exist that can mimic HIV persistence such as the hu-CD34 and hu-BLT model. However, these models have long development times and most require access and use of fetal tissue. The hu-PBMC model traditionally is used to study acute HIV infection, but had not previously been shown to support persistent HIV infection. Here, we describe the use of the hu-PBMC model in combination with oral cART to model HIV persistence.

METHODS: 4 to 6 week old, female and male, NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ (NSG) were transplanted with 10⁷ isolated human PBMCs by intraperitoneal injection. Once engraftment of mice was confirmed, mice were infected with HIV-1 (BaL, 20 ng p24) by intraperitoneal injection. HIV viremia was confirmed two weeks later by qRT-PCR (viral copies/ml). Oral cART therapy was administered for 5 weeks, then interrupted. HIV viremia and CD4+ T cells were monitored weekly.

RESULTS: Two weeks after initiation of oral cART, all the mice that received oral cART (n=7) had reduced HIV viral loads with 5/7 having undetectable viremia by qRT-PCR, while the control mice (n=2) had robust viral loads. This trend continued over the five weeks the oral cART mice received cART. After five weeks, the oral cART was interrupted and the viral loads began to rebound in the oral cART mice to similar levels as the control mice. Similar results were seen with CD4+ T cells levels with oral cART protecting CD4+ T cells.

CONCLUSIONS: Oral cART is able to suppress HIV viremia and protect CD4+ T cells in the hu-PBMC model with viral rebound occurring once oral cART is interrupted. This supports the conclusion that the hu-PBMC mouse model can support HIV persistence despite suppressive oral cART therapy. Thus the oral cART hu-PBMC model can be used to model HIV persistence and test potential curative strategies without the need to use the more complicated mouse models.

WEPEA101

Role of gut microbiota on vaccine response in HIV exposed Infants

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BACKGROUND: Maternal HIV infection has been shown to alter the composition and diversity of gut microbiota in their infants. HIV exposed uninfected (HEU) infants display multiple immune alterations when compared to HIV unexposed counterparts (HU); and are among the target groups for an HIV vaccine. We hypothesized that inheritance of an altered microbiota in HEU infants is associated with poor vaccine responses. Here, using a germ free mouse model, we investigate the causative relationship between stool microbiota in HEU infants and BCG vaccine response.

METHODS: BCG vaccine Th1 responses were assessed using a whole blood assay and an intracellular cytokine polychromatic flow cytometry panel. Stool samples from time of BCG vaccination were collected, and those from high or low BCG responder infants were then transferred by oral gavage to germ free pups at day 5 after delivery. Control pups were gavaged only with PBS. Five days after gavage, pups were sacrificed to analyze inherent immunity or vaccinated with 10⁶ CFUs of BCG. Vaccinated animals were sacrificed 28 days post vaccination at peak vaccine response. BCG specific T cells were quantified using TB10.4 (class I) tetramers by flow cytometry.

RESULTS: At d10 post-delivery, pups gavaged with high responder stool (Phr) had significantly lower body weight and total splenic cell counts compared to those gavaged with low responder stool (Plr). Furthermore, Phr pups had significantly higher proportions of effector memory CD4 T cells (CD4+CD44hiCD62Llo) relative to Plr. Total number of B cells and neutrophils were significantly reduced in Phr vs Plr. When vaccinated with BCG, Phr displayed significantly higher number of TB10.4-specific CD8 T cells compared to Plr.

CONCLUSIONS: Our data shows a direct role of the microbiota in inherent immunity in infants. Furthermore, the microbiota in low responder HEU infants caused reduced number of vaccine specific CD8 T cells. Overall, we show for the first time that intestinal microbiota in neonates impacts vaccine response.

Pregnancy (clinical management issues and pharmacokinetics)

WEPEB279

Highly diverse anaerobe-predominant vaginal microbiota among pregnant women with HIV in Zambia

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BACKGROUND: Pregnant women with HIV are at high risk of preterm birth (PTB). Preconceptional ART initiation is associated with higher risk of PTB than initiation during pregnancy in some studies. Vaginal microbiota dominated by anaerobic bacteria and some *Lactobacilli* (i.e., *L. iners*) also predict PTB. We characterized vaginal microbial communities in an ongoing cohort to investigate whether HIV and its treatment alter the microbiome in pregnancy.

METHODS: We analyzed vaginal swabs collected between 16-20 gestational weeks in the Zambian Preterm Birth Prevention Study (ZAPPS). We quantified relative abundance and diversity of bacterial taxa by whole-genome sequencing (WGS) of extracted bacterial DNA. Community state

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types (CST) were identified via hierarchical clustering. We defined exposure by HIV serostatus (HIV+ vs HIV-) and whether the participant had initiated ART before conception (ART+ vs ART-). Associations between exposures and microbiome characteristics were tested with linear and logistic regression and weighted to account for sampling.

RESULTS: We performed WGS on 261 vaginal swabs; 256 (98%) had evaluable sequence data. 99 (38%) were from HIV+ participants; 55 (56%) had started ART before conception. Major CSTs were dominated by: *Lactobacillus crispatus* (CST-1; n=34, 14%), *Lactobacillus iners* (CST-3; n=77, 31%), *Gardnerella vaginalis* (CST-4I; n=97, 39%), *G. vaginalis* & *Atopobium vaginae* (CST-4II; n=18, 7%), and other mixed anaerobes (CST-4III; n=25, 10%). *G. vaginalis* was present in 95% (n=243); mean relative abundance was higher in HIV+ (0.46±0.29) compared to HIV- participants (0.35±0.33; p=.02). Mean Shannon diversity indices were lower in HIV- participants (0.66±0.47) compared to HIV+/ART+ (0.78±0.47, p=.03) and HIV+/ART- (1.07±0.49, p<.001). Anaerobe-dominant CSTs were more prevalent in HIV+/ART+ (63%, AOR 2.94; p=.005) and HIV+/ART- (86%, AOR 7.02; p<.001) compared to HIV- (45%). Restricting the comparison to 111 women in either CST-3 (*L. iners* dominance) or CST-1 (*L. crispatus* dominance), the frequency of CST-3 was similar in HIV- (65%) and HIV+/ART- participants (66%, AOR 1.10; p=0.91), but substantially higher in HIV+/ART+ (89%, AOR 11.1; p=.04).

CONCLUSIONS: Pregnant women in Zambia, particularly those with HIV, had diverse anaerobe-dominant vaginal microbiota commonly associated with PTB. Our findings suggest a mechanism underlying HIV-related PTB and may provide insight into the incremental risk with preconceptual ART.

WEPEB280

Pregnancy outcomes among HIV-positive women on dolutegravir versus efavirenz-based antiretroviral therapy: Week 48 analysis of the ADVANCE trial

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BACKGROUND: Dolutegravir holds major advantages for antiretroviral therapy (ART), in resistance profile, tolerability and cost. However, safety concerns of its use in pregnancy pose significant ethical and equity issues, especially in low-and-middle income countries, where the majority of people living with HIV are women of child-bearing age.

METHODS: We describe pregnancy outcomes in the ongoing South African ADVANCE trial (NCT03122262), a 96-week, phase 3 clinical trial assessing the safety and efficacy of 1053 patients randomised to dolutegravir-tenofovir alafenamide fumarate-emtricitabine (DTG-TAF-FTC); dolutegravir-tenofovir-emtricitabine (DTG-TDF-FTC), or efavirenz-tenofovir-emtricitabine (EFV-TDF-FTC). All women were on ART before conception, had gestational age assessment and congenital anomaly screen during pregnancy and at birth. Women on dolutegravir were switched to alternative regimens if < 8 weeks gestation. Adverse events included spontaneous abortion, elective termination, preterm birth (< 37 weeks), small for gestational age (SGA; < 10th percentile of weight for gestational age), stillbirth or neonatal death (< 28 days from delivery), and birth defects. Infant HIV status was also assessed

RESULTS: Two thirds (43/65) of pregnancies occurred in women on a dolutegravir-based regimen. Of the 65 pregnancies, there were 28 (43.1%) live births, 8 (12.3%) spontaneous abortions, 16 (24.6%) elective terminations, and 11 (16.9%) pregnancies are ongoing. One neonatal death and 1 stillbirth occurred in the DTG-TAF-FTC and EFV-TDF-FTC treatment arms respectively. Median birth weights were similar across treatment arms. Overall 71% of infants were born prematurely and 17.2% of births were SGA. Two infants had minor birth defects (naevus flammeus and umbilical hernia) in the dolutegravir-containing arms. No HIV transmissions occurred.

CONCLUSIONS: Women who initiated dolutegravir-based ART before conception did not have higher rates of adverse pregnancy outcomes. These data add to limited evidence on the safety of dolutegravir in pregnancy. As there are other similar trials underway, it is important to pool data and to provide regular updates as data accrue.

	DTG-TAF-FTC (N=351)	DTG-TDF-FTC (N=351)	EFV-TDF-FTC (N=351)	Total (N=1,053)
Pregnancy outcomes				
Total pregnancies	21	22	22	65
Ongoing	2 (9.5)	2 (9.1)	7 (31.8)	11 (16.9)
Live Birth	7 (33.3)	13 (59.1)	8 (36.4)	28 (43.1)
Full term births (≥37 weeks)	6 (28.6)	13 (59.1)	7 (31.8)	26 (40.0)
Preterm births (<37 weeks)	1 (4.8)	-	1 (4.5)	2 (3.1)
Neonatal death	1 (4.8)	-	-	1 (1.5)
Stillbirth	-	-	1 (4.6)	1 (1.5)
Spontaneous abortion	5 (23.8)	-	3 (13.6)	8 (12.3)
Elective abortion	6 (28.6)	7 (31.8)	3 (13.6)	16 (24.6)
Infant outcomes				
Total live births	7	13	8	28
Birth weight, median IQR	3.3 (3.1-3.8)	3.1 (2.9-3.3)	3.0 (2.5-3.2)	3.1 (2.9-3.3)
Gestational age, median IQR	39.8 (38.8-40.7)	39.4 (38.6-40.0)	39.8 (37.1-40.0)	39.5 (38.5-40.5)
Small for gestational age, n (%)	1 (12.5)	2 (16.7)	2 (22.2)	5 (17.2)
Birth defect, n (%)	1 (12.5)	1 (12.5)	-	2 (6.9)

[Table 1. Pregnancy and infant outcomes of women who became pregnant in the ADVANCE trial]

WEPEB281

Impact of isoniazid and pregnancy on efavirenz pharmacokinetics in women living with HIV

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BACKGROUND: Efavirenz (EFV) is the backbone of first-line antiretroviral therapy (ART) for HIV-1 infection in most low- and middle-income countries (LMIC). Isoniazid (INH) is recommended as TB preventive therapy for all individuals (including pregnant women) living with HIV in TB-endemic LMIC. A secondary metabolic pathway for efavirenz, CYP2A6, is inhibited by INH, creating a potential drug-drug interaction. We report the interaction of EFV and INH during pregnancy and postpartum.

METHODS: Pregnant women 14-34 weeks gestation, infected with HIV, on/starting ART, were recruited from eight LMIC into a phase-IV randomized double-blind placebo-controlled trial (IMPACT P1078). The study had two arms: early (at enrollment) and deferred initiation (at 12 weeks postpartum) of INH 300mg daily for 28 weeks. Women underwent intensive PK sampling (before INH/Placebo dosing and 1, 2, 4, 6, 8, 12 h after), or sparse PK sampling (~2 h post dose) at ≥ 2 weeks after recruitment and again at 12-21 weeks after delivery. CYP2B6 genotypes that predict EFV exposure were determined. EFV PK was described by a two-compartment disposition model and elimination with a liver model.

RESULTS: EFV concentrations from 21 intensively PK-sampled and 767 sparsely PK-sampled women were included. Median weight, age, and gestational age at enrollment were 67kg (range 38-166), 29years (18-45), and 28 weeks (14-34), respectively. CYP2B6 slow, intermediate and normal metabolizers had oral clearances of 2.74, 9.90 and 14.1 L/h, respectively. After adjusting for CYP2B6 genotype and weight, pregnancy increased EFV clearance by 17% (p<0.001). INH decreased EFV clearance by 8% in normal metabolizers and 14% in slow and intermediate metabolizers (p<0.001) regardless of pregnancy status.

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CONCLUSIONS: Pregnancy increased plasma EFV clearance while INH decreased plasma EFV exposure, especially in intermediate and slow metabolizers. The clinical implications of these interactions warrant further investigation.

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Comparison of adverse birth outcomes among HIV-infected and HIV-uninfected women in the era of universal ART in Malawi: A registry study

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BACKGROUND: Lifelong antiretroviral therapy (ART) is provided to HIV-infected pregnant women under the Option B+ regimen in Malawi. Recent studies show that ART use is associated with adverse birth outcomes in HIV-infected women. We compared rates of low birth weight (LBW) and preterm birth (PTB) between HIV-infected women receiving lifelong ART and HIV-uninfected women giving birth in low- and high-risk settings.

METHODS: This registry study was conducted from January 2016 to August 2017 in one large, tertiary referral hospital and four primary health care (PHC) facilities in Blantyre, Malawi. Women who delivered singleton live births or stillbirths ≥ 20 weeks of gestation were included in the analysis. Data were extracted and double-entered from Ministry of Health maternity registries. Analyses were conducted using Chi-square tests and multivariable logistic models to control for maternal age, gravidity, infant sex and type of health facility.

RESULTS: 14,402 births were included in the analysis (7,797 from tertiary hospital; 6,605 from PHC facilities; HIV-infected mothers 1,688; HIV-uninfected mothers 12,714). There were no differences in LBW and PTB rates between HIV-infected and HIV-uninfected women delivering in PHC facilities ([LBW: 7% versus 6%; p-value 0.70], [PTB: 43% versus 43%; p-value 0.96]). However, at the tertiary hospital, rates of LBW and PTB were significantly higher among HIV-infected women compared to HIV-uninfected women ([LBW: 18% versus 13%; p-value < 0.001], [PTB: 29% versus 26%; p-value 0.03]). Rates of LBW and PTB were comparable among women initiating ART before pregnancy (reference) versus first or second trimester, and versus third trimester/labor (LBW: adjusted odds ratio [aOR] 0.77 [95% CI 0.38-1.55] and aOR 0.94 [95% CI 0.56-1.60], respectively; PTB: aOR 0.82 [95% CI 0.53-1.26] and aOR 1.01 [95% CI 0.73-1.42]).

CONCLUSIONS: Rates of adverse birth outcomes between HIV-infected, treated women and HIV-uninfected women differ by type of health facility. Rates are comparable in PHC facilities where low-risk women deliver, and significantly higher among HIV-infected in high-risk hospital settings. Differences are not associated with timing of ART initiation. Findings suggest that ART reduces the adverse effects of HIV infection in low-risk pregnancies. Monitoring adverse events can be useful as ART services expand and complex regimens are introduced.

WEPEB283

Vaginal progesterone to prevent preterm delivery among pregnant women with HIV in Zambia: A pilot feasibility study

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BACKGROUND: Vaginal progesterone (VP) reduces the risk of preterm birth (PTB) in women with mid-trimester cervical shortening, but whether it prevents PTB related to HIV infection is unknown. We conducted a feasibility study to investigate uptake, adherence, and retention in preparation for a future efficacy trial in Lusaka, Zambia.

METHODS: This was a pilot randomized, double-blind, placebo-controlled trial of 200mg daily self-administered VP suppository or placebo. Potential participants were screened with ultrasound to assess gestational age and cervical length. We excluded women with short cervix (< 2.0cm) or prior spontaneous PTB. Study drug was started between 20-24 weeks and continued to 37 weeks (or delivery, if sooner). The primary outcome was adherence (the proportion of women achieving $\geq 80\%$ study product use), assessed via dye stain assay (DSA) of returned vaginal applicators. Secondary outcomes with pre-defined feasibility targets were: uptake ($\geq 50\%$ eligible participants enrolled) and retention ($\geq 90\%$ ascertainment of delivery outcomes). We also evaluated preliminary efficacy by comparing the relative risk of spontaneous PTB between groups.

RESULTS: From July 2017 to June 2018, 208 HIV-infected pregnant women were eligible for screening and 140 (uptake=67%) were successfully screened and randomly allocated to either VP (n=70) or placebo (n=70). Median age of participants was 29 years (IQR:25-33); median estimated gestational age at screening was 20 weeks (IQR:17-22); and 95 (68%) had started ART prior to pregnancy. Most women (n=125; 89%) were multiparous. Mean adherence to study product assessed via DSA was 94% (SD \pm 9.4), with 91% (n=125/137) achieving overall adherence $\geq 80\%$. Delivery outcomes were ascertained from 134 (96%). Spontaneous PTB < 37 weeks occurred in 10 participants (15%) receiving placebo and 8 (12%) receiving progesterone (RR 0.82; 95%CI:0.34-1.97). Spontaneous PTB < 34 weeks occurred in 6 (9%) receiving placebo and 4 (6%) receiving progesterone (RR 0.67; 95%CI:0.20-2.67).

CONCLUSIONS: In contrast to findings from vaginal microbicide studies in HIV-uninfected, non-pregnant women, our trial participants were highly adherent to this daily self-administered vaginal intervention. The study's *a priori* criteria for uptake, adherence, and retention were met, indicating that a phase III efficacy trial would be feasible.

WEPEB284

Monitoring and supporting women living with HIV who choose to breastfeed their HIV-exposed infants in Botswana

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BACKGROUND: Within the current context of guidelines in high-income countries recommending formula feeding for women living with HIV (WLHIV), there is emerging interest in this setting on how best to support WLHIV who choose to breastfeed. We report an approach to monitoring and supporting WLHIV choosing to breastfeed in a research cohort in Botswana.

METHODS: Botswana guidelines promote exclusive breastfeeding among WLHIV on antiretroviral treatment (ART) and virally suppressed at delivery. Free infant formula is provided through the government for women choosing not to breastfeed. The Tshilo Dikotla study enrolls pregnant WLHIV with breastfeeding intentions. WLHIV must be on tenofovir/emcitrabine plus dolutegravir or efavirenz in pregnancy; infants are randomized to receive zidovudine or nevirapine prophylaxis for 4 weeks. Maternal viral load (VL) is obtained at enrollment, then repeated in pregnancy and at delivery if initially detectable (≥ 40 copies/mL). WLHIV are counseled on safe infant feeding practices and encouraged to select formula feeding if VL is detectable at delivery or postpartum. When breastfeeding is elected and ongoing, VL monitoring and ART adherence education occur at each study visit (1, 2, 4-6, 9-12, 18, 24 months postpartum). For breastfed infants, HIV DNA PCR testing is performed up to 6 weeks after breastfeeding cessation. This analysis includes singleton infants of WLHIV who completed breastfeeding. Prevalence rates of breastmilk-associated mother-to-child transmission of HIV (MTCT) were calculated with 95% confidence intervals (CI).

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RESULTS: Overall, 129 WLHIV/infant dyads (n=86 WLHIV on dolutegravir-based ART, n=62 infants randomized to zidovudine prophylaxis) completed breastfeeding. Median [interquartile range (IQR)] age, gravidity, and duration of breastfeeding was 30 years (IQR:26-35), 3 (IQR:2-4) and 4.03 months (IQR:1.72-6.03) respectively. Thirteen women had a detectable VL (median detectable VL: 611 copies/mL, range: 56-32,183 copies/mL) at any point during breastfeeding; of these, 8 switched to formula feeding. The prevalence rate of MTCT during breastfeeding was 0.00% [95% CI: 0.00, 0.03].

CONCLUSIONS: In this small research cohort, no breastmilk-associated MTCT occurred. Though further studies are warranted in larger populations, the approach of frequent VL and adherence monitoring coupled with counseling on feeding choices may inform the dialogue in high-income countries surrounding how best to support WLHIV who choose to breast-feed.

WEPEB285

Failure to account for delivery phenotype minimizes the apparent effect of HIV on preterm birth

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BACKGROUND: Preterm birth (PTB) is a complex syndrome where early delivery is the final common outcome of several distinct disease processes. HIV and its treatment are associated with PTB in many studies, but few differentiate between spontaneous PTB phenotypes and those that are initiated by a provider (e.g. for preeclampsia).

METHODS: The Zambia Preterm Birth Prevention Study is ongoing at the University Teaching Hospital in Lusaka. Participants receive early ultrasound dating, lab testing, midtrimester cervical length measurement, and phenotyping of each adverse birth outcome. We defined PTB as delivery between 16-37 gestational weeks and differentiated spontaneous phenotypes (sPTB, spontaneous labor or membrane rupture prior to labor) from provider-initiated phenotypes (induction of labor or pre-labor cesarean).

RESULTS: From August 2015-September 2017, we enrolled 1,450 pregnant women, of whom 1,209 (83%) were retained at delivery, and 301 (25%) were HIV+. Prior PTB was reported by 356 of 737 (48%) multiparous participants; 32 (3%) of 1,083 screened had short cervix (< 2.5cm) and 31 (3%) had twins. Of 179 (15%) documented PTBs, 118 (66%) were spontaneous and 56 (31%) were provider-initiated; 5 (3%) could not be definitively classified. Among classified preterm deliveries, 42/52 (81%) of HIV+ participants delivered spontaneously compared to 76/122 (62%) HIV- participants ($\chi^2 p=0.02$). The most common indication for provider-initiated delivery was preeclampsia, which occurred in 6% (3/52) of HIV+ participants and 21% (27/127) HIV- participants delivering preterm ($\chi^2 p=0.01$). In Poisson regression analysis adjusting for maternal age, BMI, and gestational age at enrollment, HIV+ serostatus was not significantly associated with overall PTB (ARR 1.69; 95%CI 0.31-9.04) but was associated with sPTB (ARR 1.74; 95%CI 1.19-2.55). In sensitivity analysis limited to women without other known risk factors for PTB (prior PTB, short cervix, twins), the association between HIV and sPTB was magnified (ARR 2.22; 95% CI 1.18-4.16).

CONCLUSIONS: The association between HIV and preterm birth is amplified by excluding provider-initiated phenotypes and appears highest among parturients without other established PTB risk factors. Given the known inflammatory nature of most sPTB, this may provide clues to an underlying mechanism.

Contraception

WEPEB286

Medroxyprogesterone acetate (MPA) exposure and risk of female-to-male HIV transmission among serodiscordant couples in East and southern Africa

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BACKGROUND: Few epidemiological studies have examined the relationship between use of depot medroxyprogesterone acetate (DMPA), the most popular contraceptive method in sub-Saharan Africa, and female-to-male HIV transmission. Existing evidence is inconclusive and limited by reliance on self-reported DMPA use. We evaluated the association between serum MPA concentrations, an objective measure of DMPA exposure, and female-to-male HIV transmission.

METHODS: We conducted a case-control study among HIV serodiscordant couples enrolled in three prospective HIV prevention trials in East and southern Africa. All male seroconverters with an HIV infection linked to their female study partner were considered cases. Non-seroconverter controls were frequency matched to cases 4:1 on baseline HIV risk score and parent trial arm. Serum samples collected from female partners at cases' visits of first HIV detection and the visit immediately prior, and time-in-study matched control samples, were analyzed for MPA concentrations using a validated liquid chromatography-tandem mass spectroscopy assay. We used a three-category MPA exposure variable: undetectable (< 0.02 ng/mL), below-effective contraceptive levels (0.02-0.19 ng/mL) and effective contraceptive levels (≥ 0.20 ng/mL). We used logistic regression, accounting for matching variables, male age and report of condomless sex, to assess associations between serum MPA levels and HIV transmission.

RESULTS: MPA was detected in 22% of 129 case samples and 25% of 462 control samples. We found no association between below-effective (aOR=0.68, 95% CI:0.36-1.31) and effective MPA levels (aOR=1.25, 95% CI:0.57-2.77) and HIV transmission relative to undetectable levels. To ensure sample collection preceded infection, we restricted models to include only case samples collected at the visit prior to first HIV detection (median 93 days prior), which similarly showed no relationship between below-effective (aOR=0.78, 95% CI:0.30-2.03) or effective MPA levels (aOR=1.43, 95% CI:0.40-5.14) and HIV transmission. Including only cases where time between sample collection and estimated date of HIV infection was 30 or 45 days also resulted in non-significant associations.

CONCLUSIONS: We found no association between serum MPA concentrations and female-to-male HIV transmission, which is consistent with two of three other epidemiological studies that use self-reported contraceptive use data. To address issues with misclassification, future studies may consider the quantity of MPA present at the time of HIV exposure.

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WEPEB287

Examining contraceptive use in an urban Ugandan HIV clinic after the dolutegravir safety alertA. Onzia Aketoko¹, E. Laker¹, G. Anguzu¹, A. Mugume¹, G. Kisa¹, S. Namanda¹, L. Mbabazi¹, N. Owarwo¹, I. Lwanga¹, M. Lamorde¹, S.I. Walimbwa²¹Infectious Diseases Institute, Prevention, Care and Therapy, Kampala, Uganda, ²Infectious Disease Institute (IDI) Makerere University College of Health Sciences, Research, Kampala, Uganda

BACKGROUND: Current antiretroviral treatment guidelines recommend dolutegravir (DTG) for first line treatment in adults. Effective contraception is required while using DTG due to a potential risk for neural tube defects. We assessed contraception uptake following the dolutegravir safety alert released in May 2018 in women of child bearing potential attending an urban tertiary HIV clinic in Uganda.

METHODS: We conducted a retrospective review of patient records at the Infectious Diseases Institute. Uptake of modern contraception methods by women of child bearing potential receiving antiretroviral therapy six months prior to and six months after the DTG safety alert in May 2018 was studied. Using STATA Version 14 software, the McNemar test of matched proportions was used to test for the changes in contraception uptake six months prior and six months after the DTG safety alert.

RESULTS: Of the 5656 women in clinic, 5055 were of child bearing age. 22% were receiving DTG based regimens and 78% were receiving non-DTG based regimens. Six months after the DTG safety alert, there was increase in the use of intrauterine copper devices (p value = < 0.01) and implants (p value = 0.07), while significant reductions are seen in the use of condoms (p value = 0.01), Depo Provera(R) (p value = < 0.01) and oral contraceptives (p value = < 0.01) among women of child bearing age. Stratifying the women by age, there was a significantly higher uptake of any contraceptive in the 16-24 group (p = 0.03) as compared to 25-54 (p = 0.06).

CONCLUSIONS: Uptake of long acting contraception methods increased following the DTG safety alert. This was likely influenced by clinic recommendations following safety alert. Qualitative studies are needed to further understand the choices of women concerning contraceptive use in the setting of DTG use.

Menopause

WEPEB288

Symptom burden and inflammatory cytokines in persons living with HIV in the US: An analysis by sex and menopause stageR. Schnall¹, H. Jia², N. Reame²¹Columbia University, School of Nursing, New York, United States,²Columbia University, New York, United States

BACKGROUND: Among persons living with HIV (PLWH), higher rates of symptoms have been identified with aging making the origin of symptoms in midlife women with HIV especially unclear. Although there is a growing body of knowledge characterizing the menopause experience in those with HIV, limited attention has been paid to the converse, namely the impact of reproductive aging on the overall health of those with HIV.

METHODS: 100 PLWH (25 men and 75 women recruited by menopause stage: pre, peri and post) completed a blood draw for hormones and cytokines and study questions on demographics, height and weight, reproductive health status, HIV symptoms, PROMIS-29 measures, and most recent viral load; study visits were synchronized to the early follicular phase (day 1-6) in women with regular cycles.

RESULTS: In both sexes, the most burdensome HIV symptoms were muscle aches/joint pain, difficulty falling asleep, fatigue, and hand/foot pain (neuropathy). Three of the five symptoms where burden scores differed by menopause stage related to pain (muscle aches/joint pain, stomach pain, headache) with highest scores in the pre-menopause group; the postmenopausal group also demonstrated a similar burden for muscle

aches/joint pain while scores for men and peri-menopause women were lowest and similar. Pain intensity scores on the PROMIS-29 also varied significantly by groups in a similar fashion (p = .03). For the total sample, no sex differences were observed in CRP, TNF α , IL-6 or IL-8. In contrast, when the female group was subdivided by menopause stage and compared to males, significant group differences were observed for TNF α and IL-8. After controlling for sex/menopause status and body-mass index, significant differences were noted in CRP, IL-6 and IL-8 for PLWH who reported muscle aches/ joint pain.

CONCLUSIONS: Evidence suggests enhanced burden for HIV-related pain symptoms in women in the early follicular phase, possibly owing to menstruation, and support the need for more targeted investigations in younger cycling women with HIV at multiple phases across the menstrual cycle. Further there is evidence to support that in PLWH, systemic inflammation is heightened even when viral load is undetectable making them at greater risk for comorbidities such as cardiovascular disease.

Other sex- or gender-specific issues

WEPEB289

Assessing gaps in comprehensive HIV and women's health care across a typology of care for women living with HIV in CanadaN. O'Brien^{1,2}, C. Godard-Sebillotte³, L. Skerritt³, J. Dayle², A. Carter⁴, S. Law^{5,6}, J. Cox², N. Andersson³, A. Kaida⁷, M. Loutfy^{8,9}, A. de Pokomandy^{1,2}, The CHIWOS Research Team¹McGill University, Family Medicine, Montreal, Canada, ²McGill University Health Centre, Montreal, Canada, ³McGill University, Montreal, Canada, ⁴The Kirby Institute, University of New South Wales, Sydney, Australia, ⁵Institut for Better Health -Trillium Health Partners, Mississauga, Canada, ⁶Institute for Health Policy, Management, & Evaluation, University of Toronto, Toronto, Canada, ⁷Simon Fraser University, Burnaby, Canada, ⁸Women's College Research Institute, Women's College Hospital, Toronto, Canada, ⁹University of Toronto, Department of Medicine, Toronto, Canada

BACKGROUND: Despite universal healthcare, women living with HIV in Canada experience barriers to comprehensive care. Strengthening clinical management beyond antiretroviral treatment requires an understanding of care gaps and care delivery. This study sought to

- 1) identify gaps in comprehensive HIV and women's care; and
- 2) assess whether care gaps vary across a typology of care.

METHODS: Data was drawn from baseline questionnaires (2013-2015) of the Canadian HIV Women's Sexual and Reproductive Health Cohort Study (n = 1422). Cis and trans women with HIV aged ≥ 16 years, and residing in British Columbia, Ontario or Quebec were eligible. Women currently accessing HIV-care (n = 1242) were asked about components of women's care (pap test, pap test discussions, mammography, and reproductive discussions) and HIV-care (antiretroviral use, adherence, viral load, and viral load discussions). We defined comprehensive care as pap test, mammography, reproductive discussion, and HIV viral load. A typology of care was categorized by care provider and care site. Analysis included descriptive statistics and multivariate logistics regressions.

RESULTS: Women identified as Indigenous (20.9%), African/Caribbean/Black (29.0%), and White (42.6%) and resided in British Columbia (28.1%), Ontario (46.5%), and Quebec (25.4%). Overall, 62.3% women experienced at least one gap in comprehensive care, the most common being reproductive discussions 65.3% (440/674), followed by mammography 38.7% (138/357), pap test 29.3% (308/1053), and detectable viral loads 19.0% (236/1242). Across the typology of care women accessed care from HIV-clinicians in HIV-clinics (70.9%), specialists in non-HIV clinics (17.6%), and family doctors in non-HIV clinics (11.4%). Women accessing care from family doctors in non-HIV clinics had nearly double the odds of not being currently on ART: AOR 1.94 (1.12-3.38). Women accessing care from specialist in non-HIV clinics had 1.6 times higher odds of not having discussed the importance of regular Pap Tests: AOR 1.58 (1.09-2.31), while having lower odds of having a detectable viral load: AOR: 0.63 (0.41-0.95). There were no observed differences in comprehensive care gaps across the typology of care.

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CONCLUSIONS: The majority of women in our study continue to experience gaps in care, irrespective of care type, indicating the need for models of care that address both HIV and women's health in a chronic disease era.

WEPEB290

Validation of self-reported combination antiretroviral therapy (cART) regimens in a multi-site Canadian cohort of women living with HIV

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BACKGROUND: Most observational studies reporting specific combination antiretroviral (cART) regimens among people living with HIV use self-reported data. We sought to assess the validity of self-reported cART regimens, CD4 counts and HIV viral loads among women living with HIV in British Columbia (BC) and Quebec (QC), Canada.

METHODS: Questionnaire data from Wave 1 (2013-2015) of the Canadian HIV Women's Sexual and Reproductive Health Cohort Study (CHIWOS) was linked with clinical databases from the BC Centre for Excellence in HIV/AIDS and the Réseau d'Information Scientifiques du Québec. Self-reported cART was assessed by asking: "Which antiretrovirals are you currently taking?" We measured sensitivity, specificity, and positive and negative predictive values (PPV, NPV) of self-reported values for each antiretroviral agent, and the accuracy of self-reported cART, most recent CD4 counts (< 200, 200-500, or >500 cells/mm³) and viral loads (< 50, >50 copies/mL) according to clinical databases.

RESULTS: Of 1422 CHIWOS participants, we excluded women from Ontario (n=490), not currently on cART (n=247), who did not know their cART regimen (n=71), and who could not be linked to clinical databases (BC n=2/356; QC n=163/353), leaving n=449 for analyses. Twenty percent reported taking a single-tablet regimen, 41% two-pill, 22% three-pill, and 17% ≥four-pill regimens; 91% of cART regimens had three active agents. Overall, 78.8% (95%CI: 74.8-82.5) self-reported their complete cART regimen accurately. Accuracy decreased with a higher number of active agents (88.7% [95%CI: 85.3-91.6] for 2-3 agents and 68.3% [95%CI: 51.9-81.9] for 4 or more agents) and pill burden (94.5% [95%CI: 87.6-98.2] for single tablet; 89.8% [95%CI: 85.7-93.1] for 2-3 pills/day; 73.0% [95%CI: 61.4-82.7] for 4 or more pills/day). The accuracy of self-reported CD4 counts and viral loads were 80.8% [95%CI: 76.6-84.5] and 92.4% [95%CI: 89.5-94.7], respectively. The overall sensitivity, specificity, PPV and NPV per cART agent were 91.3% [95%CI: 89.9-92.6], 98.1% [95%CI: 97.7-98.4], 92.4% [95%CI: 91.0-93.6] and 97.8% [95%CI: 97.4-98.1], respectively.

CONCLUSIONS: Self-reported antiretroviral agents strongly predicted accurate cART regimens among Canadian women living with HIV. Accuracy of self-reported CD4 counts and viral loads was also very good. Self-reported cART, CD4 counts and viral loads are valid measurement methods in research when clinical or laboratory data are unavailable.

Diagnosis of HIV disease in paediatric and adolescent populations

WEPEB291

HIV positivity trends among HIV-exposed children tested on point-of-care early infant diagnosis in Mozambique

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BACKGROUND: Mozambique has been successfully scaling up the Prevention of Mother to Child Transmission (PMTCT) program, with ART coverage for pregnant women improving from 20% in 2010 to roughly 85% in 2017 and the proportion of HIV exposed infants (HEI) who are tested for HIV increasing from 31% to 50% in the same period. Vertical transmission of HIV to infants can occur during pregnancy, delivery or throughout breastfeeding. Mozambique's national algorithm for early infant diagnosis (EID) recommends a nucleic acid test (NAT) at 4-6 weeks and then RDT at 9 months and 18 months, to be confirmed using NAT. To increase access to accurate infant HIV diagnosis, Mozambique has implemented point-of-care (POC) EID testing using the Abbott m-Pima analyzer at public health facilities.

METHODS: POC EID data for the period January 2017 to October 2018 from m-Pima devices deployed at 129 public health facilities in Mozambique was analyzed from the online Alere Datapoint database. Babies' data was categorized according to age (months) at testing from 1 - 18 months. Positivity was calculated as the number of infants who tested HIV positive among the total number of infants tested according to age. Data was also analyzed in the specific routine testing periods (1, 9 & 18 months) and positivity of infants tested outside these recommended milestones (termed random testing) was also calculated.

RESULTS: Cross-sectional data for 35,000 HIV exposed babies' was reviewed. A rise in positivity from 4% at 1 month to 27% at 8 months of age was observed. Positivity rates further increased from 24% at 9 months to 69% by 18 months, reflecting initial diagnosis using RDTs followed by POC EID for confirmatory testing. Positivity rates significantly differed (p < 0.001) between scheduled (4%) and random testing (19.2%). The total number of infants tested using POC EID decreased with age.

CONCLUSIONS: POC EID testing has been successfully implemented in Mozambique to enable reliable access to HIV diagnosis in infants. The positivity rate was inversely related to age, reflecting changes in transmission as well as different testing algorithms. Healthcare workers seem to follow the national testing algorithm, reserving NAT as the confirmatory diagnosis from 9 months.

WEPEB292

Analysis to change public health strategy in the diagnosis investigation of children exposed to HIV in Brazil

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BACKGROUND: Guidelines have been recommending risk stratification of children's to achieve early diagnosis in those with a higher risk of transmission. The aim of this study is to quantify HIV-exposed children who would benefit from initiating the diagnostic investigation at birth, if they were classified as high and at low risk of exposure.

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METHODS: Children born in 2018, were identified from data system of VL from Health Ministry - Brazil, with this information defined the children with HIV-presumed infection (HIV-Pi): at least one VL>500copies/mL. From these data were found information on the mother of these children in a VL data system and distribution of antiretroviral therapy (ART). The study period was from January to December, 2018.

Children were classified according to the risk of exposure, child at high risk of exposure (HRE): mother with no information about the VL or ART or VL>1000copies/mL; low risk of exposure (LRE): mothers with undetectable VL or 50< VL< 1000copies/mL and regular use of ART.

RESULTS: Of the 3857 children identified with HIV exposure, 89,4% (n=3448) were classified as HRE and 10,6% (n=409) as LRE. 1,47% (n=57) were considered HIV-Pi, of which, 1,11% (n=43) were HRE. Among HIV-Pi children and HRE, diagnostic investigation started before 6th week of life for 12 children, 6-12th weeks: 15, between 12-24th weeks: 12, after 24th week: 4. HIV-Pi children and LRE, investigation started before 6th week for 3 children, 6-12th weeks: 7, 12-24th week: 4. Among all children, it started after 12th week to 21,3% (n=823). If risk stratification was recommended in 2018, and VL at birth, 72% (n=31/43) of HRE children and HIV-Pi children would be investigated earlier.

CONCLUSIONS: The diagnosis for exposure children to HIV required attention e agility, because when infected need ART early.

The data show that there are children with delay to start the investigation, and there would be a reduction in the time of diagnosis when the exposure risk stratification was used, and consequently, at the beginning of ART and a decrease in morbidity and mortality of these children

WEPEB293

Innovations in index case contact testing to improve the identification of HIV-infected children and adolescents

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BACKGROUND: Index case contact testing is an effective strategy for identifying HIV-positive children and adolescents missed by PMTCT and early child health services. HIV-diagnosed adults have traditionally been index clients. However, millions of HIV-positive adults have died, potentially without disclosing their HIV status to family members or having their children tested. Also, many adolescents independently present for HIV testing and initiate ART at a facility other than where their parents receive ART.

METHODS: We adapted index testing approaches to use deceased individuals with known or suspected HIV infection as index clients at 22 sites, and adolescents as index clients at 14 sites in Kenya. Records of deceased index clients were reviewed to determine the eligibility of their children for HIV testing. Ministry of Health patient cards were used to obtain family contact information, and providers contacted them with the discrete offer of HIV home-based testing, without disclosing the HIV status of the deceased family member. Providers were trained to collect information on adolescents' siblings, document eligibility for HIV testing, and contact caregivers for consent for siblings below 15 years of age. Known HIV-positive adolescents and their siblings were encouraged to attend clinic days for health talks and HIV testing, or provided with testing at home.

RESULTS: Using deceased individuals as the index client among 1,021 tested resulted in positivity of 3.2% (4 positive) among children aged 18 months-4 years, 3.7% (9 positive) among children 5-9 years, and 4.1% (11 positive) among adolescents 10-14 years. Among 1,390 children tested using adolescents as index clients, positivity was 0% among those aged 18 months-4 years, 3.4% (16 positive) among 5-9 year olds, and 3.7% (16 positive) among 10-14 year olds. Comparatively, index case contact testing using a living, HIV-positive adult resulted in a positivity of 1.4% among 27,732 children tested aged 0-14 years.

CONCLUSIONS: These approaches were particularly effective at diagnosing children aged 5-14 years, the group often missed once they age out of facility-based PMTCT and early childhood health services. Expanding the use of deceased individuals and adolescents as index clients should be considered for scale, alongside the continued expansion of traditional index testing approaches.

ARV management strategies in paediatric and adolescent populations

WEPEB294

Virological suppression in children after switch to a Raltegravir-containing regime in Brazil: A real life study

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A. Roberta Pati Pascom, I. Ornelas Pereira, A. Sposito Tresse,

F. Fernandes Fonseca, G. Mosimann Junior, T. Cherem Morelli,

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BACKGROUND: Brazilian Ministry of Health has recommended Raltegravir (RAL) as preferred ART regimen for children aged 2 to 12 years old since 2017. This study aimed to assess virologic suppression (VS) in children in antiretroviral therapy (ART), after switched to Raltegravir-containing regimen (RAL-C) in Brazil.

METHODS: Was evaluated programmatic data from two information systems, which gather data on viral load (VL) and CD4 counts (performed within the national's public health system) and on every ART delivery. Children between 2 and 12yo who switched to RAL-C, between January/2017 and December/2018 and performed at least one VL after 30 days and before 365 days after the switch were included. The outcome assessed was achieve VS (VL< 50copies/mL) after switch. Were performed univariable and multivariable logistic regression models to assess the likelihood of the outcome according to the baseline VL (up to 180 days before), age and previous ART.

RESULTS: 221 children were included in the study, with a median age of 7 years. Before switch, 59.5% were in a Protease Inhibitor-containing regimen (PI/r-C) and 32.9% in a Non-nucleoside Reverse Transcriptase-containing regimen (NNRTI-C). Overall, 60.6% presented VS after start RAL-C. In the age analysis, VS was achieved in 45.5% at 2-4yo; 63.3% at 5-8yo; 65.5% at 9-12yo; When baseline VL was considered, VS was reached by 78.3% (< 50copies/mL); 70.0% (50-199copies/mL); 66.7% (200-999copies/mL); 55.9% (1000-9999copies/mL); 37.1% (>10000copies/mL); In previous ART analysis, VS was accomplished by 61.6% and 59,1% of NNRTI-C and PI/r-C groups, respectively. In the multivariable analysis, aOR of achieving VS were 6.092 (95%CI: 3.046-12.185) greater among those with VL< 50copies/mL and 3.385 (95%CI: 1.042-10.992) among those with 200≤VL< 1,000 compared to VL>10,000copies/mL. The higher the age the greater the proportion of VS - 1.129 (95%CI: 1.028-1.241) by year increase. Previous ART were not statistically significant.

CONCLUSIONS: This study shows that the chance of obtaining VS in children older than 2yo after switch to RAL-C increases with age, the lower the baseline VL and independent of the previous ART. These results support Brazilian public health policies in amplifying antiretrovirals options for this age, increasing adherence possibilities and permitting to individualize childcare.

WEPEB295

The youth peer mentor role in supporting adolescent HIV care: A qualitative study

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BACKGROUND: Adolescents living with HIV (ALHIV) experience poor outcomes due to complex challenges and unmet needs in care. Scalable strategies are needed to mitigate these challenges for vulnerable adolescents. Youth peer mentors (YPM) in the Academic Model Providing Access to Healthcare (AMPATH) liaise with ALHIV and clinicians to facilitate care. We sought to investigate YPM roles supporting ALHIV to navigate HIV care, as well as critical supports for YPM.

METHODS: This qualitative study was performed at the Rafiki Centre for Excellence in Adolescent Health at AMPATH, in Eldoret, Kenya. We comprehensively sampled YPM for semi-structured key informant interviews (KIs). KIs investigated the role(s) of YPM in ALHIV care, their current supports for this work, and needs to expand their role. A trained interviewer conducted KIs in either Kiswahili or English. Sessions were recorded, and transcripts were coded and analyzed through thematic analysis.

RESULTS: We interviewed 19 YPM in a total of 32 interviews. YPM described their own past traumatic experiences in HIV care—in contexts of e.g. severe illness, unsupported disclosure, and intense stigma—and discussed how these experiences motivate them to engage with ALHIV and provide support which they themselves may not have had. As such, they highly value peer mentorship and recognize its importance in ALHIV care. YPM roles include counseling for HIV education and adherence, disclosure, mental health, and sexual and reproductive health. They advise on navigating peer and romantic relationships and overcoming stigma. YPM frequently field questions and help manage challenges that otherwise may not be brought to the clinician. Much of their work extends beyond the clinical setting, through texts, calls, and in-person meetings. YPM were supported by committed clinicians, a comprehensive adolescent care program, and by the use of mobile applications.

CONCLUSIONS: YPM perform multiple roles to “fill” gaps in care and support vulnerable ALHIV through individualized support. YPM can be supported by establishing effective and supportive partnerships with HIV clinicians, technological supports, and by empowering YPM to address current gaps in the care program. Research is needed to learn how to best scale up YPM programs and evaluate their impact on ALHIV outcomes.

WEPEB296

Providing childhood TB care in a high prevalence HIV/TB setting: The experience of Baylor College of Medicine in Eswatini

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BACKGROUND: Childhood TB and HIV co-infection are leading causes of death in Sub-Saharan Africa. The Kingdom of Eswatini has been among the highest rates of TB/HIV co-infection recorded globally.

We describe baseline characteristics, longitudinal outcomes and risk factors for unfavorable outcomes among pediatric TB cases that received care at the Baylor College of Medicine Children's Foundation in Eswatini (BCMCF-SD).

METHODS: We conducted a retrospective analysis in children below 15 years who initiated TB treatment in our clinic from 2008 to 2014 using data from routine medical records. Categorical baseline characteristics and outcomes were compared using Chi-square test, while continuous variables were analyzed using two-tailed t-tests. Multivariate logistic regression was performed to describe risk factors associated with treatment outcomes. Data is synthesized within the context of evolving service delivery.

RESULTS: The clinic's model of care progressively integrated HIV and TB care during the study period. Among 598 children analyzed (mean age 5.1 years at TB treatment initiation) 95% (568/598) had pulmonary TB, 4% (26/598) were bacteriologically confirmed, and 1.5% (9/598) had DRTB. Treatment success averaged at 78.1% for the entire period of the study and varied from 70.4% to 89.7%. The strongest risk factor for unfavorable outcomes was age < 1 year ($p < 0.001$). In our cohort, immune status, time to ART initiation and ART regimen were not associated with unfavorable TB outcomes.

CONCLUSIONS: Achieving good clinical outcomes for children treated for TB is possible in resource-limited settings, even in the context of TB/HIV co-infection. Child friendly service delivery providing family-centered, comprehensive and age-tailored interventions are essential especially in children younger than 1.

WEPEB298

Pediatric anti-retroviral therapy (ART) and care of HIV-infected children in Myanmar: Gaps and challenges

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BACKGROUND: Monitoring and evaluation of pediatric anti-retroviral therapy and care of HIV infected children is critical to ensure comprehensive care for the children. Current study was conducted to identify the gaps and challenges in pediatric anti-retroviral therapy and care of HIV infected children.

METHODS: A cross-sectional, hospital-based study was conducted by applying a mixed-methods design. Review of ART records of children under 15 years, in-depth interviews with guardians, key informant interviews with providers were done at 22 ART centers from public sector in Myanmar. Descriptive statistics for quantitative data and thematic analysis for qualitative data were applied.

RESULTS: A total of 3,277 ART records, 40 service providers and 25 guardians were included in the assessment. Mean age of children was 8.8±3.4 years and 43% was in the age range of 6-10 years. Mean duration on ART was 3.1±2.3 years. Nearly 90% of children had >95% adherence to ART at last clinic visit and within last six months. Over 90% of the children had received CD4 testing at the initiation of ART while around 75% of them had tested for CD4 at six months, one year and two years of ART. Weakness in follow-up investigations was seen at some ART sites. At the start of ART, weight measurements were done for 97.5% of children then gradually declined to 83.4% at one year and 64.7% at two years of follow-ups. Height measurements were done for nearly 40% of the children at the start of ART and follow-up visits within two years. Lack of transitional care, disclosure counseling, and psychiatric assessment were the gaps in pediatric ART care while limited human resources, frequent breakdown of CD4 machine, limited antifungal and anti-viral drugs for opportunistic infections were the common challenges mentioned by the providers. Financial burden, long travel distance for ART and lack of care takers were the challenges expressed by the guardians.

CONCLUSIONS: Weakness in growth monitoring and follow-up investigations, lack of transitional care and disclosure counseling, limited human resources were the gaps and challenges in pediatric ART care.

WEPEB299

Time to viral load suppression and rebound among Canadian infants and children initiating cART in the Early Pediatric Initiation Canada Child Cure Cohort (EPIC⁴) Study

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BACKGROUND: Sustained viral suppression (VS) after early initiation of combination antiretroviral therapy (cART) is a key to limiting the viral reservoir in children. However, the time to, and durability of, VS among early-treated children has not been well described.

METHODS: Using data from the EPIC⁴ pediatric HIV cohort, the time to: 1) VS (defined as 2 consecutive undetectable viral loads (VL) after cART initiation) and;

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2) Viral rebound (VR) (determined as a single VL measure >10 000 copies/ml after VS achieved) were determined using Kaplan-Meier survival estimators.

RESULTS: Out of 226 children enrolled in the EPIC⁴ cohort, 130 (57.5%) received uninterrupted cART, of whom 52% were initiated on PI-based therapy, 43% on NNRTIs, and 5% on INSTIs. Age at cART initiation was < 12 months (28%), between 1-5 years (26%), and >5 years of age (45%). Overall, 127 (97.7%) achieved VS at any time after treatment initiation.

There was a significant difference in median time to VS according to age at cART initiation (shortest among children over 5 years of age initiating cART vs. younger children vs. infants, 0.43 vs. 1.57 vs. 1.17 years respectively, $p=0.007$), and type of first cART regimen (INSTI vs. PI vs. NNRTI, 0.2, 1.1, and 1.2 years respectively, $p<0.001$).

Six months after cART initiation, only 16% of infants had achieved VS, vs. 20% of children 1-5, and 62% of children over age 5.

Thirty-six months after cART initiation, 13% of all children who achieved VS had their first VL rebound; the risk was lowest among younger children (1-5 years) vs. infants, and older children (7% vs. 16% vs. 24%, $P<0.001$). Significant risk factors for VR on univariate analysis included gender (male vs. female, 67% vs 33%, $p=0.02$), and recipients of social welfare program (93% vs. 7%, $p=0.02$).

CONCLUSIONS: There was a significant difference in time to VS and VR according to age at cART initiation, with longer time to both VS and VR among infants as compared to older children. These results should be considered in the determination of strategies to limit reservoir size within the different pediatric age groups.

Cure strategies in paediatric and adolescent populations

WEPEB300

Children's perceptions of HIV cure research: An end of study assessment of the Early Pediatric Initiation, Canada Child Cure Cohort (EPIC4) study

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BACKGROUND: While the field of pediatric HIV cure research has expanded in recent years, little is known about participants' perceptions and understanding of such research, or motivations for participating.

The objective of this study was to document children and youth experiences of participating in an HIV "cure" study, assessing HIV-1 reservoirs.

METHODS: EPIC⁴ was a national prospective cohort study of HIV-1 reservoirs in Canadian children. At enrollment, written informed consent was obtained from parents, and assent from children.

Study visits were every 3-6 months throughout the 4-year period, and included supplementary blood draws (maximum 100 ml) at the time of routine blood sampling for reservoir assessment.

At their last study visit, participants at one site (CHU Sainte-Justine, Montreal, Canada) were asked to complete a standardized questionnaire about their experience. For children who remained undisclosed of their HIV status, this was completed by a parent.

RESULTS: By December 2018, 23 participants had completed the questionnaire: 16 adolescents (age range 15-22 years), and 7 parents of younger children (age range 7-14 years).

Overall, 13% could not explain the study's purpose, 52% mentioned HIV research, and 35% alluded to research towards a cure (to "find a cure", "eliminate HIV completely"); none mentioned the word "reservoir."

Only 2 could name the study (EPIC⁴). When asked why they agreed to participate, 78% explained they wanted to help others living with HIV; other common answers included spending extra time with the clinic team (57%) and the financial compensation that was provided (48%).

While 61% said there was nothing negative about their experience, 18% listed the blood draws ("too much" or "too painful"), and 21% listed other reasons.

Finally, when asked if they thought an HIV cure would occur in their (or their child's) lifetime, the majority (74%) responded yes.

CONCLUSIONS: Despite a standardized informed consent/assent process at enrollment, none of the participants recalled the study's specific objectives at conclusion.

These results suggest the need for ongoing discussion and knowledge translation efforts with pediatric participants and their parents throughout the course of a long-term study.

Further understanding of patient perceptions may help guide future pediatric HIV cure study design.

Adherence in paediatric and adolescent populations

WEPEB301

Outcomes of children and adolescents living with HIV considered lost to follow up at leDEA-SA cohorts in the Western Cape: Linkage to Western Cape Provincial Health Data Centre records

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BACKGROUND: Loss to follow up (LTFU) is a challenge to achieving optimal paediatric antiretroviral therapy (ART) outcomes, and limits reporting of programme performance. LTFU in children on ART vary widely from 5% to 29% a year after ART initiation, and there are few studies of outcomes in children LTFU.

METHODS: Children and adolescents living with HIV (CALHIV) considered LTFU, initiated ART at ≤15 years old between 2004-2015 at 4 leDEA-SA Western Cape sites were included. LTFU was defined as no visit ≥180 days before database closure and not recorded as transferred out or deceased. We linked leDEA-SA patient records to Western Cape Provincial Health Data Centre visit, laboratory and pharmacy records using unique patient identifier that is implemented at health facilities in the province.

We used multinomial logistic regression to assess factors associated with hospital admission, returning to care and being completely lost.

RESULTS: Among 1,057 CALHIV that were LTFU (51% female, median (IQR) age at ART start: 2.4 years (0.60, 6.80), median (IQR) CD4 at LTFU: 861 cells/μL (537, 1319)), 686 (65%) CALHIV were found to have silently transferred to other sites, 240 (23%) had been hospitalised and 131(12%) were not found. For those silently transferred, median time from last visit to first visit after LTFU was 35 (13,181) days.

For hospitalized patients, median time from last visit to admission was 45 (16, 166) days. CALHIV starting ART after 2006 were less likely to be admitted to hospital compared to having silently transferred (table).

Patient characteristics adjusted for sex, WHO stage at ART start, cohort, duration on treatment, CD4 count and third drug in regimen* (Routine care as base)	Hospital admission		Completely Lost	
	Adjusted RRR	95% Confidence interval	Adjusted RRR	95% Confidence interval
Age at ART start, years				
0-4	1		1	
5-9	1.22	0.68, 2.17	1.40	0.59, 3.33
10-15	1.16	0.55, 2.44	2.15	0.80, 5.76
ART start year				
2004-2006	1			
2007-2009	0.60	0.37, 0.96	0.79	0.37, 1.66
2010-2012	0.31	0.17, 0.56	1.76	0.82, 3.78
2013-2015	0.27	0.09, 0.80	1.23	0.27, 5.55

[Factors associated with hospital admissions, being completely lost and silent transfers among CALHIV in the Western Cape]

CONCLUSIONS: The majority of CALHIV LTFU in our study had been misclassified; most were actually retained in programme in routine care, but a substantial proportion had been admitted to hospital. Data sources beyond the initial facility of ART initiation are needed to accurately assess retention and programme outcomes so as to prevent under ascertainment of mortality estimates among CALHIV.

WEPEB302

Twelve-month outcomes among paediatric and adolescent patients initiated on ART from 2007 to 2016 in Nigeria: A retrospective cohort study

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BACKGROUND: The United States President's Emergency Plan for AIDS Relief (PEPFAR) has pioneered the expansion of antiretroviral treatment (ART) in Nigeria since 2004. As at the end of the fiscal year 2016, 34,695 children aged < 15 years and 10,402 adolescents age 15 - 19 years were receiving ART across all PEPFAR sites in Nigeria. While Nigeria routinely reports programmatic data to meet PEPFAR's reporting requirements, the outcomes of children and adolescents receiving ART in PEPFAR sites have not been systematically assessed.

METHODS: Retrospective cohort study of a random sample of patients age 0 - 19 initiated on ART between October 2007 and September 2016 from 31 states in Nigeria.

RESULTS: Of the 4,007 patients sampled, 96% were alive and on treatment at 12-months. Optimal adherence to refill (> 95% pill days covered between refills) was met by 64% of patients. Males had lower odds of optimal adherence compared to females (OR: 0.71 95% CI 0.55, 0.92) after controlling for age, clinical stage, caregiver HIV status, weight, TB status, and ART regimen. The mean adjusted (for age, sex, disease stage, and regimen) increase in CD4 count from baseline to 12 months was 250 cells/mm³ (p < 0.0001), while the change from baseline to 6 months was 201 cells/mm³ (p < 0.0001), and 49 cells/mm³ was observed between 6 and 12 months (p=0.001)

CONCLUSIONS: There was a high overall retention in care 12 months after initiation of antiretroviral treatment. While on average, patients demonstrated satisfactory immunologic response to treatment, additional attention to ensure medication adherence may be necessary among paediatric and adolescent patients, particularly among young boys.

Mental health and neurocognition in paediatric and adolescent populations

WEPEB304

In utero/early life anti-retroviral exposure related changes in socioemotional adjustment indices by 6-10 years of life in HIV exposed Ugandan children

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BACKGROUND: Perinatally HIV-infected (PHIV) or HIV-exposed but uninfected (HEU), children receive antiretroviral (ARVs) during critical developmental windows with poorly understood long-term neurocognitive effects.

METHODS: 6-10 y.o. children of HIV+ women were enrolled and followed for 12-months. *In utero/peripartum* ARV (IPA) exposure was established via medical records. For PHIV, three current ARV regimen status were defined: naïve, protease inhibitor (PI) or Non-nucleoside reverse transcriptase inhibitors (NNRTIs). Socioemotional adjustment (SEA) indices- externalizing problems, internalizing problems, behavioral symptoms index (BSI) and adaptive skills index (ASI) were defined at months 0, 6 and 12 via caregiver response to 175 standardized questions from the Behavioral Assessment System for Children. Internally age and sex standardized SEA z-scores were derived from raw scores. Repeated measures linear regression models estimated IPA vs. no IPA-related differences in SEA indices separately for HEU and PHIV using Statistical Analysis Software (v.9.4).

RESULTS: Among HEUs, there was no association between IPA and change in ASI within study intervals (all p>0.05) and over 12 months follow-up (time*IPA, p=0.633). However within respective follow-up intervals, IPA vs. no-IPA exposure predicted increases in behavioral symptoms (b=0.33, p=0.11 to b=0.68, p< 0.01), internalizing (b=0.16, p=0.431 to b=0.57, p=0.01) and externalizing (b=0.50, p=0.01 to b=0.77 (p< 0.01)), problems in each of the three follow-up periods.

Among PHIV, IPA-related change in SEA indices varied systematically by current ARV regimen. On the one hand on average ASI increased (b=0.54, p< 0.01), BSI declined (b=-0.86, p< 0.01), internalizing problems declined (b=-0.73, p< 0.01) and externalizing problems declined (b=-0.52, p=0.01) in association with IPA among PHIV currently on PI. On the other among HAART naïve PHIV, IPA was associated with higher internalizing (b=1.64; p=0.03)/behavioral (b=1.14, p< 0.01) problems and with declines in ASI (b=-0.69; p< 0.01) over the study period.

CONCLUSIONS: These data suggests that IPA is associated with behavioral, internalizing and externalizing problems among HEUs. Among PHIV, the association between IPA and sea indices may vary for ARV naïve, PI and NNRTI treated children. These data suggest the need for continued vigilance regarding early IPA-associated long-term neurocognitive sequelae in PHIV/HEU. Interventions to mitigate neurocognitive impairment risks maybe warranted particularly among HEU.

WEPEB305

Mental health and its association with metabolic outcomes in youth living with perinatally acquired HIV in the Cape Town Adolescent Antiretroviral Cohort (CTAAC)

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BACKGROUND: The Cape Town Adolescent Antiretroviral Cohort has demonstrated that youth living with perinatally infected HIV (YLP HIV) have poorer mental health (MH) compared to age- and sex-matched HIV-

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uninfected (HIV-U) youth. While some adult HIV studies have linked poorer MH to adverse metabolic outcomes, this association has not previously been explored in YLPHIV.

METHODS: We investigated the association of MH measures with metabolic outcomes including insulin resistance (IR), lipids [Total cholesterol (TC), triglycerides (TG), high density lipoprotein (HDL), low density lipoprotein (LDL)] and albumin. The Beck Youth Inventories were used to assess depression, anxiety, anger, disruptive behaviour (DB) and self-concept, Children's Motivation Scale to measure motivation levels, Conner's Parent's Rating Scale to assess ADHD, and Child Behaviour Checklist (CBCL) to measure internalizing (CBCL-IP), externalizing (CBCL-EP) and total competence (CBCL-TCP) problems.

Body mass index z-scores (BMIZ) were calculated using World Health Organization references and abnormal lipids were defined using the National Health and Nutrition Examination Survey. Linear regression models were fit to assess the adjusted association of MH measures with each metabolic outcome.

RESULTS: Overall, 204 YLPHIV were enrolled (median age 10.4 years, 49% male, 10.4% had CD4 count < 500 cells/uL, and 82.3% with viral load < 50 copies/ml at enrolment). Mean age at antiretroviral therapy (ART) initiation was 3.4 years, mean duration on ART 7.2 years with 53% and 43% on non-nucleoside inhibitor- and protease inhibitor-based ART respectively. Mean BMIZ was -0.12 and median albumin 41g/l.

Sixteen percent had hypercholesterolemia, 19% hypertriglyceridemia, 7% high-LDL and 5.3% low-HDL. Clinically significant CBCL-TCP, CBCL-IP and CBCL-EP were found in 39.7%, 30.4 and 15.7% respectively, anxiety in 11%, depression in 6.4%, and DB in 4%.

Higher levels of anger were associated with higher TC and LDL ($\beta=0.010$, $p=0.041$ and $\beta=0.012$, $p=0.048$ respectively), higher DB with higher LDL ($\beta=0.010$, $p=0.043$) and higher CBCL-IP with low albumin ($\beta=-0.067$, $p=0.052$) after adjusting for age, sex, and BMIZ.

CONCLUSIONS: This is the first study to investigate the association of MH problems with metabolic profiles among YLPHIV. Greater anger and disruptive behaviour were associated with increased lipid concentration in YLPHIV in South Africa. Further longitudinal studies are needed to evaluate whether modification of MH factors may have long-term effects on metabolic profiles.

HIV-exposed uninfected children

WEPEB306

Developmental defects of enamel in primary dentition after in utero TDF exposure

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BACKGROUND: Tenofovir disoproxil fumarate (TDF) is a recommended drug for antiretroviral treatment of HIV positive pregnant women. The safety of TDF in PMTCT has been discussed controversially and there are still conflicting results regarding the influence of TDF on the bone mineral density in children with in-utero TDF exposure. Since dexa scans in neonates are a challenging investigation, alternative methods to study bone density are required. The level of mineralization in teeth is higher and more complex than it is in bones and the mineralization process in teeth is more vulnerable. Development of primary teeth starts in early pregnancy, the teratogenic period for ameloblasts, which produce enamel. In our analysis we investigated the influence of in-utero TDF exposure on the prevalence and distribution of developmental defects of enamel (DDE) in primary dentition.

METHODS: HIV-exposed but uninfected children with in utero exposure to maternal TDF-containing ART were included in this analysis. Dental status and enamel defects were assessed by an experienced dentist and documented as hypoplasia and hypomineralisation of enamel using the modified DDE index (FDI, 1992).

RESULTS: A total of 31 children (mean age 2.1±0.3 years; 41.9% female) were included in this study. Maternal ART during pregnancy: 67.7% protease inhibitor; 22.6% integrase inhibitor and 9.7% NNRTI. Median TDF exposure in utero was 28 weeks (median ± 10.52 SD).

With respect to potential confounders the prevalence of DDE in the primary dentition was lower, but not statistically significant lower, in TDF exposed children (3.2% vs. 5.3%; $p = 0.514$) compared to cross-sectional data of unexposed children of HIV-negative mothers from high-income-countries¹. Most affected teeth were second primary molars and demarcated opacities the most prevalent type of DDE.

CONCLUSIONS: HIV-uninfected infants with in utero exposure to TDF showed a lower prevalence of DDE in comparison to cross-sectional data of HIV- and TDF unexposed children. This difference was not statistically significant, most likely due to the small sample size. The distribution of enamel defects is comparable to those described in unexposed children. By measures of dental health of the primary dentition, in utero exposure to TDF did not negatively influence the prevalence or distribution of DDE.

Transition of adolescents into adult care

WEPEB307

Patient characteristics associated with viral suppression do not predict patient confidence in the healthcare transition process among youth living with HIV

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BACKGROUND: Healthcare transition (HCT) from pediatric to adult-oriented care represents a high-risk time for disengagement from HIV care, but little is known about how to identify youth living with HIV (YLHIV) who are most at risk. Prior research with healthcare providers has emphasized their use of clinical markers, especially viral suppression (VS), to identify YLHIV needing more intensive HCT support; there is a paucity of work examining factors associated with HCT confidence from the patient perspective. We sought to identify, compare and contrast factors associated with VS and patient confidence about HCT.

METHODS: We recruited 70 YLHIV from a pediatric/adolescent clinic in Atlanta, USA, immediately prior to their anticipated HCT. Participants completed a survey including demographic and psychosocial measures. We defined "transition confidence" as agreement with the statement: "[I] have no concerns about transition to the adult clinic." Clinical characteristics for the preceding 12 months were extracted from the medical record.

RESULTS: Participants ranged in age from 24-25 years. Most were Black/African-American (93%), male (89%), had acquired HIV through sexual transmission (80%) and were virally suppressed (66%). Forty percent (40%) endorsed transition confidence. In our multivariable analysis, factors associated with VS included fewer missed appointments ($p=0.03$; OR 5.77 [1.21-27.54]), having reliable transportation ($p=0.02$; OR 5.35 [1.32-21.73]); and having more than a high school education ($p=0.03$; OR 8.05 [1.21-53.45]). Factors associated with YLHIV transition confidence were lower levels of HIV stigma ($p=0.04$; OR 0.33 [0.11-0.97]) and lack of documented sexually transmitted infections (STIs) ($p=0.05$; OR 0.34 [0.11-1.01]). Viral suppression and missed appointments were not significantly associated with transition confidence.

CONCLUSIONS: In our YLHIV cohort, patient characteristics associated with VS (e.g., fewer missed appointments) were not associated with patient confidence in the upcoming HCT. This suggests that care engagement in the pediatric clinic may not fully predict engagement in the adult clinic. Thus, future interventions should provide additional support to

youth with high levels of internalized and/or experienced stigma around their HIV status, and those with recent treatment for STIs. An exclusive focus on those who are not virally suppressed may miss opportunities to support those YLHIV who are most concerned about the HCT process.

WEPEB308

Perinatally HIV-infected adolescents transition to adult care: A natural experiment

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BACKGROUND: The transition from pediatric to adult care is a vulnerable time for adolescents with perinatal HIV infection and is often associated with poor outcomes. To help inform transition guidelines, we evaluated retention and viral suppression during a natural experiment in which a policy change led to the cessation of transfers of adolescents living with HIV from the pediatric clinic to the adult clinic.

METHODS: We performed a retrospective cohort analysis of adolescents with perinatal HIV infection receiving care in a government-supported, hospital-based antiretroviral clinic in KwaZulu-Natal, South Africa. Prior to 2012, all adolescents transitioned to adult care at 12 years ("old policy"). Due to a change in policy, all adolescents were subsequently retained in pediatric care ("new policy"). We analyzed adolescents two years before and two years after this policy change. Outcomes were retention in care (defined as one clinic visit, pharmacy refill, or viral load result in the prior 3 months) and HIV viral suppression (defined as < 400 copies/ml) one year after transition to adult care or the 13th birthday if remaining in pediatric care. Analyses included bivariate and multivariable regression models, adjusting for sex, ART regimen, history of tuberculosis, and pre-ART CD4.

RESULTS: A total of 183 adolescents who turned 12 years between 2011 and 2014 were evaluated; 50 (27%) transitioned to adult care under the old policy and 133 (73%) remained in pediatric care under the new policy. Adolescents who transitioned to the adult clinic had lower retention in care (92%; 46/50) compared to adolescents remaining in the pediatric clinic (99%; 132/133; p=0.02). In the multivariable regression model, retention in care remained lower for adolescents who transitioned to adult care (AOR 0.04; 95%CI 0.01-0.33; p=0.003) compared to those who remained in pediatric care. Viral suppression among adolescents who transferred to the adult clinic (72%; 36/50) was lower than among adolescents remaining in the pediatric clinic (83%; 110/133), although not significantly (p=0.15). Similarly, no significant association was seen in the multivariable regression model (AOR=0.63, 95%CI 0.28-1.39; p=0.25).

CONCLUSIONS: Adolescents with perinatal HIV infection have higher retention in care when attending pediatric clinics compared those transitioning to adult clinics at age 12.

Clinical issues in transgender and non-binary populations

WEPEB310

High incidence of syphilis in transgender women in Buenos Aires, Argentina

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BACKGROUND: Transgender women (TGWs) are a highly vulnerable and marginalized population, with high percentages engagement in sex work due to unemployment, discrimination and lack of other opportunities. Sex work has been consistently associated with high STIs acquisition risks. This study aimed at estimating the incidence and prevalence of syphilis and their associated factors among TGWs in Buenos Aires, Argentina.

METHODS: Retrospective information was collected from our rapid HIV/syphilis test and antiretroviral programs. TGWs with < 6 months of syphilis treatment were excluded. Syphilis was defined as any reactive treponemal test among those without history of syphilis or a VDRL \geq 4 dil after >6 months of therapy. Age, sex-work status, others STIs (HBV, HCV, and HPV), HIV status, condom use, history of syphilis, and education level were included in the analysis. Pearson's chi-square test for categorical variables was performed to examine bivariable associations between independent variables of interest and syphilis cases.

RESULTS: The sample included 112 TGWs with 45 patients-years of follow-up. Syphilis prevalence rate was 27.7% and cumulative incidence was 34.5 cases/100 persons-year. Bivariate analysis showed that syphilis cases were associated with sex work (OR=3.64, 95%CI: 1.14-11.67, p=0.023) and with not using condoms (OR=7.18 95%CI: 2.08-24.8, p=0.000). All the other factors did not affect the likelihood of syphilis among TGWs patients.

CONCLUSIONS: TGWs suffer an extremely high prevalence and incidence of syphilis, particularly those involved in sex work or not using condoms consistently. This emphasizes the importance of dual HIV/syphilis rapid testing programs, tailored preventive interventions and educational programs to address sexually transmitted infections in this population.

WEPEB311

Transgender-led same-day antiretroviral therapy services at the Tangerine Community Health Center in Bangkok, Thailand

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BACKGROUND: Transgender women (TGW) are disproportionately affected by HIV, but data are limited about how HIV diagnosis influences care received by TGW. The Tangerine Community Health Center at the Thai Red Cross Anonymous Clinic offers key population-led same-day antiretroviral therapy (SDART) services to prepare HIV-positive clients for optimal immediate and long-term care engagement. This study describes and evaluates the implications of SDART services on TGW clients.

METHODS: Data were obtained from self-identified TGW who tested HIV-positive at the Tangerine Community Health Center in Bangkok. Acceptability and logistical eligibility (ART naïve, ability to return for follow-up vis-

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its) were self-reported. Baseline laboratory tests (creatinine/ALT/syphilis/HBsAg/anti-HCV/CD4/CrAg if CD4 < 100) were conducted based on national guidelines. Physicians conducted a physical examination and used chest X-ray results to determine ART eligibility without other test results. A team of transgender-competent physicians, nurses, and transgender staff provided in-clinic HIV services, integrated with hormone services, and adherence/retention support between clinic visits. Median days from HIV diagnosis to ART initiation were calculated and baseline demographic and clinical characteristics described. Retention at 3, 6, and 12 months after ART initiation and viral load suppression were measured. Logistic regression was conducted to determine factors associated with loss to follow-up.

RESULTS: From July 2017-December 2018, 96.4% of 137 TGW clients who tested HIV-positive and met the logistical criteria agreed to enter SDART services. ART was initiated in 91.7%: 81.8% on same day, 7.4% on days 2 and 3, and 8.3% on days 4 through 7, and 2.5% greater than 7 days. Median (IQR) CD4 count was 320 (240-468) cells/mm³. Of TGW who started ART, 29.4%, 9.2%, and 3.4% tested reactive for syphilis, hepatitis B, and hepatitis C, respectively. Retention rates at 3, 6, and 12 months were 87.4%, 88.1%, and 85.7%, respectively. Viral suppression was achieved by 87% of TGW after at least 6 months of ART. Baseline CD4 \leq 250 cell/mm³ was significantly associated with loss to follow-up after ART initiation (aOR 10.01, 95%CI 1.01-99.58, p=0.049).

CONCLUSIONS: Acceptance of SDART among HIV-positive TGW in Bangkok is very high. Retention, however, needs intensive reinforcement targeting TGW who may need additional clinical and psychosocial supports.

WEPEB312

Prevalence and consequences of gender affirmation procedures done outside of medical care among transwomen in São Paulo, Brazil

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BACKGROUND: There is a global unmet need for gender-affirming medical services for transwomen, including surgical interventions and hormones. When access and resources are limited, many transwomen use non-medically prescribed hormones and fillers (free-floating industrial silicone or other nonmedical grade materials) that can have complications. We measured the prevalence of non-prescribed hormone and filler use and their side effects for transwomen in São Paulo, Brazil.

METHODS: We analyzed baseline data from Trans*National Project - a longitudinal study of transwomen in São Paulo. Participants were recruited using respondent-driven sampling (RDS). Initial "seeds" were chosen to invite eligible transwomen peers, who in turn invited others to participate. Procedures included a structured questionnaire and HIV testing. Analysis focused on the use of non-prescribed hormones and fillers, and the prevalence of potentially related complications.

RESULTS: We interviewed 739 transwomen. HIV prevalence was 28.7%. One-third (32.1%) were 18-24 years old; 75.6% earned less than minimum wage. Overall, 93.6% had ever taken hormones. Of these, 93.2% used non-prescribed hormones. Intermittent hormone use was more common when non-medically prescribed (76.1% vs. 29.8%, p < 0.001). Moreover, 40.2% had injected non-medical fillers to enhance their appearance. Injections were most common in the buttocks (91.5%), hips (65.5%), thighs (45.7%), and breasts (18.5%). Complications of filler injections were reported by 81.1%, with common and severe side-effects including migrating globules (32.0%), cellulitis (9.2%), rejection (8.8%), and pulmonary embolism (3.7%). Only 11.8% of transwomen said public health system paid for their hormones; overall, public insurance rarely paid for any gender-related procedures.

CONCLUSIONS: Transwomen in São Paulo, Brazil have a high prevalence of non-medical hormone and filler use, with many reporting complications. Lack of access to gender-affirming medical services may be due to limited availability of relevant medical expertise and procedures in the universal health care system, medical discrimination against transwomen, and medical mistrust in the trans community. Transgender health training in medical education, anti-stigma efforts, and increased availability of

gender-affirming medical procedures would likely lead to increased use of medically-administered procedures among transwomen and fewer medical complications.

WEPEB313

Predictors of increased carotid intimal media thickness among transgender women: A cross-sectional study

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BACKGROUND: Cardiovascular disease (CVD) is one of the leading causes of mortality worldwide. Transgender women (transwomen) live in adverse settings, with a high burden of HIV infection, use of feminizing hormones (FH) without medical supervision, high rates of smoking and drug abuse, and huge social and economic disparities. Ultimately, these factors may increase transwomen's risk of atherosclerosis and CVD. Carotid intimal media thickness (cIMT) is an important predictor of subclinical arteriosclerosis and has been used to evaluate subclinical CVD.

METHODS: Between August 2015 to February 2018, we performed a cross-sectional study of transwomen enrolled in the *Transcendendo* cohort, a trans-specific cohort in Rio de Janeiro, Brazil. Baseline procedures included cIMT evaluation, measured by ultrasonography, following the Mannheim protocol. Transwomen with a valid cIMT measurement were included in the present analysis. Increased cIMT was defined as a measure above the 75th percentile (0.64mm). We also collected data on demographics, traditional cardiovascular risk factors (such as smoking, family history of premature CVD, history of CVD, diabetes, hypertension, dyslipidemia and body mass index), HIV status, drug use, FH use and feminizing procedures. We performed unadjusted and adjusted logistic regression models to assess the predictors of increased cIMT.

RESULTS: Out of 308 transwomen enrolled, median age was 31 years (interquartile range 25-38), 53.8% had HIV infection, and 94.7% reported use of FH. 75 transwomen (24.4%) had increased cIMT. In unadjusted analyses, increased cIMT was associated with older age, history of CVD, hypertension, dyslipidemia, diabetes mellitus, body mass index (BMI) and liquid industrial-grade silicone use. Age (aOR per 10 years=2.70, 95% confidence interval [CI]=2.0-3.8) and BMI (aOR per 5 Kg/m²=1.41, 95%CI=1.1-1.9) remained associated with increased cIMT in the final adjusted model.

CONCLUSIONS: Age and BMI were significantly associated with increased cIMT, which highlights the importance of routinely monitoring traditional CVD risk factors during transwomen care. Longitudinal evaluations of cIMT among transwomen are needed to identify the incidence of CVD, its associated risk factors, and to help develop specific recommendations for this highly vulnerable population.

Clinical issues in other vulnerable populations

WEPEB314

Risk of polypharmacy and inappropriate prescribing in persons living with HIV ≥ 65 years of age

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BACKGROUND: Effective antiretroviral therapy has led to an increased life expectancy of persons living with HIV (PLWH). Since 2011 the number of PLWH aged ≥65 years has increased >50% in the US. Comorbidities, age-related physiological changes and care by multiple providers predispose elderly PLWH to polypharmacy (≥5 medications), drug-drug interactions (DDIs) and inappropriate prescribing. Few studies have evaluated the extent of prescribing errors in the aging PLWH population.

This study aimed to evaluate the prevalence of polypharmacy, inappropriate prescribing, and related risk in PLWH who are ≥65 years of age.

METHODS: This was a retrospective study that included PLWH ≥ 65 years of age seen at Truman Health Services in Albuquerque, United States between 01/01/2015-08/21/2018. Investigators collected demographics, comorbidities, laboratories, medications, adverse events, hospitalizations, and death. Inappropriate prescribing was classified as:

- 1) serious DDI according to the University of Liverpool website and the LexiComp database;
- 2) incorrect dose; and
- 3) inappropriate medication according to Beers, STOPP and START criteria.

Pearson correlations were used to examine associations between polypharmacy, inappropriate prescribing, and related risk.

RESULTS: Included patients (N=57) had a mean age of 68 ±4 years, were 86% male, 61% white non-Hispanic, and 90% had an undetectable HIV viral load. Polypharmacy was identified in 95% of patients; mean number of medications prescribed was 11.6 ±5.1. The frequency of prescribing errors in the study population was high: serious DDIs (63%), incorrect dose (26%), and inappropriate prescribing based on Beers (47%), STOPP (70%), and START (82%) criteria. Furthermore, 68% of patients experienced ≥1 adverse event, and 30% were hospitalized within 12 months of index. Positive and significant correlations were identified between polypharmacy and inappropriate prescribing as follows: serious DDIs ($r=0.45$, $p<0.001$), Beers ($r=0.34$, $p<0.01$), and STOPP ($r=0.56$, $p<0.0001$). Additionally, we found that adverse events correlated with inappropriate prescribing: Beers ($r=0.28$, $p<0.05$), STOPP ($r=0.30$, $p<0.05$), and START ($r=0.44$, $p<0.001$).

CONCLUSIONS: This study highlights the pervasiveness of polypharmacy in the aging PLWH population. Polypharmacy was associated with increased risk of inappropriate prescribing and related risk of an adverse event. Targeted interventions are warranted to reduce polypharmacy and inappropriate prescribing in this high-risk population.

WEPEB315

Improved HIV care in incarcerated individuals via telemedicine in Pennsylvania, United States

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BACKGROUND: The prevalence of HIV infection in the Pennsylvania State Department of Corrections (PA DOC) is 1.3% (approximately 650/50,000 persons). Previous collaborations between academic medical centers and state correctional programs to deliver HIV care have demonstrated increased virologic suppression, increased CD4 T-Lymphocyte counts, and

reduced AIDS-related mortality. The PA DOC contracted with a large academic medical center in 2015 for HIV medical management to be delivered by an interdisciplinary telemedicine team (infectious diseases physician, pharmacist, and nurse practitioner). This study was designed to measure the impact of academic medical center involvement on overall HIV-1 suppression and other clinical markers.

METHODS: Investigators conducted a retrospective review of all inmates with HIV between 2014 and 2016 in all 26 state correctional institutions of the PA DOC. Persons who received care both pre- and post-intervention (July 1, 2015) without release were included. Paired-data analyses were conducted for regimen class categorization, pill burden, regimen frequency, mode of medication delivery (directly observed therapy (DOT) or medications kept on person (KOP)),

CD4 T-Lymphocyte count, and HIV-1 RNA levels.

RESULTS: Two hundred twenty seven patients were included. The mean age was 46 (±10.6) years, 97% were male, 71% were black, 20% had HIV/HCV coinfection, and 2% had HIV/HSV coinfection. Integrase inhibitor-based regimen use increased by 16.8% ($p<0.01$). Pill burden was reduced by a mean of 1.1 tablets (±1.9, $p<0.01$). Twenty-eight patients (12.9%) had regimens reduced from 4 or more pills to a single tablet regimen. Regimen frequency was reduced from twice to once daily in 21.3% of patients. KOP increased by 16.1% ($p<0.01$). CD4 T-Lymphocyte counts increased by a mean of 40.1 cells/mm³ (±208.9, $p<0.01$), and 90.6% of patients achieved HIV viral suppression (< 20 copies/mL) by snapshot analysis ($p=0.42$).

CONCLUSIONS: Interdisciplinary academic medical care delivered via telemedicine significantly improved HIV treatment in Pennsylvania incarcerated persons by reducing dosing frequency, decreasing pill burden, reducing DOT, and increasing CD4 T-Lymphocyte counts without affecting HIV viral suppression.

Adherence to HIV prevention strategies

WEPEC494

Provision of residual drug level results from the dapivirine ring open label extension study: Participant reactions and explanations during a qualitative ancillary study (MTN 032)

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BACKGROUND: MTN-025/HOPE was an open label study of the dapivirine vaginal ring with 15 sites in sub-Saharan Africa. MTN-032/AHA, an ancillary follow-on study, retrospectively explored ring adherence during HOPE. Participants were presented with their residual drug level (RDL) results and their reactions and adherence challenges in response to these RDLs were discussed during in-depth interviews (IDI).

METHODS: AHA randomly selected former HOPE participants at 6 sites. Ten participants per site were stratified by month-1 adherence data (low, middle, high; 1:3:1 ratio). IDIs explored ring experiences and challenges and included presentation of all monthly RDLs categorized from 0 (no use) to 3 (high use). Interviewers discussed the participants' adherence challenges and responses to their RDLs and assessed whether they believed the RDLs matched their actual use throughout study participation and if they trusted the RDL testing methods. Interviewers quantitatively categorized RDL reactions on forms and summarized experiences in debrief reports. Analysts summarized qualitative data; quantitative data were tabulated using Stata.

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RESULTS: Sixty women were enrolled (age 23-48), with a median of 12 (62%; range 1-12) monthly RDL scores per participant. Most women (41/60; 68%) felt their RDLs did not match their ring use. On average, this group had varying RDLs, with majority < 3, but reported using the ring; 61% distrusted the test method. Their explanations for the discrepancy included: delays in monthly ring changes, bodies not absorbing dapivirine, blood type/stress limiting drug release, ring having less drug or not working, ring insertion errors, use of traditional medication, and faulty testing machines. Those who felt RDL matched their use (n=19) predominantly trusted the test method (95%). These participants were generally consistent users (RDLs ≥ 2), but occasionally described ring non-use because of menses, vaginal itching, pelvic pain, increased vaginal wetness, partner feeling the ring, partner objection, ring cleaning, and community myths.

CONCLUSIONS: Women in this study sample, with variable adherence levels, felt they were more consistent ring users than RDL signified. Understanding participants' reported use beyond RDL scores provides insight into how the ring is understood to work and is incorporated into women's lives, which will help facilitate successful real-world implementation of the ring.

WEPEC495

HIV pre-exposure prophylaxis (PrEP) dosing preference and reported use in the EPIC-NSW trial

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BACKGROUND: With increasing evidence for the efficacy of non-daily HIV pre-exposure prophylaxis (PrEP) dosing schedules, community interest is also growing. We investigated baseline preferences for PrEP dosing and report on-study use among gay men enrolled in EPIC-NSW, an implementation study of free daily oral PrEP among those at high risk of HIV.

METHODS: From March 2016-April 2018, 9,708 individuals were enrolled. At baseline, then quarterly, participants were invited to complete an optional online behavioural survey, which included basic demographics and questions about participants' ideal way to take PrEP (daily, event-driven, or periodic (daily during periods of risk)), as well as number of PrEP pills and events of condomless anal intercourse (CLAI) in the previous week. Preference for daily vs non-daily PrEP was compared using Pearson's chi-squared tests and non-parametric tests for trend across groups.

RESULTS: Among gay-identifying men who completed at least one behavioural survey (n=6,452; 66% of total participants), 30% expressed a preference for non-daily PrEP (16% event-driven; 14% periodic PrEP). Participants who preferred non-daily PrEP were more likely to be university-educated (35% vs 26%, p < 0.001) or 30 years or older (32% vs 27%, p < 0.001), and less likely to report CLAI in the last week (28% vs 38%, p < 0.001) or being paid sex with another man in the last three months (21% vs 32%, p < 0.001). There was no change in dosing preference by month of study enrolment (p-trend=0.769). There was a small but significant decline in the mean number of pills reported being taken in the previous week throughout the study (6.4 in quarter 1 to 6.1 in quarter 6, p-trend < 0.001). Men who expressed a preference for daily PrEP were more likely to report having taken all 7 pills in the previous week (88% vs 71%, p < 0.001).

CONCLUSIONS: Almost one-third of men reported a preference for event-driven or periodic PrEP, as opposed to continuous daily PrEP. Adherence remained high across the study but was highest in those who preferred daily dosing. The preference for non-daily PrEP was associated with engaging in less frequent risk practices and may be more attractive for men at periodic risk of HIV.

WEPEC496

HIV prevention in men who have sex with men as inferred from their adherence to daily versus event-driven pre-exposure prophylaxis: Cross-over clinical trial

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BACKGROUND: Daily and intermittent pre-exposure prophylaxis (PrEP) have both been shown to be effective for HIV prevention. A clinical trial was conducted to compare protection rate of daily versus event-driven regimens among men who have sex with men (MSM) as inferred from their adherence.

METHODS: A randomised open-label crossover study was conducted involving MSM aged ≥ 18 who were normally resident in Hong Kong, with a history of unprotected sex and risky behaviours in the preceding six months. They were randomized into two groups who either took TDF/FTC daily for 16 weeks then switched to event-driven regimen for another 16 weeks, or vice versa. An online diary was used for monitoring adherence and sex history. HIV protection was defined by the coverage of condomless anal intercourse (CLAI) with either two doses before sex plus two subsequent daily doses, or four consecutive daily doses since the day before CLAI. Univariate and bivariate analyses were conducted to identify factors associated with adherence and protection. The trial was approved by the Joint CUHK-NTEC Clinical Research Ethics Committee (Ref:2016.719) and registered in Centre for Clinical Research and Biostatistics Clinical Trials Registry (Ref:CUHK_CCRB00606).

RESULTS: Between Aug 2018 and Jan 2019, 76 MSM were recruited. A total of 6687 follow-up person-days and 5684 (85%) diary entries were recorded, with similar follow-up days between daily and event-driven arm (p=1.00). Of 691 CLAI recorded, 626 (91%) were covered by PrEP. Number of CLAI and its coverage rate were similar in both arms (p=0.89; 0.36). Local residents had a higher protection rate (p=0.04), while younger MSM had a lower rate (p=0.004). In the event-driven arm, two tablets were taken on 324 person-days. MSM with HIV+ sex partners took more off schedule loading doses (p=0.008). After controlling the number of follow-up days, number of tablets and CLAI, MSM achieving full CLAI protection were more likely local (p=0.04), older (p=0.03) and not engaged in chemsex (p=0.032).

CONCLUSIONS: Daily and event-driven PrEP are similarly effective in achieving HIV protection in MSM. More effective protection could be achieved by advising MSM to adopt a regimen best suited to their behavioural lifestyles and sex-networking practices.

WEPEC497

A self-administered scale for assessing adherence of men who have sex with men to pre-exposure prophylaxis

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BACKGROUND: Adherence to pre-exposure prophylaxis (PrEP) is essential to give sufficient protection against HIV infection. Systematic assessment of PrEP adherence in a clinical setting could help providers plan tailored actions to achieve optimal outcome.

METHODS: A scale to assess adherence was developed and tested in a pilot PrEP study in Hong Kong. The study involved MSM participating in the partially-subsidised PrEP programme (participants paying about 13% of the total cost of TDF/FTC) over a 30-week period. At each of the clinic visit participants were asked to fill out self-administered questionnaires including 18 items on adherence and the number of days without taking

PrEP since last visit. The latter was transformed into a binary variable indicating perfect adherence as the dependent variable in the binary logistic regression.

RESULTS: As of December 2018, 309 questionnaire entries from 68 participants were available for analyses. Of 18 designed questions, 4 were excluded because of low number of positive responses. Six significant variables were retained in the logistic regression giving an overall accuracy of 90% (95% confidence interval [CI]: 86-93%). Sensitivity and specificity were respectively 92% (95% CI: 86-96%) and 88% (95% CI: 82-92%). Positive and negative predictive values were respectively 87% (95% CI: 82-91%) and 92% (95% CI: 87-95%). The three questions predicting non-adherence were "I had ever forgotten to take the tablets" ($p < 0.001$), "I had ever skipped PrEP because I felt that I didn't need the protection from PrEP" ($p = 0.03$), and "I had ever skipped PrEP to avoid discomfort after medication" ($p = 0.01$), while the three predicting adherence were "I am capable of making the best decision to protect myself" ($p = 0.03$), "I feel confident about taking PrEP on time" ($p = 0.01$), and "I am worried that I would solely depend on PrEP for protecting myself" ($p = 0.04$).

CONCLUSIONS: Using a scale of 6 questions, it is possible to assess MSM's adherence to PrEP in clinical settings. Adherence counselling on self-efficacy and tools to remind PrEP users about taking the tablets would be useful in maintaining good adherence.

WEPEC498

Prevalence of HIV testing, unrecognized HIV infection and ART uptake among key population in India: Findings from a large-scale multi-centric cross-sectional surveillance survey

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BACKGROUND: India has the third largest people living with HIV (PLHIV). The epidemic is concentrated with HIV prevalence among key population 7-29 times that of general population. Progress of HIV/AIDS response among key population will have significant bearing on country progress to achieve end of AIDS as a public health threat by 2030. The objective of this paper is to present prevalence of HIV testing and unrecognized HIV infection among key population in India.

METHODS: India implements cross-sectional multi-centric HIV sentinel surveillance (HSS) biennially among pregnant women, key population and bridge population to track the level and trend of HIV epidemic. The last round was implemented in 2017. We examined the data from HSS 2017 for key population of female sex workers (FSW), men having sex with men (MSM) and people who inject drugs (PWID) to ascertain the prevalence of HIV Testing and unrecognized HIV infection among key population in India.

RESULTS: Overall 99,289 key population (FSW, MSM and IDU) were recruited under 2017 round of HSS. The mean age of respondents was 32.2 years (Std. Dev=6.6). Life time exposure to HIV testing among key population was almost universal (>95%). Out of total respondents recruited, 2705 were reactive for HIV under HSS. Out of total HIV positive, 66% (95% CI 64%-68%) reported the results of their last HIV testing as "HIV Positive" and 42% (95% CI 40%-44%) reported to be taking anti-retroviral therapy.

CONCLUSIONS: While life time exposure to HIV testing has been high, one third of HIV positive key population are not aware of their status indicating that they were HIV negative at the time of their last testing. Clearly, the coverage of testing programme is high among key population. Proper follow-up of HIV negatives and more frequent HIV testing will further increase the probability of early detection of unrecognized HIV infections. ART uptake among HIV positive key population is a critical challenge that programme need to address on priority.

Indicator	FSW	MSM	PWID
Sample Size	58391	21579	19319
HIV Prevalence (%)	1.6	2.7	6.3
HIV positive who know their HIV Status (%)	56.8	58.4	76.3
HIV positive who are on ART (%)	45.7	49.3	35.6

[HIV Prevalence, unrecognized HIV infection and ART uptake among key population in India, HSS 2017]

WEPEC499

Role of support groups in promoting pre exposure prophylaxis (PREP) adherence among men who have sex with men (MSM) in Hoymas Clinic Nairobi, Kenya

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BACKGROUND: United Nations general assembly's 2016 political declaration on HIV/AIDS, committed to provide 3 million people at higher risk of HIV infection with PrEP by 2020. Post PrEP demonstration studies done in the US and Africa showed when PrEP is taken consistently and correctly reduces the chances of contracting HIV infection by over 90%. Part of the challenges of PrEP is poor adherence especially among men who have sex with men.

Support groups have been used to improve adherence in care and treatment, therefore At Health Options for Young Men on HIV/AIDS and STI (HOYMAS) support groups is a strategy adopted to promote adherence on PrEP among MSM.

We sought to assess the effectiveness of support groups in promoting adherence among MSM on PrEP

METHODS: PrEP support groups were convened twice a month. The support group dates were synchronized with PrEP appointment dates, to avoid frequent visits to the facility. Every support group meeting had 30 members and they used the platform to share their experiences on PrEP and asked the facilitating clinician and HTS counselor questions as they disseminated more information about PrEP.

Data was collected retrospectively from the standard Kenyan Ministry of Health registers (PrEP register, PrEP encounter forms, risk assessment tool, appointment register and the daily activity register) for the period May 2017 to Nov 2018 looking at the appointment dates, risk behaviour identified, number of pills dispensed, number of days the client missed taking the pills.

Data analysis before and after the support groups formation was compared by finding out number of pills missed within a week as recorded on the encounter forms and if there appointment date was kept to determine adherence to PrEP.

RESULTS: Among 703 MSM attending support groups in HOYMAS missed appointments dropped from 647 MSM (92%) missing their appointment dates to 352 MSM (50%).

Adherence on PrEP which included taking PrEP daily and accurately among MSM at HOYMAS increased from 91(10%) to 422(60%)

CONCLUSIONS: Support groups can be used to promote adherence among MSM, therefore more support is needed in order to conduct more support groups.

Combination prevention approaches

WEPEC500

Effect of DREAMS interventions on HIV risk among out-of-school adolescent girls and young women (AGYW) with higher and lower HIV vulnerability: Results from Malawi

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BACKGROUND: Identifying and reaching the most-at-risk AGYW with combination HIV prevention programming is critical to reducing HIV incidence. Yet there remains ambiguity on how to identify the most vulnerable AGYW and if multi-sectoral HIV prevention programs can reduce HIV risk for the most vulnerable. We used latent class analysis (LCA) to define clas-

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sify out-of-school AGYW enrolled in DREAMS programs into vulnerability groups, and assess changes in HIV risk vulnerability group after 12 months of enrollment.

METHODS: AGYW enrolled in DREAMS programs aged 15-24 were surveyed Jul-Oct 2017 and Sep-Nov 2018 across two sites in Malawi (n=1,157). Surveys captured knowledge, attitudes, practices, and participation in DREAMS interventions (e.g., life skills, savings and loans). We used LCA models using measures on household & family characteristics, gender attitudes, and HIV knowledge to define vulnerability profiles of AGYW. Multiple logistic regression analyses examined change over time in risk behaviors by vulnerability class.

RESULTS: We identified two distinct HIV vulnerability profiles—higher (56%) and lower (44%). At enrollment, AGYW with a high vulnerability profile had higher odds of engaging in transactional sex, experiencing sexual violence, and having STI symptoms compared to AGYW with a low vulnerability profile. At follow-up, there were no significant differences in program participation or in risk behaviors when comparing high vulnerability profile to low vulnerability profile.

Over time (table 1), AGYW with both high and low vulnerability profiles had significant reductions in multiple sexual partners, STI experiences, and sexual violence from intimate partners and non-partners. There were no significant changes in consistent condom use and transactional sex for either profile. AGYW with low vulnerability profiles had higher odds of having a transactional relationship with a main partner between enrollment and follow-up.

CONCLUSIONS: DREAMS programs were successful in reducing HIV-risk behaviors for AGYW with both low and high risk vulnerability profiles, highlighting the need for continued investments in multi-sectoral HIV prevention programs. Research techniques, like LCA, can help programmers classify and research highly vulnerable AGYW.

Vulnerability strata	STI experience (last 6 months)	Number of sex partners in last year	Consistent condom use	Alcohol use before sex	Transactional relationship (main partner)	Transactional sex (casual partner)	Sexual violence from intimate partners in last year	Sexual violence from non-partners in last year
Low vulnerability profile AdjOR (95% CI)	0.78 (0.59-1.03)	0.45 (0.23-0.88)	0.98 (0.59-1.61)	1.04 (0.21-5.28)	1.52 (1.06-2.18)	0.86 (0.39-1.90)	0.32 (0.20-0.51)	0.34 (0.18-0.65)
High vulnerability profile AdjOR (95% CI)	0.52 (0.40-0.68)	0.44 (0.25-0.78)	0.90 (0.49-1.61)	0.13 (0.02-1.07)	1.29 (0.90-1.85)	0.83 (0.46-1.49)	0.22 (0.14-0.33)	0.21 (0.12-0.37)

[Table 1. Change in HIV risk-related indicators over time stratified by AGYW vulnerability profile]

WEPEC501

Using the one stop shop (OSS) based point of service (POS) strategy for effective prevention, care and treatment to key populations (KP) in Nasarawa State, Nigeria

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BACKGROUND: Enrollment, retention, and adherence to ART treatment among female sex workers (FSWs), men who have sex with men (MSM) and people who inject drugs (PWID) is key to reducing HIV incidences among key populations (KP) who are known to be drivers of the HIV epidemic in Nigeria. Understanding the dynamics of community-based ART is key to prevention, care, and treatment. Heartland Alliance International (HAI) employed an innovative One-Stop-Shop (OSS) based point of service (POS) approach for reaching KP in Nasarawa State, Nigeria. The POS approach is a Physical OSS outpost used in order to provide holistic, stigma-free care to clients outside of Physical OSS coverage, including ARV pickup, STI syndromic management, and other ancillary services. The objective of this abstract was to explore whether this POS approach improves linkage, adherence, and retention of KP in HIV treatment.

METHODS: Between January 2017 and August 2018, HAI linked 481 KP to care using the POS strategy. This is a descriptive, cross-sectional study. Routing program data from Client's enrolment forms, care cards and client satisfaction questionnaires from three POS located in the local government areas of Akwanga, Ajaga, and Lafia was analyzed and summarized.

RESULTS: Of the 2,033 clients linked to HIV services within the period, 1,552 (76%) accessed care through physical OSS while 481 (24%) accessed care via the POS. POS clients experienced improved outcomes compared to static OSS clients in adherence (347 (61%) vs. 222 (39%)), retention rates (414 (86%) vs 451 (29%)), and viral load for those who are eligible (380 (92%) vs 325 (72%)). An analysis of data from 200 client satisfaction questionnaires showed client satisfaction was higher at the POS (92%) compared to the OSS (60%).

CONCLUSIONS: The above findings show that reducing the distance to HIV services results in better client adherence, uptake, retention, and satisfaction, which will help in achieving the 90-90-90 goals. The use of POS should be considered and scaled up for care to Key Population in a bid to achieving an AIDS-free Generation.

Prevention for HIV serodiscordant couples

WEPEC502

Sexual behaviour and perceived HIV risk among HIV-negative members of serodiscordant couples

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BACKGROUND: Risk perception can influence the uptake and persistent use of HIV prevention interventions such as HIV testing and pre-exposure prophylaxis (PrEP). Therefore, understanding factors associated with HIV risk perception and how they influence personal interpretation of risk is important. In this study, we longitudinally assessed the relationship between sexual behavior and HIV risk perception among HIV-negative individuals with HIV-positive partners.

METHODS: We used data from HIV-negative adults enrolled in a demonstration project of PrEP integrated with ART delivered to high-risk HIV-serodiscordant couples in Kenya and Uganda (the Partners Demonstration Project). Sexual behavior and HIV risk perception (a Likert item with 5 responses: „high risk“, „moderate risk“, „low risk“, „no risk“, „don't know“) were assessed quarterly by interviewer-administered questionnaire. Using multinomial logistic regression, we assessed whether sexual behavior, defined as condomless sex 1) with their HIV-positive partner or non-primary partner during the last three months, and 2) during last sex with HIV-positive partner, was associated with perceived HIV risk.

RESULTS: Among 908 HIV-negative participants with 24 months of follow-up, men reported perception of no risk more frequently than women (38% vs 24% of observations, p < 0.001).

After adjusting for time in study and important demographic and clinical confounding factors, those who reported condomless sex had 5-fold higher odds of reporting themselves as „high risk“ than those who reported no condomless sex [adjusted odds ratio [aOR]=4.9, 95% CI: 3.4-6.9]. Correspondingly, condomless sex was associated with 4- and 3-fold higher odds of reporting a moderate and low risk perception, respectively.

Not using a condom during the most recent sex with study partner was significantly associated with increased odds of perceiving some (high, moderate, low) risk of HIV acquisition (aOR=7.3, 95% CI 4.9-10.8; aOR=4.8, 95% CI 3.5-6.7; aOR=3.5, 95% CI 2.7-4.6, respectively).

CONCLUSIONS: HIV-negative individuals who self-reported sexual behavior indicative of actual HIV risk also reported greater risk perception in the context of a mutually-disclosed HIV serodiscordant partnership. The alignment of sexual behavior with perceived risk of HIV acquisition can facilitate HIV-negative partners' decisions about PrEP use and can be incorporated into PrEP and HIV prevention counseling.

Prevention for populations with multiple co-occurring epidemics

WEPEC503

The syndemic of alcohol/drug use and violence victimisation and its effects on HIV transmission risk among transgender women: Cross-sectional, population-based study in India

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BACKGROUND: HIV risk among transgender women (TGW) in India is associated with adverse psychosocial exposures such as problematic alcohol/drug use and violence victimisation, which themselves are often rooted in social stigma and structural violence directed at this vulnerable population. No studies, however, have examined the synergistic interactions between these exposures. To address this gap, we assessed for potentially synergistic interactions between alcohol use, drug use, and violence victimisation on both the additive and multiplicative scales.

METHODS: We used data from a probability-based sample of 4,607 HIV-negative TGW recruited in the Integrated Bio-Behavioural Surveillance study conducted by India's National AIDS Control Organisation. The outcome was inconsistent condom use with male partners in the past month. The primary exposures were past-week alcohol use, past-year drug use, and past-year physical/sexual violence victimisation. We assessed for two- and three-way interactions between the exposures on the additive (linear probability regression) and multiplicative (logistic regression) scales. Regression models adjusted for age, education, marital status, sexual identity, HIV knowledge and HIV programme exposure.

RESULTS: More than one-third had been exposed to physical or sexual violence (36.1%), 8.8% had been exposed to both, 33.9% reported frequent alcohol use, and 11.5% reported drug use; moreover, 6.8% reported both alcohol and drug use, 5.0% reported both alcohol use and violence victimisation, 2.7% reported both drug use and violence victimisation, and 2.2% reported all three exposures. Violence victimisation (aOR = 1.83, 95% CI 1.18 to 2.83) and drug use (aOR = 1.40, 95% CI 1.05 to 1.87) were correlated with inconsistent condom use. We found evidence for two-way interactions on both the multiplicative and additive scales between violence victimisation and drug use, and between violence victimisation and alcohol use.

CONCLUSIONS: Alcohol/drug use and violence victimisation are highly prevalent and synergistically interact to increase HIV risk among TGW in India. While HIV prevention interventions that address any one of these problems could reduce HIV risk, holistic/integrated interventions could have an even greater effect on reducing HIV risk.

WEPEC504

Depression among HIV-positive female sex workers in Malawi is associated with prior treatment default, experience of violence, and low income

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BACKGROUND: With high HIV prevalence and numerous partners, reducing HIV transmission among female sex workers (FSWs) is an important component of Malawi's epidemic control strategy. However, many HIV-positive FSWs report inconsistent HIV prevention behaviors, thus maintaining long-term adherence to anti-retroviral therapy (ART) is critical. Mental health is an important, yet overlooked element in influencing long-term adherence. Prior studies show that depression is associated with poor HIV treatment outcomes, and FSWs' experience of violence may contribute to depressive episodes. We examined levels of depression among HIV-positive FSWs and associated factors to inform ART service delivery.

METHODS: Data are from interviews with 190 HIV-positive FSWs residing in Blantyre and Mangochi. At recruitment, participants were either HIV-naïve, or were previously on ART but had defaulted on treatment for at least 90 days. Participants were recruited via community testing events, peer outreach, and referrals from HIV testing counselors. All were tested for HIV following national guidelines and referred to treatment services. The questionnaire included the PHQ-9 depression scale, on which a score of 10 or higher indicates moderate-to-severe depressive symptoms. We analyzed the data using descriptive and logistic regression methods to identify factors associated with depression: age, location, education level, prior treatment default, monthly income, and experience of physical and/or sexual violence.

RESULTS: The median age of the sample was 25 years; 59% lived in Blantyre. Education was low: 6% had never attended school, and 68% had attended only primary school. Nearly 85% were new ART clients, while the remaining 15% were defaulters. Thirty-nine percent of participants had experienced violence in the past 12 months, and 22% reported moderate-to-severe depression. Depression was associated with prior treatment default (aOR: 6.8; 95%CI: 2.3-20.6), experience of violence (aOR: 4.8; 95%CI: 2.1-10.9), and lowest income quartile (aOR: 3.5; 95%CI: 1.3-9.4).

CONCLUSIONS: In developing countries, mental health services are difficult to access, particularly for marginalized populations. Our analysis suggests a link between depression, and treatment default, which may warrant targeted interventions for FSWs enrolling in ART. Focused depression screening and treatment, and enhancing referral to gender-based violence counseling and support services for FSWs are recommended.

Prevention in people who inject drugs

WEPEC505

Understanding high-risk injection practices among people who inject drugs following the closure of a rural syringe services program

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BACKGROUND: Syringe sharing is a primary route of HIV infection among people who inject drugs (PWID). More than 30 years of research has documented the public health benefits (e.g., reductions in syringe sharing) of syringe services program (SSP) utilization among PWID; however, a dearth of research exists that examines changes in high-risk injection practices among rural PWID following the closure of SSPs. This is a critical gap in HIV prevention science given the disproportionate impact of the opioid crisis in

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rural communities. The purpose of this research is to understand how the closure of a SSP in Charleston, West Virginia affected high-risk injection practices among a population of rural PWID.

METHODS: We conducted semi-structured interviews with 27 PWID (59% male, 88% non-Hispanic white) to understand the public health implications of the closure of a SSP in Charleston, West Virginia. Participants were recruited from street locations frequented by PWID. Interviews were audio-recorded and transcribed verbatim. We employed thematic content analysis to systematically code and synthesize textual interview data.

RESULTS: Following the closure of the SSP, participants described having diminished access to sterile injection equipment. Participants expressed that the SSP closure precipitated six changes in injection practices: (1) persons reused their syringes more frequently, (2) individuals purchased used syringes that were in "good condition", (3) persons used discarded syringes found on the street, (4) PWID shared syringes with acquaintances more frequently, (5) persons shifted to non-injection drug use, and (6) persons attempted to buy sterile syringes on the street. A small number of participants reported not having shared syringes since the SSP closed, but many of these individuals also reported not having confidence in their ability to avoid syringe sharing in the future.

CONCLUSIONS: The closure of a rural SSP in Charleston, West Virginia increased HIV risks among PWID. After the program closed, PWID reported engaging in activities that placed them at extremely high-risk for HIV and other bloodborne infections. There is an urgent need for HIV prevention services among this rural PWID population. Future work should explore how to decrease high-risk injection practices among rural PWID.

WEPEC506

Evaluating impact of harm reduction on the HIV epidemic among people who inject drugs in China

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BACKGROUND: Since the beginning of its HIV epidemic, transmission via injecting drug use has been a major mode of HIV transmission in China. However, harm reduction approaches for people who inject drugs (PWID), including methadone maintenance treatment (MMT), and needle and syringe exchange, have been scaled-up since 2004. We aimed to evaluate the impact of harm reduction over the past 14 years on three measures of HIV infection: new diagnoses, prevalence, and incidence.

METHODS: The study observation period was defined 1 January 2004 to 31 December 2017. The annual numbers of newly-diagnosed HIV infections acquired via injecting drug use were collected from the China's HIV/AIDS Comprehensive Responsive Information Management System (CRIMS). Data on the annual prevalence of HIV infection among drug users were collected from China's National Sentinel Surveillance Program also in CRIMS. Annual incidence of HIV infection was collected from the open, dynamic, nationwide cohort of MMT clients. The new diagnoses outcome is expressed in absolute numbers, the prevalence outcome is calculated by the number diagnosed divided by the total number surveyed expressed as a percentage, and the incidence outcome is calculated by the proportion of new HIV infections expressed as a percentage.

RESULTS: The number of newly-diagnosed HIV infections among PWID increased from 10 509 in 2004 to 15 703 in 2008, and then began to decline in 2009, falling to 12 255 in 2010, 6955 in 2013, and 4269 in 2017. The prevalence of HIV among drug users declined over the entire study period from 7.5% in 2004 to 4.5% in 2010, 3.0% in 2015, and 2.8% in 2017. Likewise, HIV incidence declined from 0.95% in 2006 to 0.43% in 2010, 0.11% in 2015, and 0.03% in 2017.

CONCLUSIONS: We found a meaningful decline in three important epidemic-level indicators—new diagnoses, prevalence, and incidence—that coincided with the implementation and scale-up of harm reduction measures in China, suggesting that China's harm reduction efforts have brought its HIV epidemic among PWID under control. China's experiences and lessons learnt during development, implementation, and scale up of harm reduction for PWID can be translated other low- and middle-income country settings.

WEPEC507

Comparative analysis of effectiveness of HIV testing modalities among PWID in Ukraine

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BACKGROUND: Estimated number of people who inject drugs (PWID) living with HIV in Ukraine is 78,400 (IBBS 2017). Out of them, 58% know their status and 38% are receiving treatment. Achieving ambitious 90-90-90 targets called for intensified case detection efforts among PWID. HIV testing / assisted HIV self-testing in outreach implemented by Alliance for Public Health (APH) since 2004 produced up to 18.5% positivity rate among PWID in earlier years (2007); however, in 2018 the yield was only 1.7% (139,980 PWID tested, 2428 found positive). Other HIV testing modalities that produce higher HIV detection rates had to be considered in order to improve HIV case finding among PWID in Ukraine.

METHODS: HIV positivity rate obtained through outreach testing among PWID was compared to two new testing modalities: Optimized Case Finding (OCF) and provider-initiated testing services (PITS) to identify the most effective testing strategies among PWID and recommend them for expansion. OCF is a form of incentivized extended risk network testing that uses recently diagnosed HIV-positive and high-risk HIV-negative persons to identify members of their social, sexual, or drug-using networks and recruit them for testing. PITS for PWID started in specialized health facilities in 2018 through identifying potentially high-risk PWID based on a set of screening questions and offering them HIV testing.

RESULTS: In 2018 38,003 PWID were newly tested through OCF, and 4138 were found positive (yield of 10.9%); in the same year 2046 PWID were tested through PITS, and 167 persons were found positive (yield of 8.2%). Both of these strategies produced considerably higher positivity rates than 1.7% obtained through testing in outreach.

CONCLUSIONS: Among HIV testing modalities for PWID currently supported by APH, both risk network testing and PITS proved to be comparatively effective strategies, and should thus be considered for expansion. Unless modified to produce higher yield, HIV testing in outreach is not recommended for expansion. Adding cost data to the analysis would allow to refine the results and base the recommendations on cost-effectiveness considerations.

WEPEC508

Characteristics of buprenorphine injecting drug abuser in Bandung; a cross-sectional study

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BACKGROUND: While Indonesia experienced a scarcity of heroin, a distinct phenomenon for People Who Inject Drug (PWID) community emerged in Bandung, one of the city profoundly impacted with HIV epidemic in the country. PWID switch injecting drug from heroin to buprenorphine, that mostly acquired illegally from the black market. This substance that is supposed to be used to treat addictions by sublingual, widely abuses by PWID, thus increasing the risk for HIV infection. Therefore, we want to understand the characteristics of the injecting buprenorphine user and their risk of HIV transmission.

METHODS: This quantitative study was conducted by filling out a questionnaire for injecting buprenorphine users who had been selected using convenient sampling during August 2017 in Bandung. The main characteristics that measured during the study were (1) history of opiate use, (2) the injection pattern, (3) how to get buprenorphine and (4) risky sexual behavior. Respondents were asked to fill out questionnaires online through digital electronic devices. The information collected is analyzed using a spreadsheet.

RESULTS: The study found 207 people who had injected buprenorphine in the past year. As many as 56.25% of respondents have injected opiates throughout their lives. Based on how to get buprenorphine, 26.53% got it by prescription from the medical doctor, and the rest got it through the

black market. Regarding injecting behavior, it was found that 31.12% had used other people's used needles in the past month. From the risk behavior, the results showed that 42.03% had unprotected sex.

CONCLUSIONS: Buprenorphine injecting drug user have a low awareness of HIV prevention, many of them practicing risky sexual behavior and use of contaminated needles. Consequently, we conclude that there is potential for HIV transmission in injecting buprenorphine users in Bandung. We recommend extending the coverage of harm reduction programs not only to opiate users but also to buprenorphine as well, given the availability of these substances is quite easy to obtain. We also recommend disseminating the harm reduction program intensively through peers outreach workers due to a large number of black market access.

WEPEC509

Heroin use and sexual risk behaviours among HIV/HCV co-infected methadone patients in Myanmar

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BACKGROUND: Among estimated 83,000 people who inject drugs (PWID) in Myanmar, 14,325 (17%) were on methadone in June 2018. HIV prevalence among PWID is 28.5% and HIV/HCV co-infection is 59.7%. This study estimates illicit heroin reduction and identifies risky behaviour of HIV/HCV co-infected methadone patients in Myanmar.

METHODS: Total 210 methadone patients with a minimum of being 6-month treatment were recruited from five cities (42 from each site) in 2017. Methadone sites were selected using stratified random sampling. Personal interviews with questionnaires relating to methadone service utilization and risky behaviours were explored. Urine for methadone and illicit drugs were identified.

RESULTS: 16.27%(34/209) had co-infection with HIV/HCV. Among HIV/HCVco-infected methadone patients, their average methadone dose was 132mg and average 36-month duration. 88%(30/34) were on antiretroviral therapy (ART) and 67.65%(23/34) had high-dose methadone (>80mg). Urinalysis showed 76.47% had at least one illicit drug. 76.92% had heroin followed by Benzodiazepine (61.54%) Amphetamine-type-stimulants (34.62%) and Cannabis-THC (11.54%). HIV/HCV co-infection was associated with lower physical quality-of-life, high-dose of methadone, currently on antiretroviral therapy, history of sharing needles and syringes, being arrested by police, living in States, working as peer worker, less alcohol drinking, being separated/single and tuberculosis treatment history ($p < 0.05$).

While on antiretroviral therapy, high-dose of methadone in co-infected patients had estimated 4.8 times less heroin abuse than low-dose co-infected patients (IRR=0.21, 95%CI:0.08-0.58, $p=0.0014$) and 2.3 times less than high-dose patients without co-infection in cox-regression (HR=0.44, 95%CI:0.20-0.94, $p=0.034$). Low-dose co-infection treated with ART had no reduction of heroin compared with low-dose non-coinfection (HR=1.11, 95%CI:0.34-3.69, $p=0.859$) and had lower quality-of-life ($p=0.0350$).

Co-infected patients used the condom with regular partners ($p=0.0001$) but no difference of condom use with irregular and paid-partners than others. No case was reported for needle sharing and being seized within 30-days, no sexually transmitted infections in 12-months.

CONCLUSIONS: High-dose methadone can reduce heroin abuse significantly even among co-infected patients. High-dose methadone can prevent further spread of co-infections by reducing unsafe needle sharing due to heroin injection. Methadone programme should address the special needs of co-infected patients and which can be considered as dual-benefits, treatment of co-infected patients and prevention to negative clients.

Prevention in adolescents

WEPEC510

Using a multiple approach to increase uptake of HIV testing services among adolescent girls and young women: TASO Mbarara

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BACKGROUND: Globally there is a reduction in HIV new infections among adults and children from 2010-2016 however young women are disproportionately affected with 59% of new infections among young people aged 15-24years (UNAIDS 2017) In Uganda. HIV prevalence is almost four times higher among females than males aged 15 to 24(UPHIA 2017). TASO Mbarara has employed different strategies to contribute to the reduction of HIV incidence among this priority group.

METHODS: Adolescent girls and young women (10-24years) are reached out with HTS through the community models(stepping stones and SIN-OVUYO), facility walks-ins, moonlight clinics at mapped out ,hot spots' and VMCC platform. The community models use DREAMS (Determined, Resilient, Empowered, Safe mother) approach to reach out to young girls with HIV testing and prevention services who are followed up quarterly as a cohort for 2 years.

RESULTS: Considering a cohort of October to December 2017, 708 adolescent girls and women (10-24) were reached out to with HTS services, 41 (6%) were positive 34 enrolled on ART at the facility while 7 linked to other service providers. Out of the 184 walks-ins tested, 26 were positive with a yield of 14%. DREAMS, 200 were tested, 5 positive with a yield of 2.5% while other approaches including moonlight clinics yielded 2.9%.

The walk-ins yielded higher positivity with less numbers tested as compared to other approaches.

DREAMS approach yielded the least positivity. The walk-ins and those identified from moonlights over 70% (19-24years) were involved in transactional sex.

CONCLUSIONS: Reaching out to adolescent girls and young women with HTS services can increase on identification new positives in the age group of 15-24years as prevalence is high.

Multiple approaches can cumulatively increase on access and utilization of HTS services among adolescent girls and young women.

WEPEC511

Engaging adolescent girls and young women in HPTN 082: Lessons learned

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BACKGROUND: Adolescent girls and young women (AGYW) in Africa are at substantial risk for HIV and could benefit from pre-exposure prophylaxis (PrEP), which is highly effective when used consistently. There is limited experience in how to create demand for new HIV prevention tools including PrEP among African AGYW, who have limited access to services and for whom specific and innovative strategies may be needed.

As part of recruitment for a PrEP study (HPTN 082), community engagement teams developed strategies for demand creation for PrEP for African AGYW.

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METHODS: HPTN 082 is an open label study of PrEP uptake and adherence among 16-25-year-old HIV-uninfected women in Cape Town and Johannesburg, South Africa and Harare, Zimbabwe, conducted from October 2016-2018. Field notes, project records and staff experiences were evaluated. Approaches to PrEP demand creation and community engagement were reviewed with respect to innovative approaches to community preparation, actual PrEP uptake, and recruitment and retention of AGYW. **RESULTS:** Community engagement staff developed strategies for PrEP education for HPTN 082, based on cultural appropriateness, age sensitivity, and meaningful community involvement. Innovative and youth-friendly print media, videos and community fora were used to inform communities about PrEP as a new and highly effective method for AGYW to stay HIV negative, which was under women's control. In the first year of recruitment for HPTN 082, AGYW reported they needed support for PrEP adherence from parents and other adults, and efforts were intensified to engage more community stakeholders. Overall, early preparedness and consultation with youth promoted PrEP uptake (95%) and retention (88% at 6 months) in HPTN 082.

CONCLUSIONS: HPTN 082 required innovative community education about a new HIV prevention tool (PrEP), and the need to adapt strategies to reach African AGYW and engage their support network. Informing, consulting, involving, collaborating, and empowering AGYW, primary care givers, and communities contributed to high recruitment and retention of AGYW, who had increased awareness and motivation to use PrEP. The lessons learned may inform community engagement practitioners, research groups, program implementers, policymakers, and study sponsors on how to effectively engage and work with AGYW in HIV prevention.

WEPEC512

HIV testing and treatment among adolescents and young people in a high burden district with annual home-based HIV testing: Findings from the Chókwe Health Demographic Surveillance System (CHDSS), Mozambique, 2014-2017

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BACKGROUND: In 2016, approximately 1.5 million adolescent girls and young women (AGYW), aged 15-24 years, were living with HIV in Eastern and Southern Africa, where AGYW are twice as likely to have HIV compared with their male counterparts. We evaluated the HIV cascade among persons 15-24 years in a test and start district where home-based HIV testing and counseling (HBHC) had been implemented.

METHODS: The Chókwe Health and Demographic Surveillance System(CHDSS) conducts annual demographic surveillance of approximately 700,000 residents in Chókwe, Mozambique. Each year since 2014, consenting residents aged 15-59 years participated in a brief survey and tested for HIV if not previously tested positive through the CHDSS. The survey assessed reported HIV status, and engagement in HIV care and treatment. For each round 2014-2017, we estimate HIV diagnostic and ART coverage and viral load suppression (VLS) among persons 15-24 years. All estimates are weighted to the 2016 census.

RESULTS: Between 2014 and 2017, 19,371(74%) of 26,306 residents aged 15-24 years accepted HBHC at least once, with 7,396-9,734 testing in each round. 11,356(59%) participants were female. From round one to four, awareness of HIV infection (diagnostic coverage) increased from 41.0% to 84.6% and the number of newly diagnosed HIV participants decreased from 433 to 92. From round one to three, ART coverage increased from 36.8% to 67.2% and VLS increased from 25.7% to 65.3%. The increase in awareness, ART coverage, and VLS was higher among males compared with females. In round four, at least 112 females and 37 males, ages 15-24, remained undiagnosed among those not reached by HBHC in 2017.

CONCLUSIONS: Substantial progress was made towards achieving the UNAIDS 90-90-90 goals among AGYW and their male counterparts in Chókwe. To help achieve epidemic control, providing comprehensive annual HBHC services over a relatively short period can reach most HIV-infected undiagnosed adolescents and young adults.

Participant characteristics	Round 1 04/2014-04/2015				Round 2 05/2015-01/2016				Round 3 03/2016-03/2017				Round 4 04/2017-11/2017								
	HW+	HW+	DC	VLS	HW+	HW+	DC	VLS	HW+	HW+	DC	VLS	HW+	HW+	DC	VLS					
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%					
Total	699	84	433	41.0	36.8	25.7	82	27	59.5	54.0	43.7	718	8.1	199	73.1	67.2	65.3				
	(8.9)	(10.4)	(30.8)	(26.9)	(15.1)	(6.8)	(22)	(6.4)	(49.0)	(43.3)	(30.0)	(6.7)	(65.2)	(59.1)	(54.8)	(46.6)	(44.6)				
			(51.1)				(70.1)	(64.7)				(9.5)		(75.0)	(75.0)	(75.9)	(64.6)				
Gender																					
Female	636	13.2	373	41.8	38.7	28.4	12.2	22	62.6	58.6	45.0	637	12.2	168	70.2	64.7	52.9	419	8.4	72	85.0
	(10.3)	(16.1)	(31.0)	(28.0)	(17.2)	(9.3)	(61)	(20)	(52.1)	(47.9)	(33.6)	(10.1)	(61.7)	(55.8)	(43.5)	(6.7)	(10.4)	(78.6)	(78.6)	(93.4)	
			(52.6)				(14.7)	(73.1)	(65.0)	(56.4)		(14.4)	(78.7)	(73.5)	(62.3)						
Male	81	3.1	60	36.6	27.5	19.0	3.0	43.6	30.8	29.2	10.1	3.0	24	75.8	80.2	82.9	90	1.8	20	76.2	
	(11.5)		(8.4)	(12.4)	(10.0)	(11)	(1.9)	(5)	(9.9)	(8)	(1)	(1.6)	(105.4)	(82.4)	(66.2)	(7.1)					
			(64.8)	(53.7)	(43.0)	(5.0)	(77.5)	(61.8)	(63.2)	(4.4)		(4.4)	(96.1)	(97.7)	(99.5)			(2.9)		(100)	

Abbreviations: HW+ = human immunodeficiency virus; DC = diagnosed; VLS = viral suppression; C = Wald confidence interval
*Includes participants aged 15-24 years who test HIV positive through CHDSS HBHC as well as participants who report ever having tested HIV-positive, testing HIV-positive at the last test, or currently or ever receiving HIV care. Percentages are of survey participants.
¹Weighted to the 2016 CHDSS census by age group, sex, and urbanicity.

[HIV cascade among persons 15-24 years by round and gender, Chokwe, Mozambique, 2014-17]

WEPEC513

Risky sexual behavior among in-school adolescents participating in the Girls Achieve Power Trial in South Africa: Intervention considerations for high HIV prevalence settings

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BACKGROUND: South African adolescents remain at high risk of HIV acquisition; however sex and age disaggregated incidence and risk data, particularly for in-school adolescents remains limited. To develop targeted adolescent interventions it is critical to understand the behaviours which place adolescents at risk of HIV infection. This study presents baseline data on risky sexual behaviors from adolescents participating in the Girls Achieve Power cluster randomized trial in South Africa, with the aim of identifying relevant adolescent focused HIV prevention interventions.

METHODS: Cross-sectional analysis of baseline data from an ongoing trial. Behavioural data was collected using Audio Computer Assisted Interviewing (ACASI) from grade 8 learners from 25 lowest quintile (1-3) public high schools in Khayelitsha, Soweto and Tembisa, South Africa. Descriptive statistics were used to analyse data using Stata version 15.

RESULTS: Between April 2017-September 2018, 2910 learners were surveyed: 62.5% (1805) girls, mean age of 13.6 years (SD±1.0), 54.5% between 11-13 years, and 40.1% (1141) living with one parent. Fifty-two percent (1522) of learners reported being in a relationship of which 21.8% (332) reported their partner to be 10 or more years older (26.1% boys vs. 18.6% girls). Twenty percent (584) of adolescents reported ever having sex (significantly higher among boys; $p < 0.001$) of which 21.6% (126) reported sexual debut as early as 7-10 years whilst 42.3% were between 13-14 years; boys having earlier sexual debut than girls ($p < 0.001$). Of those reporting having had sex, 32.4% (189) reported not using a condom during the first sex act. More boys reported alcohol use before their first sex act ($p < 0.014$). Uptake of HIV testing was low with only 40.5% of learners having previously tested.

CONCLUSIONS: Findings indicate the need to rapidly scale sex and age specific HIV prevention interventions. Behavioural interventions which focus on comprehensive sexuality education and increasing risk perception is needed to reduce the likelihood that adolescents will engage in potentially harmful behaviours. Implementation models most likely to achieve epidemic control must include the provision of a comprehensive package of sexual and reproductive health and HIV services which are integrated with the school, community and health facility environments.

WEPEC514

Shifts in HIV-risk outcomes among adolescent girls and young women (AGYW) in Kenya

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BACKGROUND: A range of socio-demographic, biological, and behavioral factors are associated with HIV incidence among AGYW. Multi-sectoral HIV prevention efforts, like DREAMS, take a comprehensive approach to address multiple vulnerabilities. We assess shifts in biological and behavioral factors related to HIV acquisition among AGYW in Kenya.

METHODS: AGYW enrolled in DREAMS programs aged 15-24 were surveyed in 2016 and 2018 across two sites in Kenya (n=736). Surveys captured knowledge, attitudes, practices, and participation in DREAMS safe space (SS) interventions that provide life skills and address HIV, STI, violence-prevention, and sexual and reproductive health. Bivariate and age-stratified multiple logistic regression analyses—adjusting for site, marital status, schooling, and orphanhood—examine change over time in STI experiences, sexual behaviors, partnership characteristics, violence experiences, and HIV testing among AGYW.

RESULTS: At follow-up, mean age of respondents was 20 years and 14% had lost both parents. Over time fewer were enrolled in school (60% vs.53%), more were sexually active (60% vs. 67%) or been married (23% vs. 26%). Over 90% of adolescent girls (AG, 15-19 years) and young women (YW, 20-24 years) had participated in the SS interventions. Over time, HIV testing increased significantly among AG (AdjOR: 6.35 [3.29, 12.24]) and YW (AdjOR:1.26 [0.55, 2.89]), and AG and YW had significant reductions in sexual violence from intimate partners (AdjOR: 0.35 [0.19, 0.65], AdjOR: 0.37 [0.22, 0.60], respectively). YW also had significant reductions in sexual violence from non-partners (AdjOR:0.34 [0.23, 0.50]). There were no significant shifts in other risk factors (i.e. number of sexual partners in the last year, consistent condom use, and STI experience). Both AG and YW reported increases in transactional relationships with a main partner (AdjOR: 2.89 [1.71, 4.89], 2.54 [1.70, 3.80], respectively) and YW reported increased transactional sex with casual partners (AdjOR: 1.86 [1.01, 3.40]).

CONCLUSIONS: We show mixed effects of DREAMS program engagement on outcomes related to HIV acquisition among AGYW. Over time, there were notable reductions in experiences of sexual violence and increases in HIV testing, yet there were increases in transactional relationships and sex. There is a need to re-double efforts to reduce high-risk sexual behaviors among AGYW.

WEPEC515

Empowering adolescent girls and young women to remain HIV-free: Outcomes of a DREAMS HIV self-testing and PrEP combination prevention intervention targeting AGYW and male partners

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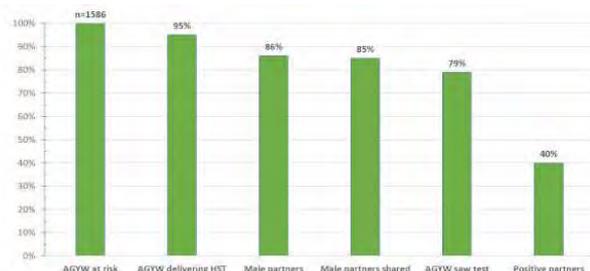
BACKGROUND: Sub-Saharan African adolescent girls and young women (AGYW) are at high HIV infection risk. We assessed an intervention consisting of distribution of HIV self-test kits by AGYW to their male partner(s) and pre-exposure prophylaxis (PrEP) for AGYW.

METHODS: HIV-negative AGYW aged 16-24 years in a non-violent, stable (>3 months) sexual relationship with a male partner of unknown HIV status were recruited between September 2017-October 2018 at Witkoppen Clinic and surrounding communities in Johannesburg, South Africa. Following HIV testing, AGYW were counseled and given an OraQuick HIV self-test kit, testing instructions and a video to share with their partner(s). PrEP was offered to non-pregnant/non-lactating AGYW. Follow-up was ascertained via phone or face-to-face interviews. Participant characteristics, engagement of male partners in self-testing, disclosure of test

results to AGYW and uptake of PrEP are described; predictors of AGYW learning their male partner's HIV-status (distributing test+seeing results) were assessed using modified Poisson regression.

RESULTS: Of 2,200 AGYW enrolled, median age was 22 years [IQR:20-23],16% were pregnant, 3% reported transactional sex, 48% had a partner ≥5 years older, 20% reported consistent condom use, and 17% had STI symptoms. Overall 26% perceived their 12-month HIV-infection risk as moderate or high. Outcomes were known for 1,586 (72%) and reported negative-effects/social harms were rare (0.2%). Most (95%) AGYW delivered the test-kit, most men tested (86% overall/90% of those receiving the test) and disclosed results (predominantly HIV-negative [99%]), resulting in 79% of AGYW learning their partner's HIV status (Figure1). Pregnant AGYW (RR:0.91, 95%CI:0.84-0.99) and those with current STI symptoms (RR:0.90, 95%CI:0.83-0.98) were less likely to learn their partner's HIV-status. Among 1,882 eligible AGYW, 702 (37%) were interested in and 59 (3%) initiated PrEP.

CONCLUSIONS: The intervention was highly successful in empowering HIV-negative AGYW to learn their partner's HIV status, most of whom were HIV-negative. Few AGYW took up PrEP despite frequent interest.



(Figure 1- Engagement among AGYW and male sexual partners in HIV self-testing and linkage to care)

WEPEC516

Impact of a community-level combination HIV prevention intervention on knowledge of HIV status amongst adolescents: Primary results of HPTN 071 (PopART) for Youth Study

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BACKGROUND: The HPTN 071 (PopART) for Youth (P-ART-Y) study evaluated the acceptability and uptake a community-level combination HIV prevention intervention among young people in Zambia and South Africa (SA). The primary outcome was knowledge of HIV-status among adolescents aged 15-19; defined as self-reported HIV-positive or being tested for HIV in the past 12 months.

The study was nested within HPTN 071 (PopART), a 3-arm, cluster-randomized trial in 21 communities testing the impact on the PopART intervention (Arms A and B) compared with standard-of-care (Arm C).

Arm A provided the "full" combination HIV prevention package including home-based HIV counselling and testing and immediate ART delivered in annual rounds (ARs) by community HIV-care providers (CHiPs).

Arm B provided a similar intervention but with ART provided according to national guidelines. The intervention was delivered from January 2014 until December 2017 during three ARs.

METHODS: For Arms A and B communities, CHiPs' electronic logbooks were used to record knowledge of HIV-status. For Arm C, data were collected from a cross-sectional survey of approximately 200-400 randomly-selected adolescents aged 15-19 in each community. The survey was done from August to November 2017. Community-level summaries of knowledge of HIV-status were calculated.

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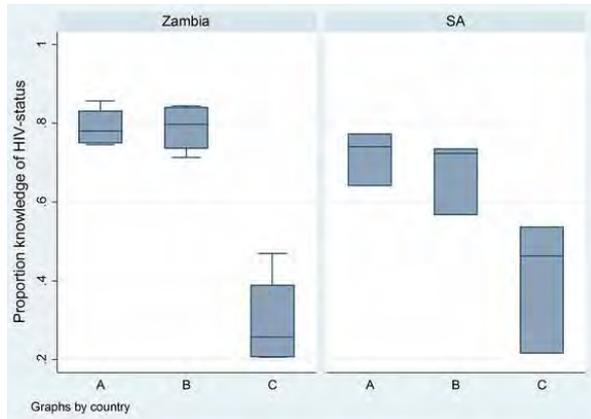
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RESULTS: Overall, knowledge of HIV-status was 77.2% (23,218/30,089) in Arm A and 74.7% (24,018/32,148) in Arm B compared to 32.9% (698/2,120) in Arm C. Knowledge of HIV status varied by triplet, sex, and age. The intervention increased knowledge of HIV-status by 41.6% comparing Arm A with Arm C, [95%CI 28.1-55.2, $p < 0.001$] and 39.6% comparing Arm B with Arm C, [95%CI 24.5-54.7, $p < 0.001$]. The increase in knowledge of HIV-status was greater in Zambia (app. 50%) than in SA (app. 30%) (Figure 1).

CONCLUSIONS: A universal community-level combination HIV prevention intervention increased knowledge of HIV- status among adolescents. This increase varied by sex, age, country, and community.



[Figure 1. Knowledge of status in all PopART communities by Arm and country]

Prevention in transgender populations

WEPEC517

Getting to first 90: Factors associated with ever being tested for HIV among transgender women, intersex, and Hijras who have sex with men reached online in India: Implications for intervention

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BACKGROUND: HIV disproportionately affects transgender-women, intersex-individuals, and Hijras (TIH) in India and reaching TIH for HIV-outreach remains a challenge globally. Using the internet may be a feasible strategy to reach TIH. We therefore sought to understand prevalence and determinants of HIV-testing among TIH reached online and their barriers to testing.

METHODS: As a part of pan-India survey, TIH, solely recruited in virtual spaces via social-media and mobile dating-apps, who were sexually active with men, ≥ 18 years, completed an online-survey in English or Hindi about their HIV testing, sexual behaviors, sociodemographics, and barriers to testing (among those never HIV-tested). Multivariable logistic regression was used to identify factors independently associated with HIV testing.

RESULTS: Of 363 TIH meeting inclusion criteria, 92% (n=335) completed the survey. Respondents came from 18 states, 75% responded in English, 74% from urban-metropolis area, median age was 25, 62% were college graduates, and 50% had high-incomes of $>20,000$ INR/month. In the past-six months, 82% engaged in anal-sex, 41% reported ≥ 6 partners, 45% had condomless-anal-sex (45%), 29% used drugs/alcohol with sex, and 6% were diagnosed with STI in past 12 months. Previously, 30% had disclosed having sex with men to a doctor, 40% found it easy to access free

HIV testing, and 44% knew of a comfortable testing site. Overall, 44% had never been HIV-tested and reasons for never-testing were perception of no risk (37%), fear (24%), did not feel the need (19%), lack of time (14%) and lack of knowledge on where to get tested (14%). In multivariable analysis, shown by aOR (95%CI), EVER tested was associated with (all $p < 0.01$) Hi-jra-identity 3.8(1.9-7.9)[ref: transgender-women], 18-24 age 0.1 (0.01,0.93) (ref: 40+), living in rural areas 0.3(0.13-0.6), disclosure to doctor about sex with men 3.1(2.79,4.7), easy to access free HIV testing 2.9(1.75,1), and knowledge of a comfortable testing-site 2.7(1.3,5.7).

CONCLUSIONS: In one of the first data about Indian TIH reached online, findings show TIH had high-risk behaviors but low-rates of testing, even among those with higher socioeconomic-status. Online-to-offline HIV-testing interventions need to address individual and structural barriers for TIH reached online to help achieve UNAIDS' first 90 in India.

WEPEC518

Developing a model to prioritise male-to-female transgendered people/Hijras for differentiated prevention services in targeted interventions in India

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BACKGROUND: Male-to-female transgendered people/Hijras (TGH) are key vulnerable population in India. Targeted prevention interventions are being systematically implemented for TGH community. The present study was designed to develop a composite indicator for behavioural risk and vulnerability classification for appropriate prioritisation of services.

METHODS: Demographic (age, years as TGH, years in TI programme); sexual behaviours (number of sex acts, condom use, compromise condom use), and biological data (history of sexually transmitted infections - including syphilis) over two-year period were used for development of the tool. These variables were used as explanatory variables in the regression models and HIV incidence was the outcome. The final weights for the composite indicator was based on weights of the individual parameters in the regression model.

RESULTS: The median score in the composite indicator was 16 (interquartile range: 12-20). The cut-off for classification of scores was High ≥ 16 and Moderate < 15 . We could not classify any TGH as low-risk. About 60.7% TGH were classified as high-risk and 39.3% as moderate-risk. HIV incidence was significantly higher in the high-risk TGH compared with moderate risk TGH (1.3% vs 0.4%; $p=0.07$) [Table 1].

Group	Total	HIV infected	Age (25-35 years)	Associated with TI < 2 years	Years as TGH (0-3 years)	Compromised condom-use in past 3 months	Did not visit STI/RTI clinic in last quarter
High (≥ 16)	2390	31 (1.3%)	1760 (73.6%)	2325 (97.3%)	324 (13.9%)	121 (5.5%)	194 (11.9%)
Moderate (< 15)	1548	6 (0.4%)	597 (38.6%)	459 (29.7%)	0 (0%)	28 (1.9%)	48 (3.4%)
p value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

[Table 1. Distribution of various indicators in male-to-female transgendered people, India]

Higher weights for HIV positivity in the models was assigned to the following indicators: Years as TGH (0-3 years) (41%); Missed condom use (24%); Association with TI for < 2 years (14%); Not visited the STI clinic (2%); Compromised condom use (2%). Young TGH (18-24 years) were significantly more likely to report missing a condom or compromising condom use in the past three months (Table 2).

Age groups (years)	Total	Missed condom in last 10 sex acts	Compromised condom-use in past 3 months
18-24	1103	122 (11.1%)	74 (6.7%)
25-35	2209	112 (5.1%)	62 (2.8%)
>35	363	14 (3.9%)	13 (3.6%)
p value		<0.001	<0.001

[Table 2. Condom use and condom compromise according to age groups in male-to-female transgendered people, India]

CONCLUSIONS: The composite indicator was able to appropriately classify TGH most at-risk for new HIV infections. Behavioural interventions for young TGH are a priority. This tool can be implemented in all TIs for differential prevention and optimisation of services at the community level.

WEPEC519

Factors associated with condom use with non-commercial partners among transgender women in Cambodia: Findings from a national survey using respondent-driven sampling

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BACKGROUND: Globally, the prevalence of HIV among transgender women is 49 times higher than that of the general adult population. The rate of consistent condom use among this population remains persistently low. This study explores factors associated with consistent condom use among transgender women in Cambodia, specifically with their non-commercial partners.

METHODS: Data used for this study were collected as part of the National Integrated Biological and Behavioral Survey 2016. Participants were recruited from the capital city of Phnom Penh and 12 other provinces with high burden of HIV using the Respondent-Driven Sampling method. Face-to-face interviews were conducted using a structured questionnaire. Weighted multivariate logistic regression analysis was conducted to explore independent factors associated with consistent condom use. This study was approved by the National Ethics Committee for Health Research (No. 420 NECHR).

RESULTS: This study included 1,202 transgender women who reported having anal sex with at least a male partner not in exchange for money or gifts in the past three months. The mean age of the participants was 26.0 (SD= 7.0) years. Of total, 41.5% reported always using condoms with male non-commercial partners in the past three months. After adjustment, the likelihood of consistent condom use was significantly higher among participants who resided in an urban community (AOR= 1.7, 95% CI= 1.1-2.6), had attained at least 10 years of formal education (AOR= 1.8, 95% CI= 1.2-2.7), perceived that they were likely or very likely to be HIV infected (AOR= 2.9, 95% CI= 2.0-4.1), reported drinking alcohol two to three times per week (AOR= 3.1, 95% CI= 1.1-8.3), reported using amphetamine-type stimulants (AOR= 1.9, 95% CI= 1.1-3.8) or other drugs (AOR= 7.6, 95% CI= 1.5-39.5), and reported inconsistent condom use with male commercial partners in the past three months (AOR= 4.3, 95% CI= 1.8-10.4) compared to that of their respective reference group.

CONCLUSIONS: This study confirms the persistently low rates of condom use, particularly in non-commercial relationship among transgender women in Cambodia. To address these concerns, efforts towards education about harmful effects of multiple, concurrent relationships, and inconsistent condom use should be reinforced among transgender women.

WEPEC520

Combined mobile and static clinic approach to increase HIV testing and positive yield for transgender population in Lahore, Pakistan

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BACKGROUND: Pakistan faces concentrated HIV epidemic with no in-country HIV testing and Counselling (T&C) services for men who have sex with men (MSM) and transgender (TG) population until 2017. Multi country South Asia (MSA), regional grant funded by global fund and implemented by Save the Children in Nepal operates in seven south-Asian countries

with 6 community based organizations (CBOs) in five cities of Pakistan to deliver HIV services for MSM and TGs. Lahore, Pakistan has nearly 4,455 TGs with HIV prevalence of 5.4%. Khawaja Sira Society (KSS), CBO working for TGs in Lahore implemented HIV T&C in two modalities (static and mobile) from January - December 2017.

METHODS: The data was collected using standard tool, aggregated in project database and analysed in SPSS version-16. Chi-square test was done for significance testing.

RESULTS: A total of 3,671 TG people were tested and counselled for HIV. 56.2% TG people visited mobile clinic while 43.8% visited static clinic. The positive yield was high in static clinic (4.2%) compared to mobile clinic (2.5%) which is statistically significant. Over 95% of people who visited clinics had multiple sex partners. 94.3% of them had male partner, 5.6% had both male and female partner and 0.1% had only female partner. The positive yield was high among TGs with both partners (8.3%) compared to only male or only female partner. A total of 122 cases were diagnosed positive of this 84.3% were referred to government centres for CD4 counting, initiation of ART and other services

CONCLUSIONS: Combination of static and mobile clinic is effective in doubling coverage of T&C. Mobile clinics had higher coverage because of potential to overcome barriers like long distance, waiting time and cost implication. HIV positive yield is high in static clinic because in Lahore 62% TGs knew about static clinics and the clients with perceived risks are likely to visit such clinics.

WEPEC521

Low PrEP uptake but good retention among transgender women: Preliminary results from real-world PrEP roll-out in Vietnam

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BACKGROUND: Transgender women (TGW) in Vietnam are at very high risk of HIV and STIs. Studies have measured HIV and syphilis prevalence as high as 18%, while a recent pre-exposure prophylaxis (PrEP) acceptability survey found that 85% of TGW indicated a desire to take PrEP once available.

METHODS: We initiated PrEP services in Ho Chi Minh City in March 2017 and in Hanoi in February 2018 with the aim of enrolling TGW, men who have sex with men and other key populations through twelve community-based organizations and four community-owned private clinics. Hormone testing and counseling services were integrated into two of the four clinics in October 2018. TGW led-CBOs co-created online content promoting PrEP through a dedicated Facebook site, Be Me.Be Happy, that reaches more than 22,000 TGW in Vietnam. An observational rolling-enrollment PrEP cohort study was integrated into routine PrEP service delivery, from March 2017 on. The study aim was to provide recommendations for national PrEP scale-up by measuring enrollment, retention, adherence, and behavioral trends over time.

RESULTS: By December 2018, 68 TGW ever enrolled in PrEP services (3.5% of total enrollees in the same period), 62 of which joined the cohort study. The average enrollment rate from March 2017-December 2018 was 3.4 persons per month. No trend of increasing enrollment was found. Among TGW in the cohort study, median age was 24.5 years, 62.9% had attained an education beyond secondary school, and 64.5% reported having health insurance. Month 3 retention was 85.3% and self-reported good adherence (7 pills/day taken in the past week) was 70.9%. At baseline and month 3, amphetamine use was 37.1% and 39.6%, frequency of condomless receptive anal sex was 15.5 and 7.6, and engaging in sex work was 37.1% and 37.7%, respectively, over the past three months.

CONCLUSIONS: Despite high HIV risk among TWG and community-led demand creation efforts, PrEP enrollment has been low and slow. Among those that do enroll, 3-month retention results are relatively strong. Much greater effort is needed to tailor PrEP-prescribing clinics to the health care needs of TGW with a focus on gender-affirming services.

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HIV prevention for migrant populations

WEPEC522

Why intervention among migrants is required for enhancing HIV/AIDS prevention responses in India? A study of National AIDS Control Programme

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BACKGROUND: HIV prevalence among migrants (0.51 %) is higher than ANC clinic attendees (0.28%) which are considered a proxy for general population in India (HSS, 2017). Migrants come to destinations like cities for work and keep moving between destination and their source villages. At destinations, migrants are exposed to different high risk behaviours. National AIDS Control Organisation (NACO) implements targeted intervention (TI) through NGOs to provide prevention and treatment services to these migrants. Interventions are primarily focussed on selected occupational category, migrants located in key settings like large industry/, small and medium enterprises, spread out across the city etc. Service delivery packages include prevention, treatment and care provided through health camps, interpersonal communications, mid media activities, and counselling.

The study aims to assess the impact of TI programme in India and suggest way forward to enhance HIV response.

METHODS: The study is conducted for the period 2012-13 to 2017-18. Annual reports, HSS, HIV estimation, Migrant Operational guideline are referred for the study. Data analysed based on indicators like coverage, HIV testing, migrants treated for Sexually Transmitted infections (STI), and linkages to Anti Retroviral Therapy (ART).

RESULTS: The number of interventions has been decreased over the years. Migrant's coverage to the estimated population was only 59% as on 2017-18. The HIV testing has increased and HIV positive case detection has lowered from 0.77% (2012-13) to 0.22% in 2017-18. HIV positive case detection remained nearly same as 0.22% since 2015-16. Linking of HIV positive migrants to ART centre increased from 85% to 91%. The migrants treated for STI has lowered from 6.47% (2014-15) to 2.43% (2017-18). The India HIV estimation 2017 indicated that HIV incidence among high risk groups is higher than the general population in selected states which are also the major destination states for migrant's population in India.

CONCLUSIONS: India is committed to 'End AIDS' by 2030 and adopted the fast track targets. To reach the targets, the current pace of the migrant interventions may be enhanced by way of redesigning existing service delivery model. Community based screening, meaningful engagement of employers and private sectors be increased.

Assessing impact of structural interventions and social protection

WEPEC523

Sustaining safe sex behavior among female sex workers by addressing their vulnerabilities and strengthening community-led organizations in India

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BACKGROUND: Between 2014 and 2017, a program aimed at reducing HIV risk and promoting safe sex sought to work through addressing social and economic vulnerabilities and strengthening community-led organizations (COs) of female sex workers (FSWs). This study examines if the program was effective by studying the relationship between the strengthening of COs, vulnerability reduction and sustaining of HIV risk behavior among FSWS.

METHODS: We used a panel data of 2085 FSWs selected from 38 COs across five states of India. The longitudinal data were collected both at CO and individual level in 2015 and 2017. Measures of governance, project management, financial management, program monitoring, advocacy and networking, and resource mobilization were used to assess organizational strength. Individual-level data were used to measure financial security (FS), social welfare security (SWS), socio-legal security (SLS), and safe sex behavior. Bivariate and multivariable regression models were fitted to examine the change in various outcomes from round 1 to round 2. Multivariable regression with an interaction term was used to assess the effect of program indicators on the change in outcomes.

RESULTS: Significant improvement was noted in the strength of COs (up by 27 percentage point [pp]), FS (32 pp), SWS (34 pp) and SLS (27) from Round 1 to Round 2. The improvement in strength of COs led to improvement in FS (3 times), SWS (2 times) and SLS (3 times) among FSWs. The multivariable analysis further showed that improvement in FS contributed to sustained safe sex behavior among FSWs whereas SWS and SLS had a negligible effect on sustaining safe sex behavior. A positive outlier analysis of those who demonstrated sustained safe sex behavior shows that sustained behavior was positively associated with membership in self-help groups, high self-efficacy, and self-confidence, solicitation in street and brothels.

CONCLUSIONS: The vulnerability reduction program was successful in sustaining the safe sex behavior among FSWs by strengthening COs and addressing socio-economic vulnerabilities faced by FSWs. Moreover, the improvement in the financial condition of FSWs is key to sustaining behavior. Therefore, going forward interventions should focus on empowering FSWs economically can help in adopting safe sex behavior.

WEPEC524

Unintended HIV prevention outcomes of a cash transfer trial on child development in East Zimbabwe: Evidence from a cluster-randomised trial and general-population survey

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BACKGROUND: Cash transfers (CTs) are increasingly considered for HIV prevention but evidence for impacts on sexual behaviour comes largely from purposely designed trials. It is unclear if CT interventions not designed for HIV prevention can have HIV prevention outcomes ("spillovers"), including adverse outcomes, particularly given the lack of studies among males. We evaluate HIV prevention outcomes of a cluster-randomised CT trial in Zimbabwe designed for child development.

METHODS: The Manicaland Trial (2010-11) evaluated CTs distributed to households to improve children's health and education. Data from a simultaneous general-population survey on participants (15-54) living in Trial households (n=2909) were used to evaluate CT effects on sexual behaviour (recent sex, condom use, multiple partners, partner age difference [young people]), mental distress, school enrolment (young people), and alcohol/cigarette/drug consumption. Average treatment effects (ATEs) were estimated using logistic regression predictions (cluster-robust standard errors) including treatment status and study site variables, by sex and age (15-29/30-54). Outcomes were also considered with a larger synthetic control group created through propensity score matching of survey to Trial (treatment) individuals.

RESULTS: See Table for results for young people. Recent sex (< 30 days) was lower among young males and females receiving CTs. Young males receiving CTs reported no increased consumption of alcohol, cigarettes, or drugs but increased multiple partnerships (no association among older men). School attendance was higher among males receiving CTs. Analyses with the synthetic control group indicated increased condom use among younger and older women receiving CTs (+5.27% [+0.65%;+9.90%]; +6.58 [-+1.69%;+11.5%]).

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	Male: Control n/N (crude %)	Male: Treatment n/N (crude %)	Male: Adjusted ATE	95% CI	Female: Control n/N (crude %)	Female: Treatment n/N (crude %)	Female: Adjusted ATE	95% CI
Sex (past 30 days)	41/57 (71.9%)	69/122 (56.6%)	-19.8%	-32.69%, -6.89%	82/110 (74.6%)	197/282 (69.9%)	-6.50%	-12.93, -0.07%
Condom use (last sex)	21/57 (36.8%)	51/122 (41.8%)	+7.22%	-2.36%, +16.79%	19/110 (17.3%)	46/282 (16.3%)	-0.84%	-6.30%, +4.62%
Multiple partners (past 12 months)	10/57 (17.5%)	31/122 (25.4%)	+11.8%	+0.73%, +22.84%	0/110 (0.00%)	7/281 (2.49%)	NA	NA
Partner 5+ years older	21/56 (37.5%)	32/120 (26.7%)	-14.9%	-28.45%, -1.39%	65/109 (59.6%)	164/264 (62.1%)	+1.07%	-5.99%, +8.12%
Psychological distress	29/232 (12.5%)	58/535 (10.8%)	-1.80%	-8.16%, +4.56%	52/225 (23.1%)	116/578 (20.1%)	-3.47%	-9.87, +2.92%
Enrolled in school	104/232 (44.8%)	288/535 (53.8%)	+8.66%	+2.06%, +15.25%	84/225 (37.3%)	228/578 (39.5%)	+2.08%	-7.10%, +11.26%
Alcohol use	34/232 (14.7%)	64/535 (12.0%)	-2.74%	-7.1%, +1.62%	0/225 (0.00%)	2/578 (0.35%)	NA	NA
Smokes cigarettes	20/232 (8.62%)	36/534 (6.74%)	-2.21%	-5.52%, +1.10%	1/225 (0.44%)	0/578 (0.00%)	NA	NA
Recreational drug use	26/232 (11.2%)	47/533 (8.82%)	-2.69%	-7.88%, +2.49%	1/225 (0.44%)	1/578 (0.17%)	-0.27%	-1.11%, +0.57%

[Effects of cash transfers on males and females aged 15-29, Manicaland, Zimbabwe, 2010-2011.]

CONCLUSIONS: Non-HIV-prevention CT interventions can have HIV prevention outcomes, including reduced sexual activity among young people, partially mediated by school attendance, and increased condom use. There was no increased alcohol, cigarette, or drug consumption but increased multiple partnerships among young men. CT interventions should monitor HIV prevention outcomes and targeted interventions may be needed to avoid adverse outcomes.

WEPEC525

Achieving the first two 90s of 90-90-90 target of female sex workers: Impact of peer educators' model in Malawi

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BACKGROUND: In Malawi 60 percent of female sex workers (FSWs) are estimated to be HIV positive, 6 times general population's prevalence rate. The government in 2015 adopted the UNAIDS's 90-90-90 target to eliminate the AIDS epidemic by 2030. A major challenge to achieve the targets was to identify an effective and efficient means of reaching the FSWs with HIV testing and treatment services.

METHODS: To increase access to HIV testing and treatment services, ActionAid Malawi recruited 200 peer educators (PEs) to provide FSWs with reproductive health and HIV/AIDS information. The PEs were also tasked to strengthen the linkage of FSWs to HIV/AIDS testing & treatment services.

All 200 PEs were deployed to 150 hotspots in 11 districts after receiving a training. The ratio of PE to FSW was 1 to 40. Every peer educator was affiliated to a nearest health center to ease linkage.

Monthly service data was monitored for a 12-month period (January 2018 - December 2018).

RESULTS: A total of 2875 FSWs were referred for HIV testing, out of these 2570 received an HIV test and result surpassing the target of 2000 by 28.5 percent, 1059 FSWs were found HIV positive representing 41 percent, 96 percent of FSW tested positive were initiated on ART surpassing the target by 6 percent.

There was positive correlation between number of peer educators and number of FSWs referred and tested for HIV and enrolled on treatment. HIV testing and counselling (HTC) uptake continuously increased as more PEs were recruited.

CONCLUSIONS: The peer education model has demonstrated to be an effective and efficient way of reaching the FSWs with RH & HIV/AIDS information, referral and linkage to HIV testing and treatment. The intervention which is ongoing has increased the FSWs being tested for HIV and being

enrolled on treatment, increasing Malawi's potential to achieve the UN-AIDS's first two 90-90-90 targets. There is need to strengthen coordination mechanisms between PEs and health facilities for effective linkage of FSWs to HIV/AIDS services.

WEPEC526

Barriers and facilitators of uptake of minimum prevention package intervention (MPPI) by men who have sex with men (MSM) in Nigeria

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BACKGROUND: Nigeria has the second largest HIV burden in the world with an estimated 3.4 million people living with HIV. Key populations like MSM contribute significantly to this burden. Nigerian Government introduced the Minimum Prevention Package Intervention (MPPI) to promote access of key populations to behavioural, biomedical and structural preventions. Unfortunately, there is no formal evaluation of this prevention model. This study determined barriers and facilitators of uptake of this programme among MSM in Nigeria.

METHODS: A mixed methods approach was used. This involved qualitative methods (interviews and focus group discussions). The quantitative method was a cross-sectional study design using interviewer-administered structured questionnaire among 300 MSM from urban and rural areas of Rivers and Kaduna States, Nigeria, from July-December 2015. Content analysis, univariate and bivariate analyses were done for this study.

RESULTS: The mean age of MSM was 31.1±3.9years and mean age at first sexual debut was 17.1±4.7years. About 67.6% live in the urban area and 91.3% had both primary and secondary education. Identified barriers to service uptake include: stigma and discrimination by providers (p=0.001); inability to address police harassment (p=0.01); and high cost of services. On facilitators of uptake of MPPI, 79.7% were willing to access services in peer-led facilities in comparison to only 50.3% and 61.1% that were willing to access in public and private hospitals respectively. They indicated that MPPI programme needs to be complimented with training of their members to acquire skills for income generation and provision of legal services.

CONCLUSIONS: These findings have implications for planning and implementing HIV prevention services for MSM in Nigeria. Most identified barriers are structural in nature. Consequently, we recommend scaling-up of comprehensive peer-led MPPI and strengthening of structural interventions to include economic empowerment and provision of legal support in addressing issues related to stigma and discrimination.

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Policy-level HIV interventions, including legal-policy reform

WEPEC527

Updating national guidelines to scale up PrEP implementation: The Taiwan experience

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BACKGROUND: In June 2016, The Taiwan Pre-exposure prophylaxis (TW PrEP) guideline recommended daily PrEP use for men who have sex with men (MSM), transgender women (TGW), and HIV-negative individuals in serodiscordant relationships. Taiwan CDC subsequently initiated a nine-month PrEP demonstration project, which only filled 30 percent of available places (302/1000). We present how Taiwan AIDS Society revised the TW PrEP guideline to facilitate PrEP scale-up in Taiwan.

METHODS: The TW PrEP guideline writing group searched randomized controlled trials and guidelines published before October 2017 through Medline/PubMed, Cochrane Database, Embase and ClinicalTrials.gov database. Keywords included: Pre(-)exposure prophylaxis, PrEP, Truvada, tenofovir, HIV, and AIDS. Each selected article was assessed by two authors using the Grading of Recommendations Assessment, Development and Evaluation (GRADE). External reviewers were invited to independently evaluate the revised manuscript per the Appraisal of Guidelines for Research and Evaluation (AGREE II). Before publication, a public consultation was held to reach consensus on the updated guideline among providers, civil society, and Taiwan CDC.

RESULTS: Four systematic reviews and 28 original articles were reviewed. The second version of the TW PrEP guideline was released in May 2018. We additionally recognised that MSM and TGW could benefit from event-driven PrEP by demonstrating schematic scenarios. In September 2018, Taiwan CDC scaled up PrEP implementation by providing two thousand participants free Truvada® for 12 months in 38 clinics and hospitals nationwide. HIV-negative adults in serodiscordant relationships could access daily PrEP while MSM/TGW aged between 18 and 30 could use daily or event-based PrEP. In the first three months, the programme had serviced 700 PrEP users, more than twice the number reached in the previous PrEP project.

CONCLUSIONS: Taiwan is the first country in Asia where event-driven PrEP is recommended for MSM and TGW. Our experience suggests that revising national guidelines with public consultations may expedite the implementation of PrEP.

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Gay, bisexual, and other men who have sex with men

WEPED776

Predictors of anticipated healthcare stigma among adult men who have sex with men in the United States and across sub-Saharan African countries

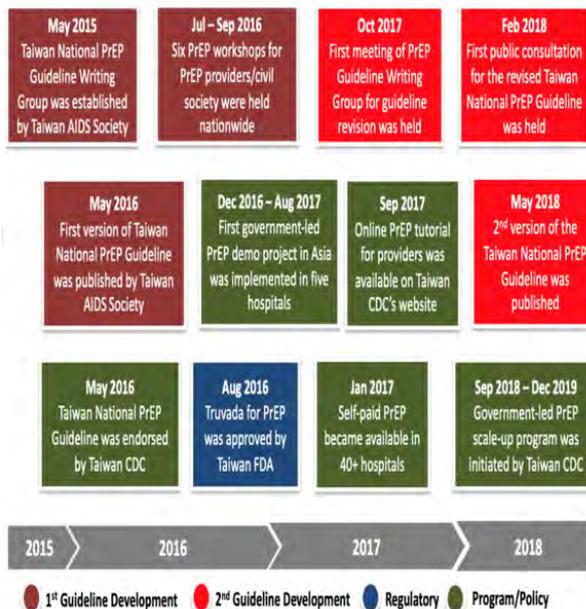
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BACKGROUND: Evidence of anticipated healthcare stigma among men who have sex with men (MSM) identified correlations between fear of seeking healthcare services and avoidance of seeking healthcare services. Disruptions to healthcare-seeking behaviors among MSM undermine foundational principles of HIV prevention including HIV testing, pre-exposure prophylaxis, and HIV care-engagement. Among adult MSM in the United States(US) and Sub-Saharan African(SSA) countries (Cameroon, Senegal, Cote D'Ivoire, Lesotho, eSwatini), we investigated correlates of two anticipated healthcare stigma outcomes: 1.Healthcare-Seeking Fear; 2.Healthcare-Seeking Avoidance.

METHODS: Consistent stigma metrics were collected through socio-behavioral surveys among MSM. Interview-administered surveys were used to collect 4,063 MSM from SSA and online surveys were used among 3,932 MSM from the US. Separate multiple logistic regression models were used to assess correlates (sexual behavior, disclosure, depression, serious mental illness) for each stigma outcome.

The Timeline of PrEP Implementation in Taiwan



[The Timeline of PrEP Implementation in Taiwan]

Variables	Healthcare-Seeking Fear			Healthcare-Seeking Avoidance		
	Model 1 ^a (n=7951)	Model 2 ^b (n=4,063)	Model 3 ^c (n=3,932)	Model 1 ^a (n=1,236)	Model 2 ^b (n=796)	Model 3 ^c (n=642)
HIV Status Self-Report						
Negative (Ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Positive	1.30 (1.02, 1.62) ^a	1.27 (0.98, 1.62)	1.13 (0.48, 1.67)	0.84 (0.54, 1.30)	0.84 (0.44, 1.57)	0.74 (0.26, 1.83)
Unknown	1.83 (1.13, 3.35) ^a	1.38 (1.12, 1.69) ^a	0.98 (0.73, 1.34)	1.22 (0.85, 1.68)	1.30 (0.87, 1.94)	0.89 (0.51, 1.55)
Disclosed same sex practices to family member						
No (Ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.74 (0.63, 0.87) ^a	1.19 (0.97, 1.45)	0.56 (0.35, 0.61) ^a	0.80 (0.61, 1.06)	1.02 (0.70, 1.46)	0.42 (0.26, 0.68) ^a
Disclosed same sex practices to healthcare worker						
No (Ref.)	1.00	1.00	1.00			
Yes	0.54 (0.44, 0.65) ^a	1.56 (1.24, 1.96) ^a	0.39 (0.15, 0.27) ^a			
Depression Status						
No (Ref.)		1.00			1.00	
Yes		3.43 (2.17, 5.38) ^a			2.08 (1.40, 3.09) ^a	
Serious Mental Illness						
No (Ref.)			1.00			1.00
Yes			3.76 (2.85, 5.00) ^a			2.04 (1.17, 3.57) ^a

[Table 1. Results (odds ratio) of multilevel regression analyses]

RESULTS: Prevalence of Fear and Avoidance varied between the US and SSA countries. Healthcare-Seeking Fear was lower among men who disclosed sex practices to family and healthcare workers. Sexual behavior

disclosure to healthcare workers was protective of Fear in the US, however, not in SSA countries. Participants with positive and unknown HIV status had a higher odds of reporting Fear. Overall, one-third of men reporting Fear disclosed sexual behavior to family. Fewer reports of Avoidance were observed among US men disclosing to family members; however, disclosure to family was not associated with Avoidance in SSA countries. Mental health indicators of depression in SSA and serious mental illness in the US were the strongest predictors of both Fear and Avoidance.

CONCLUSIONS: Disclosure to healthcare workers and family was differentially associated with anticipated healthcare stigma between MSM in the US and SSA. Supporting disclosure to family and healthcare workers may support healthcare-seeking in the US more than in SSA. Integrative strategies that identify and provide support for men with mental health illness may help strengthen healthcare-seeking.

WEPED777

Use of enhanced peer mobilizers to increase MSM reach for HIV clinical services in Zimbabwe

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BACKGROUND: Zimbabwe men who have sex with men (MSM) are disproportionately affected by HIV, with an estimated prevalence of 24% compared to 14% among the general population. Due to stigma, discrimination and criminalization, MSM experience barriers to access HIV prevention, treatment and care services, including those at public health facilities. Most MSM do not self-identify for fear of social reprisal and miss opportunities for health services.

METHODS: Beginning October 2016, Population Services International (PSI) introduced targeted HIV services for MSM in the 5 priority districts of Harare, Bulawayo, Gweru, Masvingo and Mutare, offering HIV testing services (HTS), pre-exposure prophylaxis (PrEP), anti-retroviral therapy (ART), STI screening and treatment, condoms and lubricants. Initially, non-MSM interpersonal communications outreach workers were deployed in partnership with key populations (KP) community-based organizations (CBOs). To increase MSM reach in the program's second year, PSI recruited, trained and deployed 100 MSM and other KP community members to serve as Enhanced Peer Mobilizers (EPMs). Drawing on community knowledge and a strengthened focus on HIV clinical cascade linkages, the program used a tiered incentive system among EPMs and continuing CBO partnerships to more effectively reach MSM and connect them to services.

RESULTS: From October 2016 to September 2017, the PSI KP program reached a total of 1,287 MSM with 25% (325/1,287) being tested for HIV. Of those tested, 42% (136/325) were HIV-positive, of whom 92% (125/136) were commenced on ART; 20% (66/325) were initiated on PrEP. Utilizing EPMs, from October 2017 to September 2018 the program reached 6,333 MSM, a 392% increase over the previous year. Subsequently, 508 MSM received HTS; 42% (212/508) tested HIV-positive, of whom 96% (203/212) commenced on ART and 954 were initiated on PrEP, representing an increase of 56% in HTS, 63% in ART and 1,345% in PrEP service uptake over the previous year.

CONCLUSIONS: Use of MSM and other KP community members to serve as enhanced peer mobilizers substantially improves the ability to reach MSM and link them to services. PSI and its partners will continue to engage EPMs to penetrate new MSM networks, conduct interpersonal communications and commodities distribution, and facilitate uptake of and retention in HIV services.

WEPED778

Condomless intercourse with female partners among bisexual male sex workers in the Dominican Republic: A social network analysis

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BACKGROUND: Bisexual Male Sex Workers (MSW) in the Dominican Republic report different patterns of sexual risk behaviors according to partner type. Social network relationships influence behaviors like condomless intercourse (CI) through communication and social norms, with differential patterns of influence for male versus female partners. We conducted a network analysis to better understand CI with last female partners among Bisexual MSW.

METHODS: MSW were recruited through venue-based sampling in Santo Domingo and Boca Chica, Dominican Republic from June-August 2015. Cross-sectional surveys measured egocentric social network characteristics, demographics, and HIV risk behaviors. Participants' networks were defined as people with whom they had interacted most over the past 6 months. Network proportions of different relationship categories (family, friends, clients, etc.) were calculated from this network data. Adjusted prevalence ratios of social network characteristics associated with CI with the last female partner were calculated using Generalized Linear Models.

RESULTS: Analysis was limited to bisexual-identified participants (n=166). Participants' mean age was 26.8 (SD 7.1) with a mean of 9.6 (SD 11.0) male and 9.5 (SD 19.9) female partners. 52.4% reported having a stable partner and prevalence of CI with last male and female partners were 3.2% and 28.1%. The average social network proportions of clients and other sexual partners were 20% (SD 20%) and 30% (SD 20%). The average proportion of social networks made of family and friends were 20% (SD 20%) and 30% (SD 20%) respectively. MSW with a stable partner or ≥1 family member in their network had a greater probability of CI with their last female partner (Prevalence Ratios: 1.9 [95% CI: 1.1, 3.2] and 2.4 [95% CI: 1.1, 5.1], respectively). MSW with a higher network proportion of friends were less likely to report CI with their last female partner (PR:0.2 [95% CI: 0.1,1.0]).

CONCLUSIONS: Specific social network characteristics are linked to CI with female partners among bisexual MSW. While CI with men was rare, family relationships and a stable partners were associated with increased likelihood of CI with these women. Additional research is needed to define the interaction of social networks, sexual disclosure, and HIV risk among bisexual MSW in Latin America.

WEPED779

Depressive symptoms and substance use: Changes overtime among a cohort of HIV-positive and HIV-negative MSM

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BACKGROUND: We examined the prevalence, correlates, and change in depressive symptoms among HIV-positive and HIV-negative men who have sex with men (MSM) over time.

METHODS: 534 participants from an NIH/NIDA funded cohort enrolled between August 2014 and June 2018 in Los Angeles, CA were included. Eligible participants were: ≥18 and < 45 years of age at enrollment; male at birth; and if HIV-negative reported condomless anal intercourse with a male partner in the past six months. Half were HIV-positive and half HIV-

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negative. Self-interviews were used at baseline and semi-annual visits to collect information on depressive symptoms (CES-D₂₀), substance use, and sexual behaviors. Factors associated with depressive symptoms were evaluated using regression analysis with generalized estimating equations and changes over time were evaluated using individual growth curve modeling.

RESULTS: Average age was 31 with 43% identifying as Black/African American, 37% Latino/Hispanic, and 14% white. The average CES-D₂₀ score was 19.5 and prevalence of depressive symptoms (CES-D₂₀ ≥23) across 1,888 visits was 35% and higher among HIV-positives (38% vs. 31%; p value=0.02). Depressive symptoms were highest among substance users; daily/weekly heroin users had the highest prevalence (70% vs. 49% for occasional users and 34% for non-users; p value=0.03), followed by daily/weekly methamphetamine users (56% vs. 39% for occasional users and 27% for non-users; p value< .01). Based on growth curve modeling, methamphetamine was the most influential predictor of rate of change in depressive symptoms, more than any other substance accounting for 10% of depressive symptoms (random intercept variance from 80.7 to 72.5; p value< .01). Depressive symptom differences were also noted by sexual behaviors. HIV-positive participants with new sex partners had a higher prevalence of depressive symptoms than those without new partners (42% vs. 31%; p value< .01). Among HIV-negative participants, depressive symptoms were higher among those reporting transgender sex partners (46% vs. 30%; p value< .01).

CONCLUSIONS: The prevalence of depressive symptoms among this cohort of HIV-negative and HIV-positive MSM was relatively high, especially among substance users. These findings suggest that reducing substance use and methamphetamine in particular may reduce depressive symptoms and impact other co-occurring issues such as sexual risk behaviors.

WEPED780

Depressive symptoms as a predictor of HIV seroconversion among young adult African-American/Black men and transgender women who have sex with men in the Southeastern United States

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BACKGROUND: Several studies have demonstrated high HIV incidence among Black men and transgender women who have sex with men (MSM/TW) in the United States. In 2016, young Black MSM/TW under the age of 24 accounted for more new HIV infections than any other sociodemographic group, yet little is understood about the upstream determinants of HIV seroconversion in these groups. Understanding drivers of the HIV epidemic among key populations, including young Black MSM/TW, is critical for informing HIV prevention programs and reversing the course of HIV epidemics in these populations. Depressive symptoms are correlated with HIV-related risk behaviors (e.g., reduced condom use) and engagement in HIV prevention services (e.g., lower likelihood of HIV testing), but depressive symptoms as a predictor of HIV seroconversion among young Black MSM/TW is understudied.

METHODS: Participants were recruited in the Atlanta, GA USA area from 2014-2017. During study procedures, N=130 Black MSM (91.6%) and TW (8.4%) aged 18-24 years tested HIV negative and were enrolled into a longitudinal study that included a baseline assessment and HIV testing at the 12-month follow-up. Multivariable logistic regression analyses were completed in order to assess the relationship between depressive symptoms with HIV status at 12 months, controlling for gender identity, alcohol and drug use, anal intercourse with HIV positive/status unknown partners, and group sex in the past three months, as well as lab-confirmed STI test results.

RESULTS: The sample had a 10.0% (N=13) annual HIV incidence. Analyses demonstrated that depressive symptoms positively, significantly predicted HIV seroconversion (aOR = 3.698, 95% CI = 1.012-14.761), with no other variables predicting seroconversion.

CONCLUSIONS: Controlling for well-known sex- and substance use-related proximal risk factors, depressive symptoms positively, significantly predicted HIV seroconversion among young Black MSM/TW. Results

suggest that young Black MSM and TW with greater levels of depressive symptoms may have riskier sexual networks, e.g., may be more likely to meet sex partners online, exchange sex for money, goods, or other services, and/or have less stability in their relationships. Future HIV prevention interventions for Black MSM/TW must work to address mental health and interpersonal/relationship health in addition to behavior change to reduce HIV incidence rates in these groups.

WEPED781

HIV care cascade in men who have sex with other men in Paraguay 2017: Combination of epidemiological surveillance data studies with laboratory data

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BACKGROUND: Paraguay has a concentrated HIV epidemic and men who have sex with men (MSM) are disproportionately affected. Yet, no data is available on the HIV care cascade for this population. This study aimed to assess the HIV care cascade among MSM in Paraguay in 2017

METHODS: The HIV care cascade (HIVCC) in MSM was constructed combining information from the National surveillance of HIV Prevalence and risk behaviors in Paraguay and the HIV/AIDS laboratory system of health information. The HIVCC included: i) number of MSM people living with HIV (PLHIV) who entered the National surveillance HIV Prevalence study recruited through the RDS methodology ii) proportion of PLHIV who reported ever diagnosed; iii) proportion of MSM PLHIV who reported linked-to-care iv) proportion of MSM PLHIV who reported having started antiretroviral therapy (ART); v) proportion of MSM PLHIV who were virally suppressed at their last visit.

The pillars I, ii, iii, iv were extracted from the national surveillance of HIV Prevalence and the V from the national reference laboratory. The data of the prevalence study and data of the laboratory were linked through a common identifier

RESULTS: In 2017, 1455 MSM were tested at National surveillance of HIV Prevalence and risk behaviors in Paraguay. From the study population 209 (14.36%) were HIV-infected. The proportions of each stage in the cascade were: 61% reported ever diagnosed, 58 % reported linked-to-care, 53 % reported having started ART, 32% virally suppressed

CONCLUSIONS: The combination of data from epidemiological surveillance studies with laboratory data to build the attention cascade provides important information to advance towards the goal of eliminating HIV. Improving care cascade outcomes among MSM must be a principal component of national response to HIV epidemic in Paraguay with emphasis on testing and strategies to suppress viral load in MSM

WEPED782

Understanding low rates of HIV testing among men in Colombia: Findings from a population-based survey

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BACKGROUND: Most research studies and interventions to promote HIV testing in Colombia have been conducted in large cities (e.g., Bogotá, Cali). As a result, knowledge about HIV testing in other areas of the country is scarce. We sought to characterize factors associated with HIV testing in a nationally-representative sample of Colombian men.

METHODS: We analyzed self-reported questionnaire responses from the 2015 Demographic and Health Survey (DHS) in Colombia. We included men aged 13 to 59 that reported having ever had sex (N= 29413). We used logistic regression to identify factors associated with having ever been tested for HIV. Variables included in the analysis were: demographics (e.g., age, place of residence); sexual behavior (i.e., age at first sex, any STI in last 12 months); sexual orientation (i.e., identification as gay or bisexual);

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HIV-related stigma; HIV-related knowledge and anti-gay stigma. Survey results were weighted using country-specific sampling weights provided by DHS.

RESULTS: Only 18% of men reported having ever been tested for HIV. In multivariate logistic regression analysis, likelihood of lifetime HIV testing was almost four times greater among men who identified as gay or bisexual compared to those who identified as heterosexual (42.2% vs 17.6%; OR 3.7; 95% Confidence Interval [CI] 2.8, 4.8, $p < 0.001$). Increased likelihood of testing was also associated with living in a large city (vs. small cities, towns or rural areas), older age, being married or living with partner, higher educational attainment, younger age at first sex, having had an STI in last 12 months, and lower HIV-related and anti-gay stigma.

CONCLUSIONS: Testing rates among men in Colombia are low. The fact that rates are significantly higher among gay and bisexually identified men, and among those living in cities targeted by interventions to promote HIV testing, speak well about the efficacy of such interventions. However, there is an urgent need to develop interventions to promote HIV testing in other areas. For these interventions to be most effective, more research is needed to identify the psychosocial and social-structural factors associated with HIV testing among men in smaller cities, towns and rural areas of the country.

WEPED783

Low viral suppression among HIV-positive men who have sex with men in Mpumalanga, South Africa

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BACKGROUND: Men who have sex with men (MSM) in South Africa engage in HIV care at lower rates than other persons living with HIV (PLHIV) in the general population. Estimates note that as few as 25% of MSM living with HIV are on ART. MSM may face population-specific barriers to linkage to ART and viral suppression (VS). In Ehlanzeni, Mpumalanga, an estimated 14% of MSM are living with HIV and < 10% of them are on ART. As part of a pilot trial of an MSM-tailored peer navigation (PN) intervention, we assessed factors associated with ART use and VS among MSM at trial enrollment.

METHODS: The study used snowball sampling to recruit 103 HIV-positive MSM. Inclusion criteria were: assigned male at birth, identify as gay/bisexual man or transgender woman, HIV-positive (by rapid antibody testing at enrollment), age ≥ 18 years, sexually active, and resident of Ehlanzeni District. Data on clinical visits and ART adherence were self-reported. We verified viral suppression (VS) status through laboratory analysis of biological samples (Viral Load < 1000 copies/ml). We assessed correlates of viral suppression at baseline using multivariable logistic regression analysis, including demographic, psychosocial, clinical, and behavioral indicators.

RESULTS: Mean age was 30.9 (SD=9.4) years. Only 45.6% had disclosed their HIV status to their partners/spouse. Among participants, 52.4% (n=54) reported ART use and only 42.2% (n=43) were VS; 49.5% (n=51) had adhered to ART (i.e. not missed pills 4 days in a row ≤ 3 months) and were engaged in care in the past 3-months. Of those, 56.0% (n=28) were VS. In multivariable analysis, significant correlates of VS were age ≥ 25 years (aOR=3.3, CI 95%: 1.1-9.9), being married or living with partner (aOR=2.7, CI 95%: 1.1-6.9), and adherence to ART/engagement in care in past 3 months (aOR=3.9, 95% CI: 1.6 - 9.6).

CONCLUSIONS: A low proportion of MSM were optimally engaged in care and virally suppressed. Those with viral suppression were more likely to be optimally engaged, married/living with partner, and older. Results suggest targeted linkage support programming is needed alongside HIV testing interventions to address low engagement among diagnosed MSM and improve treatment outcomes among this population.

WEPED784

HIV testing by MSM peer educators: High HIV-positive yield among MSM living in Yaoundé tested by Humanity First Cameroon

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BACKGROUND: Since the five past years, WHO recommends a non-medical approach to test at least 90% of people living with HIV, especially for hard-to-reach population like men who have sex with men (MSM). Indeed, despite efforts in the HIV response, prevalence among this group of population remains high, in Cameroon it is at 25% according to the latest IBBS conducted in 2016. Discrimination and lack of appropriate care hinder their access to HIV testing which can only be done by a care provider. The goal of Humanity First Cameroon is to demonstrate effectiveness, safety, HIV positive yield and linkage to care among MSM in Yaoundé receiving HIV testing by MSM peer educators.

METHODS: Twenty peer educators were trained during 36 hours by lab technicians on finger prick blood collection and rapid HIV testing using Determine. They were trained during 16 hours on didactics sessions on up to date information about HIV and 08 hours of field work. They also received 08 hours of psychosocial counseling training. Certification was issued for those who scored >60% of theory and practical assessment.

RESULTS: Between January and October 2018, this non-medical approach has permitted us to test 210 hard-to reach MSM. Of which 27% were tested HIV reactive and were referred to the health facilities for confirmation of the result according to the national algorithm of HIV testing. 100% of them was successfully linked to treatment and are currently on ART. A skilled team of psychosocial counselors are devoted to help them achieve a suppressive viral load.

CONCLUSIONS: This study has shown us that MSM peer educators could be successfully empowered to be lay provider, they can safely and effectively delivered HIV testing to their community and reach high risk MSM (according to the yield). We also found that this approach maintains 100% of test quality and 100% of linkage to treatment of people tested HIV positive.

HIV testing by peer educators could be help to achieve the first 90 and it should be integrated as one crucial component of national health care system to end HIV by 2020.

WEPED785

Assessing sexual event-level substance use and risk behavior for HIV infection in a diverse sample of HIV-negative MSM in the era of PrEP, 2018

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BACKGROUND: Assessment of sexual event-level risk is a critical approach to understanding the full context of HIV risk-related behavior among MSM, including sexual and substance-using behavior. In an era where PrEP is increasingly used to prevent HIV infection among HIV-negative MSM, assessment of protective behavior is more complex than in the earlier era of condoms for primary prevention. In this analysis we examine condom, PrEP, and substance use related to the most recent anal sex encounter with a casual sex partner in a diverse sample of MSM in three US cities.

METHODS: Data are from baseline assessment of the M-Cubed (Mobile Messaging for MSM) study. A convenience sample of MSM was recruited online and through community venues in Atlanta, Detroit, and New York City in 2018. This analysis focuses on the HIV-negative subsample who reported having a casual anal sex partner within the prior 3 months (n=553 of 782; 71%). We analyzed demographic variables of race/ethnicity, age group, education, and city, and risk behavior related to the recent sex encounter (no condom use, no PrEP use, and substance use (drunk/buzzed on alcohol, drug use).

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RESULTS: Among the 553 MSM indicating anal sex with a casual partner in the prior 3 months (Table 1), respondents reported risk behavior of no condom use (60%), no PrEP use (62%), neither condom nor PrEP use (33%), being drunk or buzzed on alcohol (27%), and drug use (15%). In multivariable regression analysis (Table 2), being drunk/buzzed during sex was associated with no PrEP use (AOR=1.59, 95% CI=1.04-2.44) and neither condom nor PrEP use (AOR=1.75, 95% CI=1.15-2.66). Age group and education differences were found for sex-related risk behavior (e.g., men age 18-29 (vs 40+) had lower odds of no protection (AOR=0.59, 95% CI=0.37-0.95).

CONCLUSIONS: In a diverse sample of HIV-negative MSM in three US cities who report having recent anal sex with a casual partner, one-third report no use of protection by condoms or PrEP to prevent HIV infection. Being drunk/buzzed on alcohol was associated with no protection. Although PrEP is an increasingly common tool, primary prevention is still a challenge among some MSM.

WEPED786

Perceived barriers to access available HIV and STIs services among men who have sex with men (MSM) in Tanga Region Northern, Tanzania

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BACKGROUND: Whilst studies have shown a high prevalence of HIV and STIs among MSM globally and in Africa. Other studies shown that the MSM faced barriers during the accessing the HIV and STIs services from the health care facilities are among the factor that increase the prevalence. The study was aimed to determining the proportion of MSM who accessed health care and disclose their sexual orientations to health care workers (HCW) and anticipated barriers from if MSM disclose their sexual orientations. It also intended to find out social factors that MSM perceived from the community especially and HCWs which result to them denying accessing to SHRS and STIs services from health care facilities.

METHODS: A cross sectional study that involves both quantitative and qualitative methods was conducted from April and June 2015 in four districts of Tanga, Tanzania. 266 MSM were enrolled in the study using Respondent Driven Sampling method. Quantitative data was collected using structured administered interview and entered in SPSS 23.0 vision for analysis while Qualitative data was collected using in-depth interview, analyzed and interpreted manually.

RESULTS: The mean age of the participants was 27.2 (SD 6.7) years, 48% were married or cohabiting, with median of 20 lifetime. The majority 68.8% of MSM have not accessed HIV and STIs services till they were sick. 13.4% did not go to the health facilities for treatments even if they are sick due to fear of stigma and discrimination. 67.8 % had ever disclosed their sexual orientations to either to HCWs or close person. This was due to lack of confidentiality, fear of stigma and discrimination, shame and mistreatment and fear of the healthcare worker's reaction after they disclosed their status.

CONCLUSIONS: MSM need to be empowered to overcome their perceived fears towards healthcare workers and health facilities. Efforts should be put into breaking the cycle of negative information and perceptions MSM have about healthcare workers and how they deal with same sex practices' health related problems.

WEPED787

Types of group sex and their association with sexual risk behaviors among HIV-negative men who have sex with men (MSM)

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BACKGROUND: Group sex among MSM is usually characterized as a high-risk setting for HIV and other STIs, although recent findings suggest that group sex behavior is varied and risk levels are heterogeneous. We identified types of group sex and their association with different sexual behaviors related to STI and HIV infection among HIV-negative MSM.

METHODS: The sample consisted of 392 MSM (median age=40 [IQR=32-47]) who reported 1015 group sex events during 7 waves (2015-2018) of the Amsterdam Cohort Studies. Latent class analysis was used to identify types of group sex based on: group size, familiarity with partners, location, planning, and drug use (excluding alcohol). Sexual behaviors related to STIs were considered risky if receptive and without protection or protection was shared between partners. Associations between group sex types and sexual behaviors related to STI (risky fingering, risky fisting and/or use of sex toys) and HIV infection (condomless anal intercourse [CAI]) were evaluated using logistic regression with generalized estimating equations, comparing individual types to the sample mean as a reference.

RESULTS: Four types of group sex were distinguished: familiar (30%), intimate (27%), impromptu (35%), and party (8%). Familiar group sex mostly occurred in private places, with known partners and involved drug use; intimate group sex mostly involved threesomes, no drug use, and occurred in private places; impromptu group sex was mostly unplanned, with unknown partners, and occurred in public places; party group sex mostly involved large groups, planning and unknown partners. Familiar group sex had an increased odds of risky fingering (OR=1.5, 95%CI:1.2-1.9) and of risky fisting and/or use of sex toys (OR=2.3, 95%CI:1.5-3.5). Intimate group sex had a decreased odds of risky fisting and/or use of sex toys (OR=0.6, 95%CI:0.3-1.0). Impromptu group sex had a decreased odds of CAI (OR=0.6, 95%CI:0.5-0.8). Party group sex had an increased odds of CAI (OR=1.5, 95%CI:1.1-2.1).

CONCLUSIONS: This study identified patterns of group sex behavior, with some group sex types riskier for STIs and others for HIV infection. These findings suggest that interventions should consider the context of group sex in order to more effectively prevent HIV and STI transmission.

WEPED788

Family characteristics in sex communication and social support: Implications for emerging adult men who have sex with men's PrEP engagement

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BACKGROUND: Parental support remains a strong correlate of positive sexual health outcomes for heterosexual youth, yet the same has not been established for emerging adult MSM (EAMSM; ages 18-25). With the emergence of pre-exposure prophylaxis (PrEP), few studies have examined the potential for parental support to elicit PrEP adoption among EAMSM. Our study aimed to describe the extent to which parents' support, as operationalized by social support and comfort discussing sexuality-related issues, is associated with current PrEP use.

METHODS: PrEP-indicated EAMSM (N=194) were recruited via Facebook and Grindr (October 2018-January 2019) to complete an online survey. Eligibility included HIV-negative (self-reported), cis-gender MSM, aged 18-25, who reported sex with men in the past 6 months, eligible for PrEP (≥1 indication) and resided in a Mid-Atlantic urban metro area. We calculated a composite score indicating participants' comfort discussing sexual behaviors, sexual identities, sexual health, and PrEP use with their mother and father (8 items; alpha=.91). Other family characteristics included sexual identity disclosure to family, family social support, and EAMSM's

prioritization of family in their lives. A multivariable logistic regression examined the associations between family characteristics and PrEP uptake, after adjusting for sociodemographic variables (e.g., age, race, education, relationship status).

RESULTS: Thirty percent ($n=57$) of participants reported current PrEP use. Although roughly 20% reported moderate/high comfort with parent sex communication, most EAMSM reported being out to their family (80%), having moderate/high support (70%), and ranking their family as a high/very high priority in their lives (70%). In adjusted models, the odds of current PrEP use increased with age ($AOR=1.56$, 95% CI : 1.19-2.03), parent sex communication ($AOR=1.82$, 95% CI : 1.14, 2.90), and increased family disclosure of sexual identity ($AOR=1.42$, 95% CI : 1.03-1.95). Participants who reported being in a relationship were less likely to be on PrEP than single participants ($AOR=0.29$, 95% CI : 0.13-0.63).

CONCLUSIONS: Parents possess a critical potential to reduce EAMSM's risk of HIV and promote PrEP uptake. Interventions that facilitate parents' efficacy to foster affirming, non-judgmental environments and discussions about EAMSM's sexual behaviors, attractions/relationships, and risk reduction strategies (e.g., PrEP) may offer a new HIV prevention approach for EAMSM.

WEPED789

Identifying the experiences of young gay, bisexual, and other men who have sex with men who engage in the sexualized use of cannabis

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BACKGROUND: While there is abundant research examining factors and outcomes associated with the sexualized use of some key substances (e.g., methamphetamine, GHB) among gay, bisexual, and other men who have sex with men (gbMSM), little is known about how cannabis features within these experiences. Given that the sexualized use of substances is among the primary contemporary drivers of high rates of HIV and other sexually transmitted and blood-borne infections (STBBI) among gbMSM, the objective of this study was to identify experiences with cannabis use and HIV/STBBI risk behaviour within this population.

METHODS: We conducted a thematic analysis of 50 in-depth, semi-structured interviews with young gbMSM ages 15-30 in Vancouver, Canada, on the sexualized use of substances.

RESULTS: Findings revealed two themes regarding the sexualized use of cannabis. First, participants identified how using cannabis during sex could provide *positive effects*. Within this theme, reported motivations, contexts, and patterns of cannabis use centered on lowering inhibitions and decreasing anxiety. For example, several participants described how using cannabis during sex allowed them to engage in sex acts and explore fetishes that they would otherwise avoid. More so, many participants emphasized how using cannabis decreased anxieties with respect to insecurities about sexual performance, fear of HIV acquisition, and concerns with past sexual trauma. Others described how cannabis both enhanced sexual pleasure and reduced pain during receptive anal sex. Alternatively, a subset of participants described how using cannabis during sex could have potentially *adverse effects*, including significant increases in risk-taking behaviour

(e.g., unprotected sex), decreased capacity to negotiate their needs and boundaries during sex, and a tendency to be complacent toward pain.

CONCLUSIONS: This study is among the first to identify the patterns, contexts, and motivations for cannabis use among young gbMSM in a setting in which non-medical cannabis was recently legalized. We identify public health strategies for reducing harm among gbMSM who use cannabis during sex. Specifically, our findings provide support for the integration of sexual health care and harm reduction services that provide opportunities to discuss the sexualized use of cannabis, with a focus on sustaining positive cannabis-related effects while reducing harms associated with HIV/STBBI-related risk behaviours.

WEPED790

"It's easy and convenient!": Perceived facilitators and barriers for HIV self-testing and PrEP uptake among adolescent men who have sex with men, transgender women and their parents

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BACKGROUND: Thai adolescent men who have sex with men (MSM) and transgender women (TGW) ages 15-19 years have high HIV incidence (10 per 100 person-years) and engage in high-risk activities. While HIV testing and pre-exposure prophylaxis (PrEP) services are available, few adolescents have tested for HIV due to barriers in accessing services, including perceived stigma and discrimination by health care providers. HIV self-testing (HST) can address these barriers. In a qualitative study led by the USAID- and PEPFAR-funded LINKAGES Thailand project, we assessed perceptions of HST and PrEP uptake among young MSM (YMSM), young TGW (YTGW), and their parents.

METHODS: Twelve focus group discussions (four each with parents, CBO staff, and health professionals) and 40 in-depth interviews (32 with YMSM and YTGW ages 15-19 years, eight with parents of YMSM/YTGW) were conducted December 2018-January 2019 in Thailand. Thematic analysis was conducted using Nvivo 11 software.

RESULTS: YMSM/YTGW found HST fast, easy, and convenient—and appropriate for their lifestyle. They preferred blood-based finger-prick testing over saliva-based swabs since they viewed blood-based testing as more accurate. They noted that HST was more sustainable and eliminated clinic visits, thus decreasing exposure to stigma and discrimination, but worried that self-test kits were not as reliable as clinic-based tests. Parents of YMSM/YTGW wanted their children to have as many HIV-prevention options as possible. Some wanted schools to be involved, and some worried that YMSM/YTGW who test positive may not be able to handle it; therefore, they felt sufficient information should be given to YMSM/YTGW about living with HIV and the importance and advantages of knowing your status. While YMSM/YTGW felt that daily PrEP was an important option for HIV prevention, some worried about adherence and wanted on-line social media tools to assist them. Finally, some participants with low HIV risk worried PrEP may not be good for their liver and kidneys.

CONCLUSIONS: We found high interest in HST and PrEP among Thai YMSM/YTGW and their parents. These prevention tools could be incorporated into the everyday lives of Thai YMSM/YTGW through online spaces, where they already navigate their development of gender and sexuality.

WEPED791

High sexual risk behaviours as a determinant to HIV infection among MSM in Nigeria

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BACKGROUND: Men who have sex with men (MSM) are an important key population (KP) in HIV programming in Nigeria. Evidence from Integrated Biological Behavioural Surveillance Surveys shows an increasing burden of HIV infection from 13.7% (2007) to 17.2% (2010) to 22.9% (2014). In order to address this trend, it is important to identify factors influencing HIV infection among MSM.

METHODS: A total of 299 MSM were recruited using respondent-driven sampling techniques in urban and rural areas of two Nigerian states, Rivers and Kaduna. Data were collected using questionnaires on high sexual risk behaviors. Multiple logistic regression was used to analyze the high sexual risk behavior of MSM.

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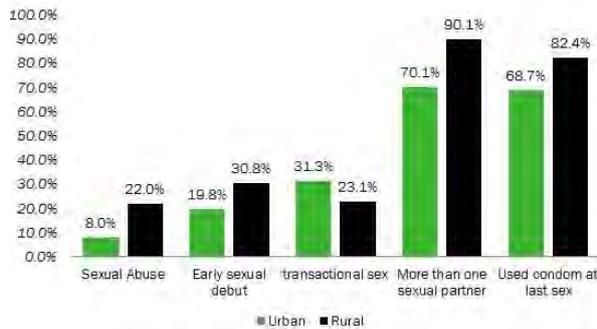
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RESULTS: The mean age at first sexual debut was 17.1 years + (4.7) (95% CI: 17.3- 18.5). The age of sexual debut ranged from 5 to 35 years with the modal age being 20 years. The mean age of sexual debut for MSM residents in urban areas was 18.9 + (4.5) [95%CI: 18.2-19.6] and that for MSM residents in rural areas was 15.9 + (4.3) [95%CI: 15.0 -16.8].

Results in figure 1 show a significant difference in the age of sexual debut among MSM in rural and urban areas (30.8% vs 19.8%; $\chi^2=22.46$; $p<0.001$). Also observed was the high proportion of MSM in rural areas who had been sexually abused (22.0% vs 8.0%).

CONCLUSIONS: To reduce the rate of new infections among MSM, information targeted at reducing HIV risk should be produced. Targeted outreach for MSM especially in rural areas should be encouraged, and continuous training of healthcare providers to provide friendly health services for MSM is required.



[Figure 1- HIV sexual risk profile of MSM by residential area]

WEPED792

Risk correlations of intimate partner violence among men who have sex with men in Chengdu, China

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BACKGROUND: Intimate partner violence (IPV) is an important determinant for HIV transmission among men who have sex with men (MSM). However, the prevalence and risk correlations of IPV are rarely explored in China. We aimed to investigate the prevalence of different types of IPV, and examined the causality between various behaviors and IPV among MSM in Chengdu, China.

METHODS: Participants were recruited from service users of a gay-friendly health consulting service center in Chengdu. All eligible participants were invited to participate in our questionnaire survey until the target sample size was met. To be eligible, participants had to be 18 or older and report at least one same-sex anal intercourse in the previous 6 months. IPV related information was measured by adjusted IPV-GBM scale, which was developed specifically for gay and bisexual men, to capture lifetime experiences of victimization/perpetration of physical, sexual, monitoring, controlling, emotional and HIV related IPV. Logistic regression analysis was conducted to determine associations between various risk behaviors and different forms of violence.

RESULTS: Among 326 participants, 92 (28.2%) reported lifetime experiences of IPV (physical, sexual, monitoring, controlling and emotional) perpetrated by a regular partner, and 93 (28.5%) reported having perpetrated IPV to a regular partner at least once. Adjusted logistic regression models revealed that having been engaged in transactional sex is a risk factor of receipt monitoring IPV (AOR=4.4,95%CI:1.5-12.8), and perpetrating monitoring IPV (AOR=4.4,95%CI:1.5-13.3); use of drugs is a risk factor of receipt controlling IPV (AOR=3.1,95%CI:1.4-6.8); ages of first homosexual intercourse were found to be protective of perpetrating physical IPV (AOR=0.83,95%CI:0.7-1.0), any monitoring IPV (AOR=0.9,95%CI:0.8-1.0), and any perpetrating IPV(AOR=0.9,95%CI:0.9-1.0); Self-esteem scores were also found to be protective of sexual, emotional and HIV related IPV. We then explored the associations between victimization and perpetration IPV in various dimensions (i.e. physical, sexual, monitoring, controlling and emotional) and found them significant (OR=20.8-84.8).

CONCLUSIONS: Violence prevalence among MSM is high and merits additional public attention. In this study, we examined both receipt and perpetration of different types of IPV, and found significant associations between some risk behaviors and violence. Researchers should consider these factors when designing effective interventions.

WEPED793

Perceived barriers to emerging PrEP modalities in the US: Social determinants of health and modality-specific attributes may inhibit PrEP uptake among sexual and gender minority adolescents

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BACKGROUND: Adolescent men who have sex with men (AMSM; 13-17 years old) account for 63.4% of new HIV infections among adolescents in the US. Daily oral PrEP was approved for HIV prevention in adolescents in 2018, and new PrEP interventions are being explored in adult populations (PrEP on-demand; long-acting PrEP injections and implants). These modalities have potential to overcome suboptimal PrEP uptake and adherence, however, published research has not examined adolescents' perspectives on their implementation.

METHODS: This mixed methods study recruited participants (sexual and gender minority adolescents assigned male sex at birth) through social media and research registries. The project collected online surveys and conducted five online focus groups in which participants watched videos and answered questions on new PrEP modalities. Quantitative and qualitative data were analyzed using descriptive statistics and thematic analysis.

RESULTS: Participants (N=56) were 14-18 years old (mean=17.0 years), 30.4% Latinx, and 28.6% racial minority; most were cisgender male (94.6%; 5.4% transgender/non-binary) and identified as gay (78.6%). Survey data indicated 80.4% were aware of PrEP and 2.2% had ever taken PrEP. The most frequently endorsed barriers to daily oral PrEP were knowing where to get PrEP, paying for PrEP, and getting to the clinic. Similarly, in qualitative focus group data, PrEP costs and transportation were frequently reported barriers, as well as homophobia in the form of disapproving parents and healthcare providers. For PrEP on-demand, perceived barriers were limits to sexual spontaneity and forgetting to take pills. For injections, barriers were fear/pain of injections and frequency of medical appointments (bi-monthly). For implants, barriers were lack of privacy due to implant perceptibility, side effects (infection, scarring), and frequency of medical appointments (3-12 months).

CONCLUSIONS: This research highlights the importance of AMSM perspectives to address barriers to PrEP uptake in advance of implementation of new PrEP modalities. Social determinants of health are considerably relevant to adolescents, particularly in regard to accessing healthcare and facing disapproval from families and healthcare providers due to their sexual and gender minority identities. Modality-specific barriers are similar to findings with adult populations and highlight the need to address ease of use, privacy, and frequency of healthcare interactions.

WEPED794

Understanding expressions of masculinity among HIV-positive, adolescent men who have sex with men in Mexico City

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BACKGROUND: Studies show that expression of dominant masculine traits and behaviors can increase the risk of contracting HIV, reduce health seeking behaviors and interfere with adherence to HIV treatment. Young men who have sex with men (YMSM) in Mexico City are at elevated

risk for contracting HIV. Yet, studies that have examined masculinity and HIV in Mexico have not fully explored how internalized concepts of masculinity and heteronormativity may affect YMSM living with HIV. We sought to qualitatively examine how perceptions of masculinity may relate to HIV risk among YMSM in Mexico City.

METHODS: We conducted 18 semi-structured, in-depth interviews with horizontally infected, HIV-positive gay and bisexual men, ages 15-19, at two specialized HIV clinics in Mexico City. We asked all participants about masculinity, sexual behavior and social norms surrounding gender expression. Data were coded and analyzed thematically.

RESULTS: Participants identify heteronormative standards and behavior as 'normal.' Participants often describe the masculine figures in their families as 'machista' (traditionally masculine). Youth value the work ethic and economic stability that this implies, but not the aggression, alcoholism, or degradation of women. Most participants say they learned how to behave in a relationship from their mothers and fathers, not from other gay and bisexual men.

All participants agree that being gay is associated with femininity, and some assert that it is also associated with promiscuity. Most men report limited communication with partners about condom use or sexually transmitted infections, and that sexual positions are determined by masculine/feminine appearance with limited flexibility.

CONCLUSIONS: YMSM in Mexico City reflect hegemonic masculinity through their rejection of more feminine YMSM and public suppression of personal traits that society deems feminine. Suppression of feminine qualities seems to be a coping mechanism to avoid verbal abuse and physical violence.

However, few men acknowledge this dynamic. Implying that hegemonic masculinity may be largely internalized and subconsciously enacted among this group, as many men report being 'out' to family, friends and co-workers. Therefore, internalized masculine norms and heteronormative standards of partner selection, condom use, and communication may influence how gay and bisexual men engage in risky behavior.

WEPED795

Understanding gay couples: A new vision for HIV prevention in Peru

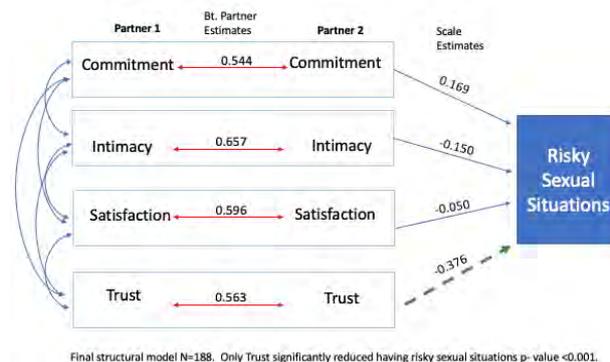
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BACKGROUND: In Peru, HIV is concentrated among sexual and gender minorities, especially gay men. However, there is limited information on their relationship characteristics, including how commitment, trust, sexual agreements, may influence risky sexual situations. This understanding may be important to improve HIV prevention efforts. Current HIV prevention programs in Peru do not take sexual relationship characteristics into account when considering HIV risk, HIV prevention strategies focus solely on individuals.

METHODS: We recruited Peruvian gay men in stable relationships from a community center for gay men. Men were asked to participate with their partner and were invited to complete a computer-based survey, including partnership related psychosocial scales and an index of risky sexual situations. Cronbach's alpha was calculated for all scales. Then we constructed a structural equation modeling (SEM) to analyze how relationship characteristics (commitment, trust, intimacy, and commitment) may influence risky sexual situations using dyadic data from couples.

RESULTS: The study included 188 gay men in stable partnerships. Their median relationship length was 9 months (interquartile range 3-24) and their mean age was 27 years (standard deviation±6). More than half of the participants reported being open about their sexuality with their family and friends. Almost half of the participants, 47.9% (n=93) reported more than one risky sexual situation. Moderate correlation on all relationship characteristics were seen between partners (0.544 to 0.657), see figure. There was a significant correlation (p-value>0.001) between having more trust in the relationship and a reduced risky sexual situations. Other relationship characteristics were associated with risky sexual situations, see Figure.

CONCLUSIONS: HIV programs should explore the possibility of providing HIV prevention services specifically for couples, such as couples HIV testing and counseling. Such services can provide couples support and build trust needed to reduce the HIV acquisition risk while in a stable relationship.



[Variables related to risky sexual behaviors in gay couples in Lima, Peru.]

WEPED796

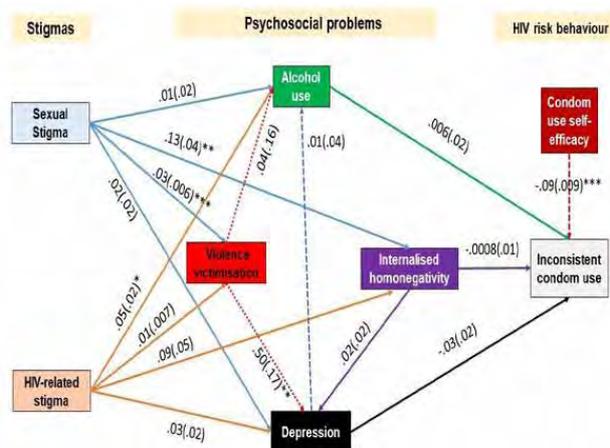
Testing the Stall et al's (2008) theory of syndemic production among MSM in India: Cross-sectional study

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BACKGROUND: The theory of syndemics explains why psychosocial problems cluster and interact in vulnerable populations to amplify disease burden. Stall et al (2008) drew on minority stress theory to propose a theory of syndemic production among urban gay men that attributed psychosocial problems to social marginalisation (secondary to societal stigma towards same-sex sexuality) and psychosocial stressors. This theory has not been empirically tested among MSM in India.

We tested whether sexual and HIV-related stigmas contribute to the production of four interconnected psychosocial problems (depression, alcohol use, internalised homonegativity and violence victimisation).

METHODS: A probability-based sample of 440 HIV-negative MSM were recruited through non-governmental organisations in a North Indian city. Standardised scales were used to measure sexual and HIV-related stigmas, health behaviour, and psychosocial problems. An hypothesised path model was tested using the gsem command in Stata 14 (Figure 1).



[Figure 1. Associations between stigmas, psychosocial problems and HIV risk]

RESULTS: Participants were relatively young (mean age: 27.2 years, SD 5.9) and had diverse sexual identities (e.g., kothi, giriya, gay). Sexual stigma was associated with violence victimisation and internalised homonegativ-

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ity, and HIV-related stigma was associated with alcohol use. Sexual stigma had an indirect effect on depression through violence victimisation, and a combined indirect effect on depression through violence victimisation and internalised homonegativity. None of the psychosocial problems had statistically significant direct effects on inconsistent condom use.

CONCLUSIONS: The results offer preliminary support for an expanded model of Stall et al's (2008) theory of syndemic production. Both sexual and HIV-related stigmas play a role in the production of psychosocial problems among urban MSM with diverse sexual identities in India.

People who use drugs (including by injection)

WEPED797

Informal pain management after reduction/ discontinuation in opioid therapy

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BACKGROUND: People living with HIV (PLWH) experience significant chronic non-cancer pain (CNCP) and a high prevalence of opioid prescribing. In response to the current opioid crisis, providers across the US have reduced/discontinued opioids for many CNCP patients. Little is understood about how patients manage their pain during this transitional period. **METHODS:** We used thematic content analysis to analyze 18 interviews from participants enrolled in a study of PLWH whose opioids were reduced/discontinued in the prior 12 months. Interviews were audio-recorded and transcribed verbatim. Two analysts coded all interviews, interrater reliability was measured, and coding discrepancies discussed. The study took place in San Francisco, California, in 2018.

RESULTS: Participants were largely male (61%), African American (44%) and white (44%), with a mean age of 55. All were actively engaged in medical care. Most participants (89%) reported a history of illicit substance use, and 61% had used within the past year.

Our findings describe (1) what, (2) when, (3) why and (4) how participants create informal pain management decisions after being reduced/discontinued from opioids, with a focus on illicit opioids given the high rate of substance use among our participants.

What are the pain management approaches? Many participants reported using integrative therapies such as acupuncture and massage to relieve pain. Most reported using illicit opioids or heroin, and some reported doing so for the first time.

When is informal pain management utilized? Participants reported using alternative approaches to fill in prescription gaps, supplement prescriptions after reduction, and replace prescriptions after discontinuation.

Why use illicit opioids? Nearly all participants reported using to decrease pain; no participant reporting using for recreational purposes.

How do participants make decisions around illicit use? Most participants made pain management decisions independently, while many sought peer advice. Participants who had never used illicit opioids before reported relying on peers for education about and access to opioids after losing access to prescribed opioids.

CONCLUSIONS: PLWH reduced/discontinued from opioids relied on informal pain management, often including illicit opioids. Providers should develop in-depth pain management plans when considering reducing/discontinuing opioids and ensure access to medications for opioid use disorder treatment if needed.

WEPED798

Alcohol, drug use and mood disorders in a random sample of HIV positive rural South African men

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BACKGROUND: Men in sub-Saharan Africa are less likely than women to access HIV care due to key behavioral, social, and structural factors. Substance use and mood disorders are hypothesized to decrease engagement in care, but evidence on this association among South African men is limited.

METHODS: We screened for substance use and mood disorders in a prospective, community-based HIV testing and linkage study among men in rural South Africa. Through self-report and urine dipstick we assessed alcohol, marijuana, amphetamine, cocaine, opioid, and benzodiazepine use. Self-reported use of mandrax, inhalants, and whoonga (low-grade heroin and fillers occasionally including ARVs) was documented. Anxiety and depression were measured using translated, validated versions of the GAD-7 and PHQ-9. Relative risks were generated using modified Poisson regression for binary outcomes, adjusted for age and study arm.

RESULTS: At exit, 100% of participants (N=131) completed all study procedures; 84% had visited a clinic and 62% were virally suppressed. On both self-report and urine tests, 80-hour alcohol use was high (59%;44%) as was marijuana (24%;31%). The urine test also identified opioid (15%) and benzodiazepine (11%) use. Inter-rater reliability was moderate for marijuana ($\kappa = 0.60$), opiates ($\kappa = 0.63$) and alcohol ($\kappa = 0.54$).

Anxiety (0%) and depression (6%) were not prevalent. Young men (18-29yrs) more frequently tested positive for marijuana (45%; 26%) and opioid use (35%; 9%) than older men(30-60yrs), with the reverse pattern evident for the alcohol use test (16%; 53%).

Over half the participants (52%) had any of: drug use, alcohol use disorder or a mood disorder. Collectively, these were not significantly associated with unsuppressed viral load (RR=1.15, 95%CI 0.66-2.03). Independently, drug use (RR=0.78, 95%CI 0.37-1.50), alcohol use disorder (RR=1.17, 95%CI 0.63-2.09) and depression (RR=0.72, 95%CI 0.12-2.32) were also not associated with unsuppressed viral load.

CONCLUSIONS: Drug and alcohol use were common with moderate agreement between self-report and urine test. Drug use was higher among younger men living with HIV while alcohol use was more prevalent in older men. While no association was found between substance use and unsuccessful viral suppression, a larger prospective sample is needed to assess associations at each step of the HIV care continuum.

WEPED799

Urgent need to address multiple high-risk behavior and prevent HIV among young PWID

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BACKGROUND: In Myanmar, with an HIV prevalence of 0.6% among 15 years and older, an estimated 29% of new infections occur among people who inject drugs (PWID). Identifying and understanding risk behaviors specific to young PWID is crucial to developing effective models for drug treatment and HIV prevention services for this population.

METHODS: From October 2017-January 2018, a cross-sectional integrated bio-behavioral survey (IBBS) was conducted among PWID using respondent driven sampling (RDS) in eleven townships and two cities. Eligibility criteria included age ≥ 15 years, having injected drugs in the past month, and having lived in the township/city for ≥ 6 months. Participants

completed an interview and were counseled and tested for HIV, hepatitis B, hepatitis C and syphilis. We compared risk behaviors of young PWID (15-25 years) versus older PWID (>25 years). Weighted data analysis was conducted with RDS Analyst and SAS.

RESULTS: Of the 6,061 PWID enrolled, 1,490 (25%) were ≤25 years old. The mean age at first drug injection was 19 years old, compared to 29 years old for PWID > 25 years. Time from first non-injection to injection drug use was also shorter for young PWID (2 versus 5 years). Over 80% of both young and older PWID inject more than once a day. A higher proportion of young PWID reported use of shared needles in the past month (48.9% versus 33.2%) and were slightly more likely to have casual (4.9% versus 2.5%) or paid (7.7% versus 7%) sexual partners. Young PWID were somewhat more likely to have used a condom at last sexual encounter (46.0% versus 34.2%). Fewer young PWID had comprehensive knowledge of HIV (34.8% versus 44.0%; $p < 0.001$) and had ever been tested for HIV (41.5% versus 49.9%; $p < 0.001$). The HIV prevalence for young PWID was 28.3%, lower than older PWID (37.0%; $p < 0.001$).

CONCLUSIONS: While young PWID engaged in multiple high-risk behaviors early, they also showed lower HIV knowledge and testing practices resulting in high HIV prevalence. Innovative approaches for engagement of young PWID and prevent HIV acquisition, are urgent.

WEPED800

Sex work as a mediator between female sex and incident HIV infection among people who inject drugs in Tijuana, Mexico

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BACKGROUND: HIV prevalence among PWIDs in Tijuana is 22 times higher than Mexico's national HIV prevalence and significantly higher among females versus males. We studied mechanisms driving gender inequities in HIV incidence among PWIDs in Tijuana, hypothesizing that sex work would be a key mediator.

METHODS: From 2011-2013, 651 HIV-seronegative PWIDs aged ≥18 were enrolled into an ongoing prospective cohort study in Tijuana, and completed semi-annual HIV tests and behavioral interviews. We calculated HIV incidence density between 2011-2018, identified univariate predictors of incident infection and conducted mediational analyses using Cox regression to test sex work as a mediator in the association between female sex and HIV seroconversion.

RESULTS: Of 651 PWIDs (males: 402, females: 249), 43 seroconversions occurred, 8.8% among females and 5.2% among males, yielding a cumulative incidence density of 1.25 per 100 person-years (PY) (95% CI=0.9-1.6). Incidence density was significantly higher among females versus males: 1.75 per 100 PY (95% CI=1.6-2.7) vs. 0.96 per 100 PY (95% CI=0.6-1.5), $p=0.02$. Significant univariate predictors of incident HIV were: female sex (hazard ratio [HR]=1.94, 95% CI=1.06-3.63), engaging in sex work (HR=2.42, 95% CI=1.33-4.41), injecting methamphetamine ≥ twice/day (HR=2.15, 95% CI=1.06-4.35) and injecting methamphetamine and heroin together ≥ twice/day in the past six months (HR=1.99, 95% CI=1.09-3.63), ever experiencing sexual violence (HR=2.40, 95% CI=1.25, 4.61), fewer years of injection drug use (HR=0.96 per year, 95% CI=0.93-0.99), and younger age (HR=0.96 per year, 95% CI=0.92-0.99). In mediation analyses, being female was significantly associated with sex work ($b=2.90$, $aOR=18.23$, $p < 0.001$), and sex work was significantly associated with incident HIV while controlling for female sex ($b=0.74$, $aHR=2.10$, $p=0.03$). After regressing female sex and sex work simultaneously onto incident HIV, the relationship between female sex and incident HIV decreased from $b=0.54$, $aHR=1.73$, $p=0.08$ to $b=0.12$, $aHR=1.13$, $p=0.72$. As hypothesized, sex work mediated a significant proportion (77.8%, $p=0.02$) of the effect of female sex on HIV seroconversion.

CONCLUSIONS: Sex work accounted for more than three quarters of incident HIV infections among female PWID in Tijuana. Thus, HIV prevention programs should target female PWID that engage in sex work to reduce gender disparities in HIV incidence.

WEPED801

Increased HIV prevalence and risk among women who inject drugs compared to men who inject drugs in Tajikistan

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BACKGROUND: People who inject drugs (PWID) are the population most affected by HIV in Tajikistan. To understand HIV prevalence and risk behaviors among PWID, we conducted an integrated bio-behavioral survey (IBBS).

METHODS: Our study used respondent-driven sampling and included consenting adults (aged ≥18 years) who injected drugs at least once in the last 6 months in eight districts/cities in Tajikistan with the highest concentration of PWID (May-July 2018). HIV testing was performed using a serial three-test algorithm. Questionnaires were based on standard behavioral surveys adapted from other settings and previous surveys used in Tajikistan. Descriptive analysis and chi-square test of the crude estimates were conducted using Stata/SE.

RESULTS: Among 2,390 PWID (2,274 men/116 women) surveyed, HIV prevalence varied from 4.0% to 18.5% across sites. HIV prevalence among women was significantly higher compared to men (24.1% vs. 11.4%; $p < 0.0001$).

More women than men reported a sex partner who also injected drugs (46.1% vs. 3.2%; $p < 0.0001$) and an HIV-positive regular sex partner (17.0% vs. 3.7%; $p < 0.0001$). Few women reported using condoms at last sex with regular sex partners who also inject drugs (29.4%) or with HIV-positive partners (12.5%).

Reported condom use at last sex with any partner was higher among women than men (50.0% vs. 36.0%; $p=0.02$). Women were more likely than men to report exchanging sex for money during the past 6 months (16.4% vs. 6.7%; $p < 0.0001$). Sharing injection equipment in the past 30 days was reported by 52.6% of women and 50.1% of men ($p=0.60$).

Women were more likely than men to get free-of-charge needles/syringes in the past 3 months (71.6% vs. 61.7%; $p=0.03$). Most HIV-positive PWID (men, 83.9%; women, 89.3%; $p=0.45$) were on antiretroviral therapy (ART). Of these, only 61.7% (men, 60.6%; women, 72.0%; $p=0.27$) were virally suppressed (< 1000 copies/mL).

CONCLUSIONS: Women who inject drugs were significantly more likely than men who inject drugs to be HIV-positive, have high-risk sex partners (PWID or HIV-infected), and sex for money. Developing gender-sensitive services and increasing access for all PWID to needed services, including safe sex and harm reduction programs, HIV testing and immediate initiation of ART, is crucial.

WEPED802

Egocentric network and HIV/HCV risk behaviors among drug users on methadone maintenance treatment in Wuhan, China

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BACKGROUND: Social network play an important role on human behaviors, while the effect of egocentric network of drug users remains elusive. The present study aimed to determine egocentric network factors of HIV/HCV risk behaviors among drug users on methadone maintenance treatment (MMT) in Wuhan, China.

METHODS: Drug users in MMT clinics were recruited using randomized cluster sampling for a cross-sectional study. Questionnaire survey was implemented to collect the information of social demography charac-

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teristics and HIV/HCV risk behaviors. Name generators and interpreters were used to collect the information of egocentric network. Multivariate logistic regression was performed to identify the factors of HIV/HCV risk behaviors.

RESULTS: A total of 739 drug users on MMT completed the questionnaire. Among those participants, 536(72.5%) was male, 198(26.8%) had lower monthly income (< 2000yuan RMB), 70(9.5%) had friends who abused drugs, 495(67.0%) had friends who were family members concurrently, 116(15.7%) reported injecting drug use in last month, and 32(4.3%) reported having multiple sex partners in last three months. The median of egocentric network size (number of friends) was 3 (IQR: 2-3), and the range of egocentric network density was 0.5-1.0. Injection drug use in last month was independently associated with egocentric network density (AOR: 0.629, 95%CI: 0.405-0.977), friends who abused drugs existed in egocentric network (AOR: 1.861, 95%CI: 1.030-3.362), and monthly income (AOR: 2.355, 95%CI: 1.553-3.573). Having multiple sex partners was independently associated with egocentric network size (AOR: 4.464, 95%CI: 1.654-12.045), family members as friends existed in egocentric network (AOR: 0.406, 95%CI: 0.190-0.869), friends who abused drugs existed in egocentric network (AOR: 2.953, 95%CI: 1.264-6.898), and gender (AOR: 4.220, 95%CI: 1.238-14.383).

CONCLUSIONS: Along with socio-demographic characteristics, the egocentric network of drug users affect their HIV/HCV risk behaviors. The findings suggest that enhancing social network intervention might contribute to harm reduction for drug users.

WEPED803

The association between opioid agonist treatment and injection initiation assistance among persons with different injection polydrug use practices in Vancouver, Canada

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BACKGROUND: Emerging evidence suggests that persons who inject drugs (PWID) prescribed opioid agonist treatment (OAT) are less likely to report initiating others into injection drug use (IDU). Given ongoing epidemics of injection-driven HIV, this has high relevance for upstream prevention efforts. We therefore aimed to investigate whether OAT enrollment was associated with a decreased risk of providing IDU initiation assistance among PWID with different polydrug use practices in Vancouver, Canada.

METHODS: Preventing Injecting by Modifying Existing Responses (PRIMER) is a prospective multi-cohort study seeking to prevent injection-driven HIV transmission by identifying structural interventions that reduce the incidence of IDU initiation. The present study employed data from a participating cohort of PWID in Vancouver (ACCESS/ARYS/VIDUS; December 2014-May 2017). Separate multivariable logistic regression models were conducted among PWID subsamples based on the drug (i.e., heroin, cocaine, methamphetamine, or prescription opioids [PO]) they reported injecting recently (i.e., past six months). The outcome was defined as reporting recently assisting others in IDU initiation; the independent variable of interest was reporting recent OAT enrollment.

RESULTS: Participants ($n=1150$) reported different recent polydrug use practices, which included 67.1% heroin IDU ($n=772$), 29.3% cocaine IDU ($n=337$), 52.5% methamphetamine IDU ($n=604$), and 26.7% PO-IDU ($n=307$). The rate of recent OAT enrollment among these subsamples were 59.6%, 56.1%, 45.2% and 49.5% respectively. The rate of recent injecting initiation assistance among these subsamples were 7.4%, 7.1%, 10.1% and 10.1%. In multivariable analyses adjusting for age, gender, cohort and injection frequency, OAT enrollment among participants who reported recent methamphetamine IDU ($n=601$) was significantly associated with a lower

odds of reporting providing recent IDU initiation assistance (AOR: 0.41, 95% CI: 0.22-0.76, $P<0.01$). Among participants reporting recent PO-IDU ($n=305$), those who reported recent OAT enrollment also had a significantly lower odds of recently providing IDU initiation assistance (AOR: 0.36, 95% CI: 0.15-0.86, $P=0.02$).

CONCLUSIONS: By reducing the risk that PWID assist others in IDU initiation, OAT may provide a population-level protective effect on the expansion of injection-driven HIV epidemics. Future research should explore OAT's HIV prevention role in injection initiation assistance among higher risk persons with opioid use disorder who inject different drugs.

WEPED804

Estimating and reaching drug users with HIV prevention package in Mali

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BACKGROUND: In Mali, the prevalence of HIV is estimated to 5.1%^[1] among injecting drug users (IDU) compared to 1.6% in the general population. HIV prevention in this group has been confronted with a lack of knowledge of its size, its distribution, its organization, the factors contributing to the infection as well as a legal context often intermingling with the health services. In 2018, Plan International, recipient of an HIV project financed by the Global Fund coordinated an estimate of the size and mapping of this key population to inform a tailored prevention package

[1] ARCAD-SDA, Bamako 2015

METHODS: Through the recruitment of a firm, a study was conducted following the „Respondent Driven Sampling“ (RDS) to establish the mapping, size estimation and identification of risk factors of IDUs to HIV. The prevention strategy was then contextualized with objective targets, relevant geographical area and places as well as the definition of a package of services adapted to this group.

RESULTS: A total of 128 meeting places and 2,401 IDUs were identified and distributed as follow: Bamako 24.3%; Koulikoro 14.9%; Sikasso 22%; and Mopti 10.4%. Women represent 4.5%. They have more sexual partners than men and inject more on average. Adults aged 20-34 represent 60.3%. About 77% of IDUs reuse their syringes and 59.5% injected with used syringes. 67% have condomless sex. The median true size was estimated at 5,602 IDUs [CI 3,612-12,524]. Mobilisers recruited from this group collaborate with animators to provide Behavior Change Communication, sterile injection equipment, condoms and lubricants as well as HIV testing and access to treatment when required. As of December 2018, 833 IDUs have been reached through this intervention with 75 % of them tested for HIV.

CONCLUSIONS: This study provides an objective basis for establishing and evaluating HIV interventions for IDUs in Mali. The findings and the undergoing interventions including the capacity building of peers set the basis for a broader HIV programming with additional components such as peer testing and substitutive therapy. This shed some light that will contribute in reaching another mile in the fight against HIV in this group and in general.

WEPED805

Understanding the public health consequences of closing a rural syringe services program in Charleston, West Virginia (USA)

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BACKGROUND: More than half of the 55 counties in West Virginia (USA) were identified by the Centers for Disease Control and Prevention (CDC) as vulnerable to HIV outbreak. Syringe services programs (SSPs) are evidence-based interventions that are associated with decreases in incidence rates of HIV and viral hepatitis among people who inject drugs (PWID). In December 2015, the Kanawha-Charleston Health Department

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(KCHD) in West Virginia implemented a SSP; however, due to sociopolitical forces and stigma surrounding injection drug use, the program closed in early 2018. The purpose of this research is to explore the public health implications of the closure of the KCHD SSP among rural PWID.

METHODS: We conducted semi-structured interviews with 27 PWID (59% male, 88% non-Hispanic white) to understand the public health implications of the closure of the KCHD SSP. Participants were recruited from street locations frequented by PWID. Interviews were audio-recorded and transcribed verbatim. We employed thematic content analysis to systematically code and synthesize textual interview data.

RESULTS: Participants reported sharing syringes with greater frequency following the closure of the KCHD SSP. While most participants reported they knew where to get tested for HIV in the absence of the KCHD SSP, they described the remaining HIV testing sites as inconvenient and difficult to access. As a result, PWID were less likely to be tested on a regular basis. Compounding these changes, individuals reported dramatic decreases in naloxone access after the SSP closed. In the wake of the KCHD SSP closure, PWID described living in fear of both acquiring HIV and fatally overdosing.

CONCLUSIONS: The closure of the KCHD SSP fundamentally changed the HIV prevention landscape for PWID. Rural PWID reported not only behavioral changes that placed them at increased risk for HIV acquisition following the closure of the SSP, but also having decreased access to essential prevention resources (e.g., testing). Further, the closure of the SSP precipitated a sense of fatalism about HIV acquisition and overdose. The closure of this SSP should be viewed as a call to action for sustaining evidence-based interventions in the face of sociopolitical forces that attempt to subvert public health.

WEPED806

Injection drug use association with HIV and sex work stigma in Kenyan sex workers

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BACKGROUND: Stigma undermines HIV prevention and treatment. Sex workers (SWs) encounter both sex-work and HIV stigma, potentially intensifying negative effects of stigma. SWs who inject drugs are at greater risk for HIV infection and other health problems. We compare perceived HIV and sex-work stigma between those who inject drugs (or have intimate partners who inject drugs) to those who don't; and explore the relationship between stigma and healthcare utilization in both groups.

METHODS: Cross-sectional data from 684 Kenyan sex workers (209 males/475 females), recruited from four sites (Nairobi/Kitui/Busia/Homa-Bay) in 01/2015. We assessed perceived-HIV and sex-work stigma(witnessed/experienced) using validated scales. Multiple regression analysis was used to test if past-year self/partner injection drug use was associated with HIV and sex-work stigma; and assess whether stigma was associated with avoidance or delay of healthcare utilization.

RESULTS: 264 (39%) participants reported self/partner injection drug use. Self/partner drug injectors reported higher Perceived-HIV and sex-work stigma (Experienced/Witnessed) (Table 1).

	Stigma Subscale	Mean ± SD (score range)	Injection Drug Use ^a (Coefficient)	95% CI ^a	P-value ^a	Corrected P-value (Benjamini-Hochberg method)
HIV Stigma	Perceived stigma	15.4 ± 3.82 (6-24)	0.73	0.13-1.34	0.018*	0.023*
Sex Work Stigma (Experienced)	Health Care Workers	8.15 ± 8.19 (0-28)	1.56	0.36-2.76	0.011*	0.017*
	Community	10.66 ± 6.84 (0-24)	1.10	0.10-2.11	0.032*	0.036*
	Family	4.48 ± 5.04 (0-16)	1.10	0.37-1.83	0.003*	0.005*
Sex Work Stigma (Witnessed)	Police	6.88 ± 6.59 (0-20)	1.84	0.91-2.76	<0.001*	0.003*
	Health Care Workers	10.8 ± 8.08 (0-24)	1.87	0.62-3.12	0.003*	0.005*
	Community	17.87 ± 7.16 (0-28)	0.73	-0.39-1.85	0.200	0.200
	Family	8.66 ± 5.18 (0-16)	1.48	0.68-2.28	<0.001*	0.003*
	Police	11.33 ± 6.59 (0-20)	2.01	1.03-2.98	<0.001*	0.003*

[Table 1. Association between Injection Drug Use and HIV/Sex Work Stigma Categories ^aAdjusted for sex, education, years in sex-work, income and depression.]

HIV stigma was associated with healthcare avoidance/delay in self/partner drug injectors; sex-work and HIV stigma were associated with healthcare avoidance/delay in non-injectors. (Table 2)

	Self/partner injection drug use (n=264)	No use (n=420)
HIV and Sex Work Stigma		
HIV stigma (Perceived), mean ± SD (range: 6-24)	16.2 ± 3.6	14.9 ± 4.0
Sex Work Stigma (Experienced), mean ± SD (range: 0-88) ^a	35.5 ± 21.6	27.2 ± 22.8
Sex Work Stigma (Witnessed), mean ± SD (range: 0-88) ^a	54.4 ± 19.4	45.1 ± 23.0
Association Between Stigma and Avoidance/Delay of Healthcare Utilization		
HIV Stigma (Perceived): Adjusted Odds Ratios (95% CI) ^a	1.10 (1.01-1.20)*	1.07 (1.01-1.13)*
Sex Work Stigma (Experienced): Adjusted Odds Ratios (95% CI) ^a	1.01 (0.99-1.03)	1.02 (1.01-1.03)*
Sex Work Stigma (Witnessed): Adjusted Odds Ratios (95% CI) ^a	1.01 (0.99-1.03)	1.02 (1.01-1.03)*
^a Sum score of entire stigma scale; ^a Adjusted for sex, stigma sum score modeled as continuous variable; ^a Significant at α=0.05		

[Table 2. Association between Sex Work and HIV Stigma and Healthcare Utilization by Injection Drug Use Status, n=684]

CONCLUSIONS: Self/partner injection drug use was associated with higher HIV and sex-work stigmas, which may intensify the negative effects of stigma on prevention and treatment for this high-HIV-risk population. Characterizing the presence and impact of HIV and sex-work stigma is needed to strengthen the HIV prevention and treatment cascades for drug users. Better understanding the intersection between injection drug use and HIV/sex-work stigma in SWs can aid targeted interventions to improve health utilization and outcomes.

WEPED807

HIV, housing, and health: A case study of the experiences of people living with HIV who use drugs living in two models of supportive housing in Vancouver, Canada

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BACKGROUND: Housing is a critical determinant of HIV-related outcomes among people living with HIV (PLHIV) who use drugs, including on HIV treatment adherence. Further, previous research has shown that the social-structural environments of low-income housing can exacerbate the health and social harms of drug-using populations, although there is minimal research examining the impact of any specific housing model on the treatment experiences of PLHIV who use drugs. This qualitative case study describes the experiences of PLHIV who use drugs living in non-profit operated supportive housing and HIV-specific housing operating under distinct service models in Vancouver, Canada, and how their HIV care experiences are framed by the social-structural contexts of these buildings.

METHODS: Semi-structured interviews were conducted with 18 PLHIV who use drugs recruited from an ongoing prospective cohort in Vancouver, Canada. Participants were recruited from two models of housing: non-profit supportive housing and HIV-specific housing. Interviews were co-led with a peer research assistant, and focused on housing, drug use patterns, and HIV management. Interviews were transcribed, analyzed thematically.

RESULTS: Participants in the supportive-housing building offered disagreeing accounts of building policies, staff treatment, and health and social services available to residents. Participants in HIV-specific buildings, while agreeing more on building policies, described stigmatization from staff on behalf of their drug use, among others. Participants also had concerns around involuntary disclosure on the basis of living in HIV-specific housing. All participants described poor housing conditions (e.g., pests, broken locks) and chaotic social environments, and the negative impacts this had on both their HIV care and mental health.

CONCLUSIONS: This case study builds on the literature exploring the impact of housing on treatment outcomes among PLHIV who use drugs, especially with regards to HIV-specific housing. Findings suggest that future housing research should consider not only housing type, but specific service models in data interpretation to most accurately represent the social and structural environments of PLHIV who use drugs.

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WEPED808

A qualitative investigation of HIV treatment dispensing models and impacts on adherence among people living with HIV who use drugs and live in low-income housing

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BACKGROUND: HAART dispensing has been shown to be strongly associated with treatment adherence. Among drug-using populations, whom experience greater social and structural barriers to adherence (e.g., housing vulnerability, food insecurity) than non-drug using people living with HIV (PLHIV), directly observed therapy (DOT) is often regarded as being a stronger predictor of optimal adherence over self-managed medications. In Vancouver, Canada, PLHIV who use drugs living in low-income housing are an important population for treatment support programs, and are typically able to access three main models of treatment: self-management, daily delivery, and daily pickup, the latter two of which are forms of DOT. This study explores how dispensing models impact HAART adherence among PLHIV who use drugs living in low-income housing, and how this experience is framed by structural vulnerability.

METHODS: Semi-structured interviews were conducted with 31 PLHIV who use drugs living in low-income housing recruited from an ongoing prospective cohort in Vancouver, Canada. Individuals living in low-income housing who had previously reported low or varying treatment adherence were recruited. Interviews were co-led with a peer research assistant, and focused on housing, drug use patterns, and HIV management. Interviews were transcribed, analyzed thematically.

RESULTS: For all participants, ability to integrate HAART into an established, healthy routine was key to supporting adherence. Self-management offered participants greater agency over routines, although those who experienced success with this model were likely to be less structurally vulnerable (e.g., stable and long-term housing). Treatment interruptions were framed by structural vulnerabilities (e.g., drug prohibition), and led participants to consider DOT-based models. Participants using DOT-models, which accounted for their structural vulnerabilities (e.g., mobility issues for daily deliveries, housing instability), credited these models for their treatment adherence, but also acknowledged their constrained agency, and the negative impacts this could have on adherence and quality of life.

CONCLUSIONS: Findings demonstrate that participants' structural vulnerabilities frame experiences with different treatment models. HAART models that account for the structural vulnerability of PLHIV who use drugs and live in low-income are necessary and housing-based supports could be critical, but the impacts of such models on agency must be considered to ensure optimal adherence.

WEPED809

Community initiated treatment for HIV-positive people who inject drugs in Ukraine

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BACKGROUND: The U.S. Centers for Disease Control and Prevention sponsored a Key Population Implementation Science study in Ukraine (2015-2018) to evaluate HIV care cascade outcomes among people who inject drugs (PWID) enrolled in the Community Initiated Treatment Intervention (CITI) compared with those enrolled in standard HIV care (SoC).

METHODS: We conducted a non-randomized cluster study in 14 regions among HIV-positive PWID who had never been linked to HIV care or who were lost to follow-up at enrollment. Depending on their region, participants were enrolled into 2 study groups:

1 group received SoC and the other received CITI. Participants were interviewed at 0, 6, 12, and 18 months during follow-up visits. We also collected

clinical data on antiretroviral treatment (ART) initiation, retention in care, and viral suppression. Our study included 885 PWID (CITI, n=597; SoC, n=288) who completed 18-month follow-up.

RESULTS: The CITI group (37%) had significantly higher rates of ART initiation at the 6-month follow-up than the SoC group (25%; p=0.001). Adjusting for demographics, drug use frequency, harm reduction services, time to AIDS center visit, and opioid substitution therapy, CITI was associated with shorter time to ART initiation than SoC. Among participants who initiated ART, significantly more CITI participants (70%) were retained on ART at the 18-month follow-up than SoC (44%; p< 0.001). CITI effectively helped participants attain viral suppression at all follow-up assessments. The CITI group had significantly higher rates of undetectable viral load (< 40 copies/mL) than the SoC group: 8% vs. 4% at 6 months (p=0.019); 24% vs. 17% at 12 months (p=0.014); and 33% vs. 26% at 18 months (p=0.039). **CONCLUSIONS:** HIV-positive PWID who received CITI were more likely to start ART and had a shorter time to treatment initiation compared to those who received SoC. CITI improved retention in care and is associated with viral load suppression among PWID.

WEPED810

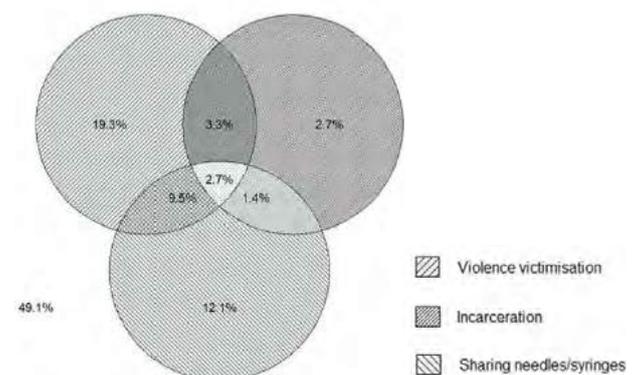
The syndemic of violence victimisation, incarceration, risky injecting behaviours and HIV infection among people who inject drugs: Cross-sectional, population-based study in India

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BACKGROUND: Substance use has been a component of several syndemics that have been described to increase HIV risk substantially. There is a near lack of empirical evidence for the presence of syndemics among people who inject drugs (PWID) in India. To address this gap, we assessed for potentially synergistic interactions between violence victimisation, incarceration experience and risky injecting behaviours (sharing of needles/syringes) on both the additive and multiplicative scales.

METHODS: This study used data collected from a population-based, cross-sectional survey of 19,902 PWID recruited in the Integrated Bio-Behavioural Surveillance (IBBS) study India's National AIDS Control Organisation. The dichotomous outcome measure was HIV status, and psychosocial exposures were violence victimisation in the past year (yes or no), history of incarceration in the past year (yes or no) and sharing of needles/syringes in the past 3 months (yes or no). The model was adjusted for age, education, marital status, HIV knowledge, and HIV programme exposure. We assessed for two- and three-way interactions between the exposures on the additive (linear probability regression) and multiplicative (logistic regression) scales.

RESULTS: Participants' median age was 30 years, 43% were married and 19% were unemployed. One-fifth (25.6%) reported sharing needles (borrowing/lending); 21.3% had experienced violence victimisation and 10.3% had been incarcerated. Figure-1 shows co-occurrence of these conditions.



[Co-occurrence of violence victimisation, incarceration, and sharing of needles/syringes (N = 19,902)]

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Sharing of needles (aOR = 1.73, p<0.001), and violence victimisation (aOR = 1.13, p<0.03) were independently associated with higher odds of being HIV positive. Statistically significant synergistic interactions were found between sharing of needles and violence victimisation (semi-elasticity = 0.25, 95% CI 0.03, .47, p=0.02) in predicting HIV status.

CONCLUSIONS: Violence victimisation, incarceration, and risky injecting behaviours are prevalent among PWID and synergistically increase HIV acquisition. Stigma reduction interventions and support services for victims of violence could help in reducing PWID's HIV risk, and thus need to be incorporated into the existing HIV prevention interventions.

Sex workers

WEPED811

Enabling factors for rapid scale-up of services for sex workers in large urban African sites, 2014-2018

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BACKGROUND: Stigma in public healthcare facilities limits access to effective HIV care and treatment for Female Sex Workers (FSWs). To mitigate this, Wits RHI pioneered tailored healthcare for FSWs in inner city Johannesburg in 1996. Recently, we scaled this model to 12 sites nationally. This study explores enablers of rapid scale-up in two urban sites between 2014 and 2018.

METHODS: We implemented a mixed-methods evaluation. Quantitative data involved a retrospective review of patient medical records. Qualitative data included three focus group discussions with programme beneficiaries and staff (N=27) and key informant interviews with key stakeholders (N=10), conducted from August 2018 - January 2019.

RESULTS: The program was successful in significantly increasing the scale of outreach, HIV testing, antiretroviral therapy (ART), and pre-exposure prophylaxis (PrEP) initiation from 2014-2018.

Johannesburg	2014	2015	2016	2017	2018	% Increase
Outreach visits	1641	22473	30597	35249	42833	2510%
Tested	363	1038	1329	2127	2639	627%
Initiated on ART	69	97	146	190	274	297%
Initiated on PrEP	0	0	46	268	629	1267%
Tshwane	2014	2015	2016	2017	2018	% Increase
Outreach visits	211	3855	6408	25571	29962	14100%
Tested	96	545	1121	1187	2675	2686%
Initiated on ART	0	19	81	164	235	1137%
Initiated on PrEP	0	0	68	301	373	449%

[Figure 1: Results for Johannesburg and Tshwane]

Four factors facilitating rapid programme growth were:

Mobile services: Loss of income is a deterrent for FSWs attending clinic. Mobile health services delivered in brothels/street-based hotspots increased accessibility and uptake through extended service hours and geographic proximity.

Primary healthcare package: Access to a comprehensive package of multidisciplinary services (including family planning, STI, chronic conditions, social service referrals) increased uptake compared to stand-alone HIV services.

Peer-led model: Introduction of peers who live and work in hotspots they serve resulted in more meaningful relationships, more frequent contact and increased retention.

Provider sensitization: Nurses, community health workers, and counsellors received sensitization training to prepare them for working with SWs, reducing stigma and making healthcare a positive experience for the SWs.

CONCLUSIONS: The evaluation found that the key aspects to achieving this scale-up are: accessibility, comprehensive services, SW-friendly staffing, mobility, and SW leadership through peer educators. These learnings may inform successful replication and scale-up in settings where reaching key populations is a priority.

WEPED812

Viral load monitoring among FSWs enrolled in the LINKAGES project in Malawi: Progress, challenges, and opportunities

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BACKGROUND: Improved access to viral load monitoring is key in tracking progress toward the third 90 target. We present the results of efforts to improve access to viral load monitoring among female sex workers (FSWs) in Malawi under the USAID- and PEPFAR-supported LINKAGES project implemented by FHI 360.

METHODS: FSWs were reached and offered HIV testing services (HTS) through various community-based approaches, including outreach and HTS at drop-in-centers (DICs). All HIV-positive FSWs were then linked to and enrolled in HIV treatment, including treatment at a LINKAGES-supported DIC.

Beginning in October 2017, LINKAGES introduced intensified viral load monitoring. Peer navigators created demand for viral load testing at community hot spots, while health care providers at the facilities counseled FSWs who were eligible for viral load testing to be tested.

At the facilities, case management tools and a standard operating procedure were developed to standardize processes and understand unmet need for viral load testing. FSWs were offered escorted referrals to viral load testing and reminders were provided at support group meetings.

We compared the proportion of FSWs who accessed viral load testing during the 12 months before and after the introduction of intensified viral load monitoring in LINKAGES sites in Lilongwe, Blantyre and Mangochi.

RESULTS: In the 12 months (October 2016 - September 2017) before intensified viral load monitoring, 44 FSWs accessed viral load testing and 33 of the 44 FSWs (75%) had suppressed viral load. During the 12 months (October 2017 - September 2018) of intensified viral load monitoring, 515 FSWs accessed viral load testing. Of these, 457 (82%) received their results and 426 (93%) had suppressed viral load.

CONCLUSIONS: The results illustrate the feasibility of increasing access to viral load testing through simple innovations and achieving viral suppression among key populations, including FSWs. More strategies are needed to ensure that FSWs have continuous access to viral load monitoring, especially those who are mobile or receiving treatment outside of the LINKAGES catchment area.

Transgender people

WEPED813

Why not PrEP? Evaluation of PrEP refusal and discontinuation among transgender women in Peru

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BACKGROUND: Pre-exposure prophylaxis (PrEP) is an effective biomedical HIV prevention technology for key populations like transgender women (TW). Yet, the potential impact of PrEP is limited by behavioral and social

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factors. To promote real-world use of PrEP for HIV prevention, deeper understanding of factors underlying PrEP disinterest and discontinuation are needed.

METHODS: Between April-May 2018, we conducted interviews with 34 TW (mean age: 28 years) to assess the impact of a social network-based PrEP adherence intervention for TW in Lima, Peru. Participants included: Peer facilitators (n=4); Participants who were eligible but did not enroll in the intervention (n=8); Participants who enrolled but dropped out (n=6); and Participants who completed the intervention (n=16). Audio files were transcribed verbatim and analyzed via an immersion crystallization approach using Dedoose (v.6.1.18).

RESULTS: Themes regarding PrEP refusal included: mistrust of research, suspicion of PrEP efficacy, disinterest in ART-based HIV prevention methods (versus condoms). Specific to oral Truvada, many non-users noted that a daily HIV prevention modality would not work for them, and preferred long-acting agents. Among transient users, discontinuation themes included: structural barriers to accessing medication (transportation, clinic hours), side effects (diarrhea, nausea), and medication stigma (cultural associations of ART use with HIV infection). The importance of side effects was further emphasized by peer facilitators who noted that negative experiences, especially chronic diarrhea, were discussed in TW social networks and affected community acceptability. Participants who experienced side effects raised concerns about clinicians' inexperience in managing transgender-specific issues like drug-drug interactions of hormones with ART. All participants questioned the sustainability of PrEP delivery due to the high cost and limited access to Truvada in Peru.

CONCLUSIONS: PrEP implementation among Peruvian TW could be strengthened by education and efforts to address population-specific structural barriers including access to culturally sensitive care (limited geographic and economic availability of PrEP distribution sites, gender-affirming clinical environments). Frequent reports of adverse drug effects suggest the need to investigate potential differences in ART pharmacokinetics (drug absorption, metabolism, drug-drug interactions) in TW. Policies and practices are needed to bridge biomedical research studies with sustainable implementation pathways that promote equity and access to PrEP in key populations.

WEPED814

Reduction of anxiety, drug and alcohol abuse and increment of quality of life in transgender women after 6 months of initiating HIV treatment

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BACKGROUND: Violence, marginalization and stigma towards transgender women (TGW) increase psychosocial vulnerability, leading to negative mental health outcomes and affecting ART retention. This study aimed at analyzing the role of gender identity stigma (GIS) on mental health and assessing changes after 6 months of starting ART in a trans-sensitive multidisciplinary HIV service.

METHODS: Psychosocial interviews were applied at baseline and after 6 months to collect socio-demographic characteristics, alcohol (AUDIT) and drug use (DAST-10), depression (CES-D), anxiety (STAI), dysfunctional personality traits (PID-5), HIV-related stigma (Berger), social support (Duke), sexual behavior, GIS by police and in different settings. Internalized GIS was operationalized as presence of negative emotions (shame, guilt), anticipation of rejection and self-isolation behavior. Enacted GIS entailed actual experiences of stigma. Linear regression analysis was used to test predictors of mental health outcomes and t-tests were applied to explore changes between baseline and 6 months.

RESULTS: The sample consisted of 61 TGW, median age 28 (IQR 25-32), 29.5% foreign born, 60.7% less than high school education, 77% sex work and 52.5% unstable housing. A significant number experienced GIS the

last year in: healthcare services (45.9%), sex work venues (44.3%), housing (29.5%) and by police (18%). At baseline, 50.8% showed significant levels of depression, 65.6% reported drug use in the last year. Depression ($R^2=.49$, $F(2,60)=28.33$, $p<.01$) was predicted by enacted GIS ($\beta=.19$, $p<.05$) and anxiety ($\beta=.60$, $p<.001$); while suicidal ideation ($R^2=.37$, $F(2,60)=17.42$, $p<.01$) by internalized GIS ($\beta=.38$, $p<.01$) and anxiety ($\beta=.32$, $p<.01$).

At 6 months, participants experienced a significant reduction of anxiety ($t(49)=1.93$, $p<.05$), drug ($t(49)=2.75$, $p<.01$) and alcohol abuse ($t(49)=2.08$, $p<.05$), and improvement in quality of life ($t(49)=-2.85$, $p<.01$). The remaining mental health indicators were not significantly modified.

CONCLUSIONS: A trans-sensitive healthcare service may contribute to retention in ART and mental health improvements in TGW initiating HIV care. However, at short term, it does not reduce enacted neither internalized GIS, nor its consequences on mental health. These results highlight the importance of designing HIV care programs for TGW that include gender-affirmation, health empowerment and drug harm reduction components to enhance retention in HIV care.

WEPED815

"Papi, I take care of myself and take care of you": PrEP communication and disclosure among Latina immigrant transgender women in the Washington DC metropolitan area

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BACKGROUND: PrEP acceptability is critical for uptake and adherence. Communication about PrEP is key in determining the type of support users receive, which in turn facilitates uptake and adherence. Little is known about Latina immigrant transgender women's (LITGW) communication about PrEP and how it impacts their use. This study explored the dialogues around PrEP that LITGW are having.

METHODS: We conducted in-depth, semi-structured interviews in Spanish with 12 LITGW living in the DC metropolitan area (6 with PrEP experience; 6 PrEP-naïve). Interviews were audio-recorded, transcribed and coded using NVivo11. We used thematic analysis to identify key themes.

	PrEP-Experienced (n = 6)	PrEP-Naïve (n = 6)
Age Mean (SD)	29.7 (5.9)	36.7 (4.5)
Time in US Mean (SD)	8.3 (8.9)	12.8 (6.6)
Country of origin	El Salvador: 5; Honduras: 1	El Salvador: 4; Honduras: 1; Perú: 1

[Table 1: Demographic characteristics]

Thematic area	PrEP-experienced (n = 6)		PrEP-Naïve (n = 6)	
	Frequency	Supporting quotes	Frequency	Supporting quotes
Has disclosed/ would disclose PrEP use to partners	6	"Look Papi, I'm taking PrEP because you know we're not perfect, that we make mistakes; that way, I protect myself and I protect you"	4	"I would tell them because it's nothing bad, it's something to prevent"
Has disclosed/ would disclose PrEP use to friends	6	"All my friends know I'm taking PrEP and the majority think it's great. I have even talked to two, so they can take it too"	5	"I would tell all of my friends, because they might be interested in it and could even avoid the consequences of an infection"
Experienced/ expected PrEP stigma	4	"He [a sexual partner] said: 'I saw that you have pills that are for AIDS. Do you have AIDS?' I educated him and explained that those were not pills for AIDS, but to prevent AIDS"	1	"There's people that don't understand and would say I'm sick... They used to say I was dying of AIDS when I was in the hospital because of my pancreas"

[Table 2: Perceptions of and experiences with PrEP disclosure and PrEP stigma (themes' frequency and supporting quotes)]

RESULTS: Most participants were open to talking about PrEP and disclosing their use, especially to main sexual partners. In general, participants noted that others have been –or would be– supportive of their PrEP use. Only one participant (PrEP-naïve) reported she wouldn't disclose her potential PrEP use to others, due to fear of PrEP stigma. Among the PrEP-experienced participants, four organically reported experiences of PrEP

stigma, whereby sexual partners had accused them of having HIV or AIDS, or friends have told them that only sex workers or promiscuous people use PrEP. Rather than avoid disclosing their PrEP use, these participants responded to PrEP stigma by informing people about PrEP, addressing their misconceptions, and encouraging them to use PrEP.

CONCLUSIONS: PrEP-naïve and PrEP-experienced LITGW are open about their use—or potential use—of PrEP. Previous studies have identified PrEP stigma as a barrier for PrEP uptake and adherence. However, LITGW in this sample viewed their experiences with PrEP stigma as opportunities to combat stigma by educating others and reinforcing the notion that they are taking care of themselves and their partners. Future studies should more systematically assess the effects of PrEP stigma among LITGW.

WEPED816

Burden of PTSD, depression, and anxiety on transgender HIV+ and HIV- persons at key population-led health centers in Bangkok and Pattaya: Mixed methods cross-sectional screening study

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BACKGROUND: Transgender persons are a key population for HIV efforts in Southeast Asia where mental healthcare is sparse, and prevalence of common mental health disorders is unknown. This cross-sectional study integrated mental health screening into three key population-led health centers in Bangkok and Pattaya offering Transgender services and HIV testing/treatment in order to establish prevalence of common mental health disorders, compare HIV-positive and negative mental health scores, and understand mental health experiences in relation to HIV through in-depth interviews.

METHODS: Scores from Thai translation of UCLA PTSD Reaction Index, GAD-7, and Thai PHQ-9 from 291 transgender participants were analyzed with respect to HIV status, viral load, and medication history from chart review and self-report. Fisher's exact test was utilized to analyze categorical variables, and student's t-test was employed to analyze continuous variables. 16 HIV positive and 15 negative interviews of survey participants were analyzed as groups using NVIVO and thematic analysis.

RESULTS: 63 (21.6%) were HIV-positive transgender women (TGW), 228 (78.4%) were HIV-negative transgender persons. HIV-positive participants had higher rates of depression (35 % vs. 20%, $p=0.017$) and higher mean scores for PTSD (mean (SD): 16.6(12) vs. 10.8(11), $p=0.001$), compared to HIV-negative. No evidence of difference for anxiety (14% vs. 12%, $p=0.67$). No evidence of difference in mental health scores for those with poor HIV outcomes comparing composite endpoints (elevated most recent viral load, no ART, and/or history of ART resistance); (mean (SD) PTSD 19.73(12.2), $p=0.34$ vs. 15.8(12); mean depression scores 6.64(3.5) vs. 6.67(5), $p=0.98$). Preliminary qualitative themes included: HIV-positive participants had unstable parental relationships in childhood, expressed a lack of social support at time of diagnosis, and reported avoidance of sharing serostatus with family and/or close friends.

CONCLUSIONS: This study revealed a significant level of clinical depression and trauma among both HIV-positive and negative transgender persons. HIV-positive TGW experience higher rates of depression and higher PTSD scores, and individual interviews highlighted a need for formal mental health support around time of diagnosis. Our sample population was highly engaged in healthcare with recent diagnoses resulting in a low sample size of "poor HIV outcomes." Future studies should target unengaged groups and conduct serial screens.

Adolescent girls and young women

WEPED817

"I was just concerned about getting pregnancy": Reproductive health decision making among adolescent girls in Thika, Kenya

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BACKGROUND: Adolescent young women are disproportionately affected by HIV and unplanned pregnancies. Adolescents comprise 20% of the population in developing nations, and prevention efforts in this population are critical to HIV control in sub-Saharan Africa. Few studies have examined how adolescent girls consider comparative risks of their decisions around sexual and reproductive health. We explored the impact of pregnancy risk perception on HIV risk perception among sexually active adolescent girls and the influence of this relationship on uptake of HIV prevention methods.

METHODS: This study was nested within a cohort of adolescent girls enrolled in the Girls Health Study (GHS) in Thika, Kenya, which recruited 400 HIV and HSV-2 seronegative female adolescents, aged 16-21. In-depth interviews (IDIs) were conducted with 20 purposively sampled sexually active adolescent girls from this cohort. IDIs were conducted in English and Kiswahili and transcribed and coded using inductive and deductive approaches to identify emergent themes.

RESULTS: The key themes that emerged from the qualitative data were (1) adolescent girls had general knowledge about HIV and risky behaviors, yet, often did not perceive their behavior to be risky (2) trust in partners was an important determinant in a young girl's decision to undergo HIV testing or use protection during intercourse (3) fear of pregnancy superseded that of HIV infection. Participants reported more interest in protective measures against pregnancy versus against HIV, with one participant stating "I was not concerned with that [HIV], I was just concerned about getting pregnancy."

Fear of pregnancy strongly influenced contraceptive choice as young women were more likely to choose contraceptive methods that were effective and reliable in pregnancy prevention, even if not effective in preventing HIV infection. When probed on reasons for this discrepancy, study participants cited the physical visibility (and associated shame) of carrying a pregnancy and the responsibilities of raising a child as primary influencers in decision-making around reproductive health.

CONCLUSIONS: Our research demonstrated that girls were knowledgeable about HIV risk and prevention, but often did not recognize their own risky behaviors. However, desire to avoid pregnancy was common, and could be a strategic point for reaching adolescent girls who are sexually active.

WEPED818

Preventing HIV in adolescent girls and young women: Presentation of Lesotho qualitative results

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BACKGROUND: In Lesotho, Determined, Resilient, Empowered, AIDS-Free, Mentored, and Safe (DREAMS) initiative is delivered through the 4Children program that primarily focuses on empowering and reducing the risk of Adult Girls and Young Women (AGYW) through social asset building, and strengthening families through parenting and caregiver programs as well as combination socio-economic approaches.

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These interventions are overlapping and mutually reinforcing and are linked wherever possible in order to achieve the synergistic effects of combining "cash plus care" to reduce HIV risk.

METHODS: Ten age matched (10-14yrs; 15-17yrs; 18-24yrs) Focus Group Discussions (FGD) with between six and twelve AGYW in each FGD were undertaken. These FGDs consisted of AGYW who have both completed two or more DREAMS interventions and those who had not been involved in any DREAMS activities.

Questions were designed to illicit conversation that highlighted new skills and knowledge those AGYW who have been through the DREAMS interventions may have acquired. Finally, six Focus Group Discussions (FGD) were undertaken with AGYW caregivers.

RESULTS: We found that age is a critical factor to consider when preparing to work with AGYW. Although much of the literature focuses on older AGYW (20-24 years), an opportunity exists for working with younger AGYW. Baseline interviews showed younger AGYW to have lower levels of self-efficacy and hope, challenges with problem solving and low sexual risk. When comparing Dreamers and non-Dreamers it was found, particularly when looking at sexual risk, that the interventions worked well and were well tailored by age. The result shows that offering the skills necessary to cope with the day to day challenges they face with their parents, peers and community could potentially have large benefits.

CONCLUSIONS: Adolescents Girls and Young Women in Lesotho are at high risk of experiencing a myriad of negative life events which could permanently alter their life course. Equipping these young girls and women with skills to navigate safely through the dangerous waters of gender violence, HIV infection and extreme poverty is at the heart of the CRS DREAMS initiative.

WEPED819

High levels of gender-based violence (GBV) among HIV-positive adolescent girls and young women (AGYW) at antenatal clinics in Malawi highlights need for GBV services

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BACKGROUND: A 2015-2016 national household survey reported that 3.4% of adolescent girls and young women (AGYW) are HIV positive and the Malawi Violence Against Children 2013 survey showed that 22% reported sexual abuse prior to age 18. Given the known association of violence and HIV, gender-based violence (GBV) prevention and response are critical to achieve HIV epidemic control.

This study aims to explore the relationship between GBV and sexual risk factors using data from an antenatal clinic (ANC)-based survey in 4 districts in Malawi.

METHODS: Pregnant AGYW aged 15-24 years, newly diagnosed with HIV at their first ANC visit were consecutively enrolled in Lilongwe, Blantyre, Machinga, and Zomba districts. We administered a questionnaire, which included questions about any physical and emotional abuse, forced sex, sexually transmitted infections (STI) symptoms and partner HIV status. We computed descriptive statistics and performed multivariable logistic regression to identify factors associated with reporting abuse in the past year.

RESULTS: Among 606 AGYW, 25.1% (151/601) reported ever being physically or emotionally abused, 8.5% (51/602) reported being physically abused in the past year, and 4.3% (26/601) reported being physically abused during current pregnancy. The median age at first sex was 17 [interquartile range (16,18)]; 19.3% (112/580) reported that their first sexual encounter was forced while 5.5% (33/606) reported being forced to have sex in the past year. AGYW who reported STI symptoms in the past year reported more physical abuse in the same time period than those without STI symptoms (15.1% vs. 5.5%, $p < 0.05$). In multivariable analyses controlling for age and marital status, reporting STI symptoms (aOR: 3.0; 95%

confidence interval (CI): 1.6-5.6) and having a partner of unknown HIV status (aOR: 2.7; 95% CI: 1.0-7.3) were associated with reporting physical abuse in the past year, compared to not reporting abuse.

CONCLUSIONS: One-fourth of newly HIV-diagnosed pregnant AGYW in Malawi experienced GBV in their lifetime. GBV was greatest among AGYW with other known HIV risk factors: STIs, and having unprotected sex with a partner of unknown status. ANC could be an opportunity to screen for GBV as there are similar risk factors between GBV, HIV, and unintended pregnancy.

WEPED820

Factors associated with HIV seropositivity among male sexual partners of adolescent girls and young women (AGYW) in Tanzania: Findings from a combination prevention program

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BACKGROUND: Tanzanian Adolescent Girls and Young Women (AGYW) aged 15-24 are three times more likely to be infected with HIV than their male counterparts. In Tanzania, youth make up 40% of new HIV infections: 80% occur among females. Not only this high risk group but also male partners of AGYW (PAGYW) need to be understood and included in HIV prevention programming. The Sauti Project is a large scale PEPFAR/USAID funded combination HIV prevention project which since 2015 has provided services to key and vulnerable populations in 14 regions of Tanzania (including AGYW and PAGYW).

METHODS: Men are reached through mobile outreach services which include HIV testing and counseling and screening for risk behaviors. Data from service visits is de-identified and entered into a program monitoring database. Information from men accessing Sauti services were examined for the period of October 2017 - September 2018. If men responded that they currently had a female sexual partner aged 15-24 years they were considered PAGYW and included in analysis. Descriptive statistics and multi-variable logistic regression were performed.

RESULTS: Of 39,203 PAGYW, 44% were aged 30+ years; 89% had primary education or less; 52% were married/cohabiting 4% reported also having sex with men and 77% with female sex workers. The rate of PAGYW testing HIV positive at their Sauti service visit was 2%. Predictors of HIV seropositivity at Sauti visit among PAGYW were: having a sexual partner who knew HIV-positive status (OR: 33.7; 95%CI: 27.85-40.81), being aged 30 years and above (OR: 2.3; 95%CI: 1.96-2.74), divorced/widowed (OR: 2.5; 95%CI: 2.0-3.1), having completed primary education (OR: 1.7; 95%CI: 1.46-1.92) and secondary education or higher (OR: 1.9; 95%CI: 1.31-2.61), and inconsistent condom use (OR: 1.9; 95%CI: 1.5-2.29).

CONCLUSIONS: These results are consistent with studies from other countries documenting that HIV seropositive PAGYW are often older and may have multiple additional partners to the AGYW. This may contribute to increased risk among AGYW. Combination prevention efforts implemented with AGYW and PAGYW may benefit from incorporating messaging about risks associated with having multiple concurrent partners, transgenerational sex, and strategies for couples to prevent transmission while in sero-discordant relationships.

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WEPED821

Adolescent girls on PrEP: Findings from Kenya's oral PrEP scale-up supported by Jilinde

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BACKGROUND: AIDS is the leading cause of death among adolescents in sub-Saharan Africa. In Kenya, an estimated 18,000 adolescents acquire HIV annually. Oral pre-exposure prophylaxis (PrEP) for HIV, adopted by the Kenyan government in 2017, offers a new approach to prevention of new infections, including among adolescent girls. Little is known about adolescent girls accessing routine PrEP services in the context of national scale-up programs.

Jilinde is a program funded by the Bill & Melinda Gates Foundation supporting roll out of PrEP for key and vulnerable populations, including adolescent girls and young women (AGYW) in public clinics, private clinics, and drop-in-centers (DICES) in Kenya.

METHODS: We report demographic and reported risk behaviors of adolescent girls, ages 15 - 19 years, initiating PrEP from February 2017 to December 2018. The adolescents received either static or outreach services from 93 Jilinde-supported clinics. Retrospective analysis was conducted on de-identified client data sourced from the PrEP medical record form approved by the Ministry of Health of Kenya.

RESULTS: Among 21,578 clients initiating PrEP, 1783 (8%) were adolescent girls, only 16% of whom were in school. DICES, clinics designed primarily for sex workers and men who have sex with men, were the preferred PrEP outlet for adolescent girls, with 67% accessing services in DICES. Slightly over half (51%) were referred to PrEP sites through peer networks. Risk behaviors underlying PrEP initiation included inconsistent condom use (96%), engaging in sex with partner considered high-risk and of unknown HIV status (83%), transactional sex (46%) and sex under influence of drugs/alcohol (34%).

CONCLUSIONS: Within the context of Jilinde, over half of adolescent girls reached were engaged in highly risky behavior (transactional sex, inconsistent condom use, partners of unknown status), and were referred for services by peers. In addition, most accessed PrEP through DICES that may provide them with services but are not designed to meet the unique needs of adolescent girls. Efforts to make PrEP accessible to AGYW at risk of HIV acquisition should include restructuring the service delivery model, and mitigating the high-risk behaviors.

WEPED822

Motivations for early PrEP discontinuation among Kenyan adolescent girls and young women: A qualitative analysis from a PrEP implementation program

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BACKGROUND: PrEP programs have noted high rates of early discontinuation among adolescent girls and young women (AGYW) within 'real-world' delivery settings. We sought to understand motivations for early PrEP discontinuation among AGYW who accepted PrEP in an implementation program in Western Kenya.

METHODS: We conducted in-depth interviews (IDI) among AGYW (ages 16-24 years) who were universally offered PrEP within routine maternal child health (MCH) and family planning (FP) clinics as part of the PrEP Implementation for Young Women and Adolescents (PrIYA) Program in Kisumu, Kenya. AGYW were identified by program nurses and purposively sampled based on 3 categories:

- 1) accepted PrEP pills, but never used them,
- 2) used PrEP < 1 month,
- 3) used PrEP for 1-3 months.

Transcripts and debrief reports were analyzed to explore reasons for early PrEP discontinuation.

RESULTS: We conducted 69 IDIs: 21 AGYW received but never used PrEP, 24 discontinued PrEP within 1 month, and 24 discontinued PrEP within 1-3 months. Median age was 22 (IQR 20-23), 29% were currently enrolled in school, and 71% were married; 89% were from MCH and 11% from FP. Interest in initiating PrEP was more heavily influenced by one-on-one interactions with a close friend, relative, or teacher/professor than by information from clinicians or media.

AGYW with known HIV-positive partners recognized their HIV risk but feared what was perceived as side effects of antiretroviral therapy such as body fat composition changes and yellowing of eyes. AGYW frequently stopped taking PrEP during periods of low risk-perception, such as after childbirth or while their male partner was away. New mothers especially found remembering to take PrEP challenging during the complex transition to motherhood.

In some cases, both AGYW and their partners feared negative effects on the fetus, which led AGYW to discontinue PrEP during pregnancy. AGYW reported that pre-initiation counseling focused on sustained adherence; many were unaware that they could restart PrEP after discontinuation.

CONCLUSIONS: AGYW correctly identified periods when they were not at risk, which influenced PrEP discontinuation patterns. Messaging on stopping/restarting PrEP tailored to life events common among AGYW, such as childbirth and periods away from partners, could strengthen appropriate PrEP use.

WEPED823

Progress towards the UNAIDS 1st 90: A descriptive assessment of pregnant adolescent girls & young women attending antenatal care clinics in 24 districts in Zimbabwe (2017- 2018)

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BACKGROUND: AIDS-related illnesses are the leading cause of death among adolescent girls and women of reproductive age in Africa, despite treatment availability. Further, only 15% of adolescent girls and young women (AGYW) in sub-Saharan Africa know their HIV status.

This analysis was conducted to describe the HIV testing services among pregnant AGYW (10-24) attending their 1st antenatal care (ANC) clinic between October 2017 and September 2018.

METHODS: Retrospective cohort data for pregnant AGYW (10-24yrs) booking for 1st ANC between Oct17-Sept18 at 666 public health facilities supported by the FACE-HIV programme were abstracted from the monthly health facility surveillance reports. Descriptive analyses were used to summarise and interpret the data using medians. HIV testing coverages and yields at ANC booking were calculated and analysed by age, sex and geographical location.

RESULTS: A total of 175,501 pregnant women booked for 1st ANC at the 666 public health facilities during the 12-month period, 49.9% (87,629) were AGYW, of these, 44.3% (38,812) were aged 10-19 years. The overall proportion of pregnant AGYW with knowledge of their HIV status following the 1st ANC visit was 97.7% (85,646/87,629). Overall HIV test yield was highest among young women 20-24 years at 4.3%. Among the 6,174 pregnant AGYW who were documented as HIV positive in ANC, 47.3% were newly diagnosed at booking. In the 15-19-year age group, 55.3% (951) of HIV positive (1,719) adolescents were newly identified at booking.

CONCLUSIONS: Knowledge of HIV status among AGYW attending 1st ANC was very high at 97.7%, indicating PMTCT program success to increase coverage of HIV testing in ANC.

However, the analysis identified missed opportunities among young adolescents (10-14 years). Of all the HIV positive pregnant AGYW attending 1st ANC, nearly half were newly identified at booking, highlighting the importance of HIV testing in ANC as an important vehicle to meeting the 1st 90 UNAIDS target.

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	10-14 Yrs	15-19 Yrs	20-24 Yrs	Total
Pregnant AGYW Booking for 1st ANC	640	38172	48817	87629
Pregnant AGYW Booking for 1st ANC with known HIV+ Status	26	768	2460	3254
Pregnant AGYW Tested for HIV at Booking	479	36543	45370	82392
Pregnant AGYW Newly testing HIV+ at Booking	13	951	1956	2920
HIV testing yield	2.7% 0.0%:IQR (0.0%,0.0%)	2.6% 1.8%:IQR (0.0%,3.9%)	4.3% 3.6%:IQR (1.1%,5.7%)	3.5% 3.0%:IQR (1.5%,4.7%)
Knowledge of HIV Status amongst pregnant AGYW in ANC	78.9% 100%:IQR (100.0%,100.0%)	97.7% 100%:IQR (97.9%,100.0%)	98.0% 100%:IQR (98.1%,100.0%)	97.7% 95.2%:IQR (92.0%,97.5%)
Estimated HIV Prevalence amongst pregnant young women & adolescents booking for 1st ANC	6.1%	4.5%	9.0%	7.0%
Proportion of AGYW newly testing HIV+ in ANC amongst all HIV+ AGYW	33.3% 0.0%:IQR (0.0%, 0.0%)	55.3% 54.5%:IQR (25.0%, 100.0%)	44.3% 44.4%:IQR (23.9%, 60.0%)	47.3% 50.0%:IQR (30.8%, 66.0%)

[Table 1- HIV Testing Services among Adolescent Girls and Young Women in ANC]

WEPED824

Understanding the vulnerabilities of adolescent girls and young women in Oshikoto region, Namibia

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BACKGROUND: Namibia has a generalized HIV epidemic, with 12.6% prevalence and 0.36 incidence per 1000 among 15-64 years population. Annual HIV incidence among adolescent girls and young women (AGYW) 0.99% is substantially high (NAMPHIA, 2017). The PEPFAR-funded DREAMS project aims to reduce HIV incidence in AGYW in five high burden districts of Namibia by 2022. Oshikoto region comprises three of those districts.

METHODS: Project HOPE Namibia and Ministry of Health and Social Services conducted a mixed methods formative assessment ahead of DREAMS implementation to understand the characteristics of AGYW aged 10-24 years in Oshikoto. During the assessment 731 AGYW participated in the socio-demographic surveys (SDS), of whom 220 participated in focus group discussions (FGDs). In-depth interviews (IDIs) were conducted with 46 stakeholders, comprising community leaders and AGYW service providers.

RESULTS: SDS data shows that 132(18.1%) were not educated, not in school and not in training, whilst 21(2.9%) had never attended school. Numerous AGYW 194(26.6%), had lost one or both parents. Overall, 324(44.3%) AGYW had ever had sex and among these 43(13.3%) debuted before their fifteenth birthday. Among study participants 42(5.6%) were currently pregnant while 153(21%) had a biological child. 377(52%) AGYW self-reported ever testing for HIV, 24(6.3%) were HIV infected and on ART through the public sector program.

Results from the IDIs and FGDs indicate that substantial numbers of AGYW in Oshikoto are poor, orphaned, school drop-outs, have early sexual debut, exposed to gender-based violence (GBV) and inter-generational partnerships. Economic pressure, alcohol abuse and lack of positive parenting influence risky behavior. Distance and health worker attitudes prevent AGYW from accessing sexual and reproductive health (SRH) services. Socio-cultural norms which propagate GBV cause under-reporting and inadequate prosecution of perpetrators. Findings highlight that GBV victims are stigmatized and face structural barriers in accessing post-GBV care.

CONCLUSIONS: The DREAMS package is relevant to Oshikoto and could reduce vulnerability AGYW through social asset building, changing norms, economic strengthening and improved access to services. High preg-

nancy rates and early sexual debut necessitate improved access to SRH services for AGYW under 15 years. Re-enrolling young mothers in school while allowing them to fulfil parental duties is essential.

WEPED825

The effectiveness of the DREAMS eligibility screening: How do we know if we are reaching vulnerable adolescent girls and young women (AGYW) aged 10 - 24? Namibia, 2018

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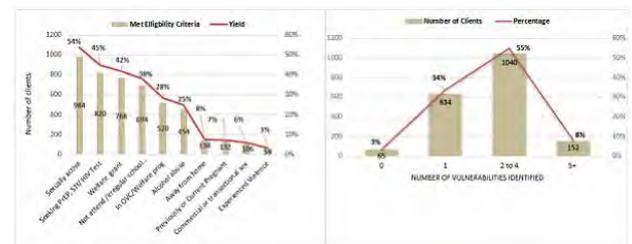
BACKGROUND: Reduction of new Human Immunodeficiency Virus (HIV) infections is critical in reaching epidemic control in Namibia. HIV incidence among adolescent girls and young women (AGYW) aged 15-24 is 0.99 per 1000 compared to 0.03 for boys in the same age group and a national incidence of 0.36 (NAMPHIA, 2017). The PEPFAR-funded DREAMS project reaches AGYW with evidence-based interventions. An effective criterion for selecting vulnerable AGYW is essential to programmatic success.

METHODS: In Namibia, the DREAMS eligibility criterion was developed into a screening tool. Domains that were screened include health, education, economic strengthening and safety. To assess if the screening tool is effective for identifying the vulnerable AGYW by asking, are we missing any AGYW?

RESULTS: Of the 1891 AGYW aged 10-24 screened using the tool, 1826 were identified for entry into the DREAMS whereas 65 screened out. All 1891 AGYW received the basic services of HIV, Gender-Based Violence (GBV) prevention education, Family Planning, HIV Testing Services, (HTS), Pre-Exposure Prophylaxis (PrEP), Sexually Transmitted Infections (STI) screening and GBV screening. Of the 65 AGYW who screened out 22 requested services while 43 did not. During needs assessments it was determined that those 22 AGYW would benefit from the program.

The highest yielding screening criteria were Sexually Active (984, 54%), Seeking PrEP or STI/HTS (820, 45%), and Welfare Grant recipient (768, 42%) (Figure 1). Of those assessed, 1192 (63%) were flagged with 2 or more eligibility criteria. Overall, we have confirmed 1094 (98%) clients assessed with needs who've screened with at least one or more eligibility criteria.

CONCLUSIONS: The current screening tool indicated 98% effectiveness in identifying vulnerable AGYW. However, it missed 2% of AGYW in need of DREAMS services. As we continue to conduct detailed assessments of AGYW including those requesting services, we will continue to improve the tool.



[Figure 1- Distribution of clients across different vulnerability criteria]

Migrants and displaced persons

WEPED826

Migrant patients living with HIV/AIDS in Japan: Review of factors associated with high dropout rate in a leading medical institution in Japan: Second report

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BACKGROUND: Migrant patients living with HIV/AIDS formed approximately 10% of the cases who have ever visited our clinic in Tokyo, Japan. The authors reported a high dropout rate in HIV/AIDS care among migrant patients, but there was no apparent association between dropout and factors peculiar to non-Japanese (PLOS ONE <https://doi.org/10.1371/journal.pone.0205184>). We conducted a follow-up study to evaluate the possible association of the timing of antiretroviral therapy (ART) introduction with the risk of dropout of migrant patients.

METHODS: A retrospective cohort study was designed. We reviewed the records of 411 selected (45 non-Japanese and 366 Japanese) treatment-naïve patients who started visiting our clinic between 2011 and 2014 and initiated their first ART during the study period of 2011-2016.

RESULTS: A total of 332 patients (80.8%, 29 non-Japanese and 303 Japanese) retained regular visit during the study period. The overall rate of censoring was considerably high among non-Japanese patients (Incident Rate Ratio (IRR)=2.41, p-value< 0.01). Particularly the loss-to-follow-up (LTF) cases were more frequent among non-Japanese patients (n=4, Incidence rate (IR)=7.78 per 100,000 person-days, IRR=4.17, p=0.02 after adjusting for age at enrollment).

Although non-Japanese patients appeared to take more time to the first visit since HIV diagnosis (p=0.03), the mean time from the first visit to the first ART and the mean time from HIV diagnosis to the final visit were not significantly different (p=0.49, 0.69, respectively).

All non-Japanese LTF patients held legal status to reside in Japan at the time of their final visit and were eligible for public health services. Two of them had limited fluency in Japanese language and used alternative verbal communication.

CONCLUSIONS: The results showed no apparent association between the LTF of migrant patients and the timing of initial treatment. Further studies are needed to identify the factors responsible for the high dropout rate and to improve the care of migrant patients living with HIV/AIDS.

WEPED827

“The doctor told me straight up that ‘we hate you’”: Foreign migrant adolescent girls’ and young women’s access to sexual and reproductive health services in South AfricaC. Milford¹, M. Bekinska¹, C.J. Heck², H. Fuhner¹, D. van Zyl³, J. Cockburn³, J. Smit¹, M. Temin²*¹MatCH Research Unit (MRU), University of the Witwatersrand, Department of Obstetrics and Gynaecology, Faculty of Health Sciences, University of the Witwatersrand, Durban, South Africa, ²Population Council, New York, United States, ³Community Media Trust, Cape Town, South Africa*

BACKGROUND: Foreign migrant adolescent girls and young women (AGYW) in South Africa are at risk of social exclusion due to disadvantaged access to quality education, language differences, and xenophobia, which can hinder their access to HIV and sexual and reproductive health (SRH) services, increasing HIV risk. Community Media Trust (CMT) implemented a project to reduce risk by increasing migrant AGYWs’ social and other protective assets, resilience, and coping skills. We describe and explore migrant AGYWs’ unique knowledge of HIV/SRH issues, risky sexual behaviour, and access to HIV/SRH services.

METHODS: Focus group discussions (FGDs) were held in South Africa (December 2017–December 2018) with foreign migrant AGYW and parents involved in CMT’s asset-building project. Six FGDs with migrant AGYW from Durban (n=25) and Johannesburg (n=26) and two with parents of migrant

girls in Durban (n=10) covered social support, protection and access to key resources and health services. FGDs were transcribed and data were thematically coded using NVivo v10

RESULTS: AGYW participants were aged 14–19 years. They originated mainly from Zimbabwe, Congo, Burundi, and Zambia; 88% attended school. Most migrant AGYW entered the asset-building program with some HIV/SRH knowledge, mostly learnt at school. Most parents felt “it was not going to be easy” for them to teach their children these topics. Some AGYWs reported that AGYW like them “like having sex at a young age,” and others reported that “parents tend to marry [them] off” early. Many disclosed inadequate health-seeking behaviour and reported challenges accessing SRH services due to fear of healthcare provider stigma toward foreigners and adolescents, lack of confidentiality during consultations, and difficulties accessing services without South African identity documents. Some AGYW reported they successfully accessed services in specific adolescent-friendly settings, and others suggested funders could support migrant-friendly clinics.

CONCLUSIONS: Multiple layers of intersecting risk factors—being young, female, and experiencing unique barriers to SRH services—may exacerbate HIV risk in foreign migrant AGYW in South Africa. They need support to develop skills to overcome these barriers, while healthcare providers and parents also need education and support to address the SRH needs of these AGYW without compromising their right to health.

WEPED828

HIV prevention cascade awareness and engagement among urban refugee and displaced adolescents and youth in Kampala, UgandaC. Logie¹, M. Okumu¹, S. Mwima²*¹University of Toronto, Toronto, Canada, ²Ministry of Health, Kampala, Uganda*

BACKGROUND: Scant research has examined urban refugee and displaced persons’ engagement with the HIV prevention cascade, particularly among adolescents and youth. Uganda, hosting over 1.3 million refugees, is a salient context to explore the nexus of HIV and urban youth displacement. We examined factors associated with HIV service awareness and HIV testing uptake among urban displaced and refugee youth in Kampala, Uganda.

METHODS: This community-based study involved a tablet-based cross-sectional survey with a respondent-driven sample of refugee and displaced youth aged 16–24 living in five Kampala slums (Kabalagala, Rubaga, Kansanga, Katwe and Nsambya). We conducted multivariable logistic regression to determine the adjusted risk ratio for HIV service awareness and HIV testing uptake (ever) among refugee/displaced adolescent girls and young women (AGYW) and adolescent boys and young men (ABYM).

RESULTS: Among participants (n=445; mean age=19.59, SD=2.60; young women: n=333; 74.7%), two-thirds (65.2%; n=290) were aware of HIV services in their community and over half (56.2%; n=250) ever received an HIV test (24.4% < 3 months ago; 24.8% 3–5 months ago; 14.8% 6–12 months ago; 36% >12 months ago). AGYW were more likely to be aware of HIV services than ABYM but there were no HIV testing uptake gender differences. Adjusted multivariable regression analysis results revealed that increased sexual and reproductive health (SRH) community stigma, lower SRH enacted and internalized stigma, and employment were associated with increased odds of HIV service awareness among AGYW. In the second analyses, age, lifetime forced sex, condom self-efficacy, and lower SRH enacted stigma were associated with increased odds of lifetime HIV testing among AGYW. In adjusted multivariable regression analyses with ABYM,

- 1) increased age was associated with higher odds of HIV service awareness, and
- 2) increased lifetime sexual partners and selling sex were associated with higher odds of ever HIV testing.

CONCLUSIONS: HIV testing among urban refugee and displaced youth in Kampala falls far below the UNAIDS goal of 90% of persons living with HIV knowing their status. Future multi-level HIV prevention cascade interventions can integrate social and structural factors, including SRH stigma, sexual violence, selling sex, and condom self-efficacy, to optimize HIV testing among urban refugee youth in Kampala.

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WEPED829

Transnationally-tailored interventions improve retention in HIV care and viral suppression among Latino immigrants living in the Continental U.SJ. Myers¹, S. John², R. Frazier², S. Shade²¹University of California, San Francisco, Medicine, San Francisco, United States, ²University of California - San Francisco, San Francisco, United States

BACKGROUND: Latino immigrants living in the Continental U.S. face complex barriers to accessing HIV care and are particularly vulnerable in the current political climate. Applying a transnational framework may improve the quality of services for immigrants as it accounts for and situates clients and their HIV care in the context of a lived experience that spans the US and their places of origin. We examined the effect of nine transnationally-tailored patient navigation interventions on rates of retention in HIV care among participating Mexicans and Puerto Ricans living in the U.S. **METHODS:** Generalized estimating equations was used on data abstracted from patient charts to: assess change over time in retention and viral suppression from baseline; and assess whether these changes differed by clients' place of origin. We combined medical data with patient survey responses to assess whether transnational practices (travel to place of origin, sending money, sending goods) or transnational influences (degree of communication with place of origin, consumption of media from place of origin, or cultural influence of the place of origin or of the US) influenced HIV outcomes.

RESULTS: Between baseline and 24-months, the 655 participants were almost 6 times as likely to be retained in care (OR=5.76; 95% CI=4.29, 7.73; $p < 0.001$) and more than twice as likely to achieve viral suppression (OR=2.41; 95% CI=1.17, 5.00; $p < 0.02$) when they received the intervention compared to those who did not receive it. Mexicans benefited more than Puerto Ricans from receipt of the intervention. Participants who identified with the culture of the US were more likely to be retained in care at 12-months (OR=1.51; 95% CI=1.13, 2.01; $p < 0.0015$). Similarly, participants who identified with the culture of the US were more likely to be virally suppressed at 12-months (OR=2.92; 95% CI=1.00, 8.52; $p < 0.05$). Engaging in transnational travel was also associated with the likelihood of viral suppression at 12-months (OR=9.90; 95% CI=3.54, 27.59; $p < 0.001$).

CONCLUSIONS: The transnational framework applied to navigational services improves HIV care outcomes among both Mexican and Puerto Rican clients. Lessons from these transnational framework based-interventions may help engage immigrants living with HIV in other parts of the world.

Other populations vulnerable in specific contexts

WEPED830

Understanding the social structural production of HIV risk among a population of marginalized Latina young women: Prevention efforts among changing risk environmentsA. Cepeda¹, K. Nowotny², T. Perdue¹, E. Ramirez¹, A. Valdez¹¹University of Southern California, Suzanne Dworak-Peck School of Social Work, Los Angeles, United States, ²University of Miami, Miami, United States

BACKGROUND: Among specific Mexican-American communities in San Antonio, TX, there has historically been a flourishing drug market that has facilitated and maintained patterns of injecting heroin use. Recent changes in the drug market are contributing to increasing risk environments, as methamphetamine use is emerging. Confounding the risks are structural and contextual factors limiting access to treatment and healthcare services. Using the social structural production of HIV risk framework, this study focuses on the social and physical context producing HIV risk among a population of marginalized Latina young women.

METHODS: Proyecto San Antonio Latina Trajectory Outcomes (Proyecto SALTO) is an ongoing NIDA-funded study examining long-term health outcomes among a cohort of Mexican-American women through a concurrent mixed-method nested design including the collection of biological, survey and qualitative data. To date, a total of 203 interviews have been conducted, and the mean age of respondents is 33.21 [28-43].

RESULTS: Although HIV prevalence was low at 1.2%, the HCV prevalence was 27.2%. Drug risk behaviors included injection drug use (31.3%) with 62.9% engaging in syringe/paraphernalia sharing. Sex risk behaviors include no contraceptive use (53.8%), sex with high risk partners (55.7%), and prostitution (6.5%). Despite engaging in high risk behaviors, health care access is limited as 45.7% of respondents report no health insurance and 33.8% report their last routine health check-up was over two years prior. Additionally, high percentages of women reported never receiving counseling on risks related to HIV (28.4%) or HCV (46.7%). Emerging qualitative data assist in understanding the intersection of risk behaviors and cultural community context creating the social structural risk environment. Structural factors (perceived racism in social/health care systems) and social environmental factors (peer group normalization of methamphetamine use) were identified by the respondents. Further, the economic and racial segregation of neighborhoods create geographical vulnerability to risk by restricting access to HIV prevention, treatment and health services.

CONCLUSIONS: While individual interventions are needed, a focus on individual factors results in a partial impact on risk reduction. The local physical and social environments creating risk must be targeted to create structural prevention and interventions that impact the vulnerability to HIV risk within the community.

WEPED831

Factors associated with HIV testing and counseling (HTC) among Vulnerable Young Key Populations (VYKPs) in urban Bangladesh: Findings from the SANGJOG Project Evaluation DataM.I. Hossain¹, M. Alam², I. Ehsan¹, S. Hossain¹, N. Mohammad², M.Z. Satiar³¹Population Council, Bangladesh Country Office, Dhaka, Bangladesh,²Population Services and Training Center (PSTC), Dhaka, Bangladesh,³Embassy of the Kingdom of the Netherlands, Dhaka, Bangladesh

BACKGROUND: Vulnerable young key populations (VYKPs) in Bangladesh suffer from a higher HIV prevalence (1%), compared to the general population (0.1%). However, they are not focused in most of the interventions although most of this group known to be highly vulnerable to STD/HIV/AIDS. This abstract used an evaluation dataset of a 2-year Dutch-funded intervention, named SANGJOG, aiming to reduce HIV transmission through increasing SRHR knowledge of VYKPs. Intervention included peer education and outreach providing education and counseling on health seeking around STD/HIV/AIDS including HIV testing and counseling combined with focused clinic capacity building to improve the sexual and reproductive health of VYKPs.

METHODS: A cross-sectional survey was conducted in October 2018 in 7 districts in Bangladesh among selected group of VYKPs which includes pavement dwellers(PDs), transport workers(TWs), female sex workers(FSWs), and young laborers(YLs). A total of 1060 VYKPs aged 15-24 were interviewed through pretested questionnaire and in-depth interview guides. The survey elicited information on key socio-demographic factors, knowledge, HIV-related risk factors, HTC, and use of FP and HIV/STI services. A sub-set of the data for HTC were used for this abstract. Bivariate (chi-square and exact tests) and multivariate analyses (logistic regression) were used to ascertain factors associated with HTC and complemented by in-depth interview findings.

RESULTS: Participants had the median age of 19 years; 49% had more than primary level education; 18% were currently married; 33% currently had a primary partner (boyfriend/girlfriend or spouse). 22% ever tested for HIV and 21% tested in the past 12 months. 18% said to know about HIV status of his/her partner. Multivariate analysis indicates that being from higher age 20-24 group [adjusted OR (aOR):1.44(1.01-2.06)]; having a primary sex partner [aOR:1.56(1.06-2.28)]; being a transport worker [aOR:2.13(1.35-3.38)]; and being a female sex worker [aOR:5.52(3.61-8.44)] were associated with higher HTC.

CONCLUSIONS: There is an urgent need for increasing HTC among VYKPs to contain rapid transmission of HIV and recommended to raise awareness of HIV risks among the younger, unmarried VYKPs.

WEPED832

Factors associated with condom use by men in extra marital relationships in Benin

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BACKGROUND: Benin's HIV epidemic is generalized, with an estimated prevalence of 1% and an incidence-to-mortality ratio of 1.32 in 2017. Only 55% of those aware of their status access ART (UNAIDS 2017). Prevention interventions such as condoms can minimize the risk of sexual transmission of HIV and other STIs, especially relevant for the estimated 22% of men aged 15-64 who reported having two or more sexual partners in the past year (BDHS 2017-8).

Since 2013, the Benin Social Marketing Association (ABMS) has run a reproductive health project aiming to increase condom use among men in Benin. A study was conducted in 2017 to identify factors associated with condom use in project areas.

METHODS: A representative sample of men aged 18-54 (n=1,314) was drawn and interviewed in project areas located in north, center and south of Benin, using a structured questionnaire between November and December 2017. Univariate and multivariate analysis were performed to describe and explore possible factors associated with condom use at last sexual intercourse.

RESULTS: Sixty-nine percent reported being married, average age was 31.7 years, and 41% reported having casual (non-spouse) partners during the 12 months before the study. Altogether 75.3% (95% CI: 71.6-78.9) of respondents reported using a condom at last sex. The proportion reporting condom use with casual partners was higher among men with high vs low education status (81.2% vs 66.0%, p< 0.001) and those who live in urban vs. rural areas (82% vs. 66%, p< 0.001).

In logistic regression, factors associated with condom use at last sex included knowledge of HIV transmission modes (OR=4.46, p< 0.001), perception of condom availability (OR=1.50, p< 0.001), ability to discuss condoms with sexual partners (OR=6.50, p< 0.001) and urban residency (OR=2.65, p< 0.01), controlling for other background characteristics.

CONCLUSIONS: Inadequate levels of condom use and high rates of casual partnership show a risk of HIV transmission in intervention areas. Interventions should work to improve the perception of condom availability and increase men's ability to discuss condoms with their partners; knowledge of HIV modes of transmission should also be improved among this population.

WEPED833

"AIDS is our greatest enemy!" A pilot study on a cultural sensitive approach to HIV prevention among Yi (Nuosu) ethnic minority group in Southwest China

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BACKGROUND: According to UNAIDS, 780,000 people are estimated living with HIV in China. Yet, the free screening and free medication services are under-utilized in rural area, especially among ethnic minorities who are from lower socio-economic background and have language barrier. According to the internal statistics of CDC in 2014, Liangshan Yi Autonomous Prefecture (Sichuan province) is one of the HIV-prevalent areas, with 90% of the affected individuals are of Yi (Nuosu) ethnic descents. The major source of HIV infection in this area was needle sharing in drug injection, especially among young Yi migrant workers who suffered from social discrimination and unfair treatment while away from home. There

is an urgent need of contextualized HIV prevention program that include local religious healers (Bimo) and traditional leaders (Degu) who have great influences on the locals' perception of their disease and treatment.

METHODS:

Study 1: Case study with HIV affected Yi patients (n=7) and their family members (n=10).

Study 2: Two focus group studies on various community and traditional leaders and healers (n=7).

Study 3: Three-month follow-up study on a contextualized HIV counselling program (n=59).

RESULTS:

Study 1: Family resilience, financial foundations and cultural heritage are protective factors for HIV affected Yi.

Study 2: AIDS is seen as an „imported“ disease by local Yi, and is being treated as the No.1 „enemy“ by the traditional leaders. Cultural stigma and social seclusion towards HIV patients came from their threat to the bloodline of family clan. Though the local Yi moral law conflicted with the universal humanitarian ethics, indigenous leaders are open for future collaboration in disease control.

Study 3: A one-time contextualized HIV education/counselling could increase high rate of awareness (from 1-11% to 62-76%) and safety behaviour (10% to 19%) among Yi group up till 3 months.

CONCLUSIONS:

1. Gaining collaboration from the traditional healers and community leaders would be crucial to dispute the existing cultural stigma and exclusion of HIV affected Yi patients.

2. A larger scale of program implementation is needed to prove the efficacy of this psycho-social approach among high risk Yi communities.

WEPED834

Sociodemographic characteristics and sexual behaviours among HIV positive and HIV negative adolescents in a primary care setting in Mexico: A case control study

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BACKGROUND: Worldwide, adolescents and young adults account for 30% of new HIV infections. Furthermore, adolescents living with HIV (ALWH) have worse clinical outcomes. Little is known regarding the HIV epidemic among adolescents in our country. The aim of our study was to compare the characteristics of HIV positive and negative adolescents attending 2 primary care clinics in Mexico City (CMDX).

METHODS: Case control study, nested in an adolescent cohort (started on , December 1st 2017), conducted in 2 HIV Clinics in CDMX. Subjects born after December 1st 1997 were included. A structured questionnaire was applied addressing sociodemographic characteristics and sexual behaviours. Cases (HIV+) were enrolled either at the counseling area or during medical visits. Controls (HIV-) were all invited at the clinic's counseling area.

RESULTS: 395 questionnaires were applied: 223 to controls and 172 to cases. Mean age of participants was 18.51 years. 17.22% were women, 1.52% were transgender women (TGW) and 81.27% were male. There was a significant higher proportion of women among controls when compared to cases (23.77% vs 8.72% p=0.001). 55% of the total sample had completed high school. However, we observed a significantly higher proportion of current students (69.06% vs 33.72% p< 0.001), with financial dependence (84.3 vs 69.19 p< 0.001) and family incomes over \$300 USD

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a month (45.29 vs 27.33 $p < 0.001$) among controls when compared to ALWH. Mean age at first sexual intercourse was 15.7 years, with no difference between groups ($p = 0.45$). Mean number of total sexual partners (SP) (23 vs 11 $p = 0.001$) was higher in cases. No difference was observed when looking at SP in the last 3 months ($p = 0.65$). Cases were more prone to have older SP (10 or more years older), when compared to controls (27.33 vs 14.98 $p = 0.006$). ALWH were more frequently offsprings from adolescent mothers (25.74 vs 13 $p = 0.003$). No differences in substance abuse were observed.

CONCLUSIONS: According to our findings, ALWH have more and older SP when compared to HIV negative adolescents. Additionally, ALWH appear to have diverse social vulnerabilities, which may increase their risk of HIV acquisition. Specific HIV preventive and care services are required for this and increasing population.

WEPED835

Multisite qualitative evaluation of microbicide/PrEP acceptability among mothers and male partners in Africa: The MAMMA study

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BACKGROUND: Pregnant and breastfeeding (P/BF) women in Sub-Saharan Africa are at high risk of acquiring HIV, yet they are typically excluded from microbicide/PrEP trials. In preparation for phase 3b trials in P/BF women, we explored attitudes about use of a microbical vaginal ring (VR) or oral PrEP and perceptions of HIV risk among key stakeholders in Malawi, South Africa, Uganda and Zimbabwe. Interest and willingness to support use of these methods were also measured.

METHODS: We conducted 16 single-sex Focus Group Discussions (FGDs) with community-recruited HIV-uninfected women, currently or recently P/BF, aged 18-40 (median 26), and men with (currently or recently) P/BF partners, aged 18+ (median 30). All participants completed a behavioral questionnaire, viewed a brief educational video and handled prototype placebo products. All FGDs, conducted in local languages using semi-structured guides, were summarized in reports for rapid thematic analysis. Interest in products was tabulated and themes related to HIV risk, key influencers and product attributes were extracted.

RESULTS: Of the 128 participants (65 women; 63 men) 75% lived with their partner and 84% had given birth or fathered a child. Women reported that the most important influencers when P/BF were the baby's father (52%), the baby's grandmother (22%) and their doctor (14%).

Furthermore, 52% of women and men agreed that at least half of decisions when P/BF (e.g., medication use; antenatal, postnatal and baby care) were made jointly.

There was consensus that P/BF women are at high risk for HIV for biological (e.g., weakened immune system) and behavioral reasons (e.g., lower libido and prescribed abstinence encouraging men's infidelity), and new prevention options were welcomed.

All agreed that endorsement by health care providers (HCPs) was key to product acceptance and that safety of the baby was paramount, with different perceived (dis)advantages for VR and PrEP:

Product	Vaginal ring	Oral PrEP
Advantages	<ul style="list-style-type: none"> • Long acting • Local (vaginal) exposure 	<ul style="list-style-type: none"> • Familiarity with pills • Easy to swallow
Disadvantages	<ul style="list-style-type: none"> • Interference with sex (e.g., impact on libido, vaginal enlargement) • Possible injury to baby at delivery • Cultural taboos about vaginal insertion (P) 	<ul style="list-style-type: none"> • Forgetting doses • Exacerbation of nausea (P) • Risk of miscarriage (P) • Breastmilk contamination (BF) • ARV-associated stigma

[Table1]

CONCLUSIONS: Participants perceived being P/BF as a time of high HIV risk and valued new prevention options. Endorsement by HCPs and support from male partners were seen as critical for product use. Participants recommended involving men and HCPs in sensitization efforts for future trials.

WEPED836

Piloting early detection of HIV, tuberculosis and hepatitis C in probation settings in Ukraine

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BACKGROUND: Ukraine's HIV, tuberculosis (TB), and viral hepatitis (HCV) rates are among the highest in Europe. Rates are especially high among detainees, prisoners and those on probation. Over the past decade, Ukraine's prison system has improved HIV and TB care services, while the created in 2015 Probation Service has never implemented HIV, TB and HCV interventions for people on probation. There are currently 58,000 people on probation in Ukraine, largely from marginalized segments of society engaged in unsafe drug injection and sexual practices with poor access to health care.

METHODS: USAID's Serving Life project, implemented by PATH, launched the first pilot project in Ukraine to involve probation staff in HIV, TB, and HCV screening, counseling, and referrals to civil health care facilities for people on probation. The project developed tools for probation staff, including a screening questionnaire and referral cards, to facilitate appropriate screening and referrals; created and equipped counseling rooms in twelve regional probation centers to conduct private screening and HIV rapid testing; and trained probation staff to use the screening and referral tools.

RESULTS: During three months (July 1 through September 20, 2018), 1,173 people on probation (32.6%) were verbally screened by probation staff, resulting in the identification of 698 (59.5%) individuals at high risk of HIV who were referred to a counseling room in the probation center for provider-initiated HIV rapid testing. Sixteen individuals (2.3%) tested HIV positive. Verbal screening also identified high HCV risk among 217 individuals (18.5%) and potential TB risk among 155 individuals (13.2%). The screened people on probation who needed diagnostic follow-up or treatment initiation were referred to the nearest primary health care facilities.

CONCLUSIONS: The three-month pilot implementation results show that HIV prevalence in probation is 2.3%, which is higher than the national prevalence estimate of 0.98%. Also, people on probation may be at higher risk of TB and HCV. Institutionalization of HIV, TB, HCV screening conducted by trained probation staff will increase case detection and enhance linkage, retention in care, and treatment for those on probation living with HIV, TB, and HCV.

WEPED837

Associations between mental and substance use disorders and virologic failure among adolescents attending antiretroviral therapy clinics in South Africa and Zimbabwe

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BACKGROUND: Mental health disorders are common in adolescents living with HIV and may negatively affect antiretroviral therapy (ART) outcomes. We describe the mental health screening outcomes from two large adolescent ART clinics in Southern Africa and report associations between mental health screening outcomes and virologic failure.

METHODS: We implemented routine mental health screening at Rahima Moosa Mother and Child Hospital in Johannesburg, South Africa and Newland Clinic in Harare, Zimbabwe. Clinic attendees aged 9-19 were offered mental health and substance use screening. Screening included four pre-screening questions followed by full screens for depression (PHQ-A), suicide (AIP handbook), anxiety (GAD-7), trauma (PC-PTSD-5) and/or substance use (CAGE-AID) for each pre-screen positive question. We calculated the prevalence of positive screening outcomes and assessed associations between screening outcomes and virologic failure (i.e. viral load >1000 copies/ml) using univariable and multivariable logistic regression. Multivariable analysis adjusted for age, gender, ART regimen, WHO clinical stage and CD4 count at ART initiation, duration on ART, and facility.

RESULTS: Amongst 2,037 currently active patients aged 9-19 years, 1,219 (60%) were pre-screened. Median age at pre-screening was 15 years (IQR 13-17). In total, 409 adolescents (34%) had a positive pre-screen. Out of the 1,219 pre-screened adolescents, 103 (8%) screened positive in full screening: 55 (5%) for depression, 39 (3%) for suicidal concern, 33 (3%) for anxiety, 39 (3%) for trauma and 14 (1%) for alcohol/substance use. The prevalence of virologic failure was 15% (134/906) in South Africa and 17% (54/313) in Zimbabwe.

In South Africa, positive full screenings for depression (aOR 2.26, 95% CI 1.03-4.93), substance use (aOR 5.74, CI 1.51-21.86), or any disorder (aOR 3.00 1.71-5.28) were associated with virologic failure.

In Zimbabwe, screening outcomes were not associated with virologic failure (Table).

	South Africa - OR (CI)	South Africa - aOR (CI)	Zimbabwe - OR (CI)	Zimbabwe - aOR (CI)	Total - OR (CI)	Total - aOR (CI)
Depression	2.41 (1.13-5.15)	2.26 (1.03-4.93)	1.21 (0.39-3.77)	1.22 (0.37-4.10)	1.94 (1.03-3.64)	1.75 (0.91-3.43)
Anxiety	2.62 (0.99-6.96)	2.16 (0.78-6.01)	0.39 (0.05-3.04)	0.42 (0.05-3.60)	1.53 (0.66-3.59)	1.39 (0.58-3.37)
Trauma	1.96 (0.70-5.49)	1.72 (0.60-4.91)	1.33 (0.42-4.24)	1.10 (0.32-3.80)	1.70 (0.79-3.64)	1.40 (0.64-3.09)
Substance use	8.79 (2.44-31.58)	5.74 (1.51-21.86)			4.25 (1.46-12.41)	2.90 (0.96-8.73)
Suicide	2.25 (0.86-5.87)	2.04 (0.77-5.44)	1.55 (0.48-4.95)	1.71 (0.47-6.28)	1.98 (0.95-4.13)	1.82 (0.85-3.92)
Any positive screening	3.52 (2.06-6.01)	3.00 (1.71-5.28)	1.03 (0.40-2.62)	1.03 (0.37-2.84)	2.49 (1.58-3.93)	2.18 (1.34-3.53)

[Table: Associations between positive full-screenings and virologic failure. OR: Odds Ratio; aOR: adjusted Odds Ratio; CI: 95% Confidence Interval.]

CONCLUSIONS: Routine mental health screening and pro-active management of mental health problems may be critical for ensuring better mental health and ART outcomes among adolescents living with HIV in Southern Africa.

WEPED838

High risk men utilize traditional healers instead of biomedical facilities in southwestern Uganda: Results from a mixed methods study

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BACKGROUND: In Uganda, and throughout sub-Saharan Africa, health-care is provided by traditional healers instead of - or concurrent with - biomedical healthcare facilities. Despite their ubiquity, healers are not integrated into community-based HIV-testing programs. The goal of this study was to characterize engagement with HIV testing among clients of traditional healers in an endemic region, using a mixed methods approach.

METHODS: This study followed an exploratory sequential design. Qualitative interviews were delivered to adult clients of traditional healers between September 2017 and February 2018 (N=30); data informed design of structured surveys administered to adults seeking care at traditional healers between March and October 2018 (N=392). Qualitative analysis

followed a grounded theory approach. Multivariable logistic regression was used to identify characteristics independently associated with the primary outcome of having received an HIV test within 12 months.

RESULTS: 381 (97%) respondents were sexually active and included in the quantitative analysis. Median age was 31 (IQR, 26-42 years); 50% were female. Only 60% (N=232) had received HIV testing within 12 months. On multivariable analysis, biomedical use within 12 months was strongly associated with recent HIV testing (OR 5.46, 95% CI 2.85-10.48; P< 0.001). 17% (N=64) of participants did not utilize a biomedical facility within the past year; among those, 75% (N=47) had also not received HIV testing within one year. This high-risk group, compared to those who *did* receive HIV testing within 12 months, was more likely to be male, less likely to be married, and more likely to have received care from bone setters or spiritual healers (Table). Qualitative data support these findings, demonstrating socio-structural factors that underlie male avoidance of biomedicine.

CONCLUSIONS: Men, unmarried adults, and clients of traditional bonesetters and spiritualists, are less likely to engage with biomedicine, and less likely to know their HIV status. Efforts to eliminate the HIV epidemic must expand beyond biomedical facilities to include communities that utilize traditional medicine.

Participant Characteristic	No HIV test in last 12 months (n=47)	HIV test in last 12 months (n=17)	P value
Male (%)	37 (77%)	10 (59%)	0.15
Married (%)	25 (52%)	12 (71%)	0.19
Type of traditional healer visited on day of recruitment (%)			0.11
Herbalist	9 (19%)	6 (35%)	
Bone setter	21 (44%)	5 (29%)	
Spiritualist	14 (29%)	2 (12%)	
Traditional birth attendant	4 (8%)	4 (23%)	

[Characteristics of participants who have not utilized biomedicine within prior 12 months]

WEPED839

HIV prevention among young key population: Community-based strategy outcomes, Brazil

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BACKGROUND: Brazil's HIV epidemic is largely concentrated among key populations whose HIV infection rates can be up to 30 times higher than those observed in the general population. Rapid HIV testing and combination prevention in community settings, delivered by peers, allows for easier access to HIV testing.

Our aim is to present the percentage of positive HIV rapid tests and intersectional risk factors of young key populations (YKP) targeted by the 'Live Better Knowing' program, a nationwide initiative launched by the Brazilian Ministry of Health in close collaboration with NGOs.

METHODS: Programmatic data were analyzed, collected through Registration form of the Monitoring and Evaluation System (SIMAV-Pro), collected from January 1st 2016 to December 31st 2018. 51 Brazilian NGOs administered the form and offer rapid oral fluid HIV tests (DPP HIV-1/2 Bio-Manguinhos/Fiocruz) and combination prevention packages to sex workers, men who have sex with men (MSM), trans people, people who use drugs and and youngsters in these populations.

RESULTS: In total, 88,052 were tested aged from 15 to 24yo, 69.2% were nonwhite, 58.9% reported drug use, 2.6% commercial sex, and 13.8% drug use and commercial sex combined. Overall, 49% reported condom use during their last sexual intercourse and 9% reported STI symptoms in the last 12 months. The general HIV prevalence found was 1% and its distribution among trans women, trans men, MSM, heterosexual women, and heterosexual men was 14%, 1%, 49%, 17% and 19% respectively.

CONCLUSIONS: Community-based rapid HIV testing delivered by peers reached YKP that had not previously accessed HIV testing. Given the combination of drug use and sex work, comprehensive combination pre-

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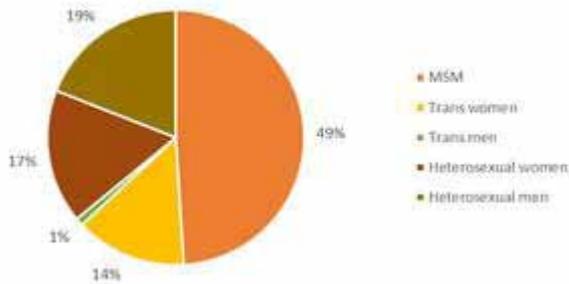
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vention services need to be delivered. Our analyses suggest the need to impact behaviors related YKP focusing on sex workers, people who use drugs, gays and other MSM, and Trans people. These findings support community-based strategies in public health policies.



[Distribution of HIV reactive results by category]

WEPED840

"HIV is much better than diabetes, with HIV you take your pill and that's it!": A qualitative study in three South African provinces

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BACKGROUND: Although HIV is prevalent in South Africa (13,1%) the antiretroviral therapy (ART) programme has been successful, resulting in fewer deaths and longer life expectancy in people living with HIV. Whilst evidence suggest the overall rate of new infections has decreased, the HIV infection rate among young people aged 15 to 24 remains alarmingly high (7,9%). The objective of this study was to explore young people perception and attitude toward the threat of HIV and how they navigate decisions about the contraceptive methods they use to prevent the possible consequences of unprotected sex.

METHODS: Between July 2015 and June 2016 we conducted a qualitative study with young people aged 18 to 24 in 3 South African provinces. Sixty five participants - 35 females and 30 males were recruited through snowball sampling, 83% were young people aged 18 to 24 and 17% were adult key informants. We conducted 14 in-depth interviews with key informants and 8 focus group discussions with young people aged 18 to 24; 3 in Kwazulu-Natal, 3 in Gauteng and 3 in the Eastern Cape. Data was coded in ATLAS.ti 6.2 using a set of pre-set codes based on the themes outlined in discussion guide and new codes that emerged during analysis.

RESULTS: The vast majority of the young people in this study expressed a lack of concern for the threat of HIV infection citing 'almost everyone has HIV now', 'HIV has become easier to manage', 'HIV treatment is effective, widely available and easily accessible' and 'it is better to have HIV than Diabetes!'. When using contraception young people assigned different priority to pregnancy and HIV, expressing a lower concern for the risk and threat of HIV infection and placing greater priority on preventing pregnancy.

CONCLUSIONS: Since the massive roll out and success of ART treatment in South Africa and the world over it is vital to further explore young peoples perception of the threat of HIV infection in order to address their HIV related risk behavior, the social influences underlying HIV risk and in order to improve the HIV prevention interventions and policies that target young people.

WEPED841

"The hardest thing is to return to who I was before the diagnosis": Gendered stigma among naïve older patients presenting to HIV care in Ukraine

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BACKGROUND: Ukraine's volatile HIV epidemic has resulted in over 238,000 people with HIV. HIV incidence among young people is declining due to targeted programmatic strategies, however we have identified a new increase in advanced HIV diagnoses (CD4< 200) among individuals ≥50yo. Exploring the role of stigma as a barrier to HIV care among older adults will inform clinical practice and research agenda, enabling 50yo+ in Ukraine be diagnosed and treated sooner.

METHODS: After informed consent, trained research staff conducted qualitative interviews with 30 adults ≥50yo newly diagnosed with HIV and reviewed 26 charts, in a private confidential location at a government HIV clinic in Kyiv, Ukraine. Interviews were transcribed verbatim, translated into English, imported into Dedoose software, and inductively analyzed for themes.

RESULTS: Among 26 older individuals initiating HIV care, the mean age was 54.4 (SD=11.63) and 15 (57%) were women. Opportunistic infection was present at HIV diagnosis in 24 (92.1%) and 4 (16.0%) were positive by serology for Hepatitis C. The mean CD4 count was 180.1 cells/mm3 (SD=178.8) and 21 (81%) had recently started antiretroviral therapy (ART). Thematic analyses concurred that both men and women were affected by preconceptions of who acquires HIV, as well as comorbidities, but external (e.g. during HIV status disclosure) and internal stigma experiences differed. Men's concerns around ART initiation were with own physical health and function, with the majority receiving family support, while women's concerns were about being "safe" to continue providing support to family like child or eldercare. Also, women considered their HIV diagnosis incompatible with their identity as a "decent woman and mother", "ordinary person who leads a healthy lifestyle"(i.e. internal stigma) and feared family's rejection.

CONCLUSIONS: This data demonstrates the gendering of HIV stigma among older adults newly diagnosed with HIV in Ukraine. While new HIV diagnoses challenged all older adults' perceptions that HIV shouldn't affect 'ordinary persons', only older women felt pressured to prove themselves as deserving to maintain their family, work, and societal roles. Future longitudinal evaluation is needed to determine how internal and external stigma influences the HIV care cascade, particularly VL suppression, among ≥50yo group in gendered ways.

Awareness, information, and risk perception regarding HIV transmission and prevention

WEPED842

Understanding of perceived infectiousness and its influence on sexual behavior among individuals with acute HIV infection in Lilongwe, Malawi (HPTN 062)

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BACKGROUND: Acute HIV infection (AHI) as an important driver of secondary transmission. AHI describes the 3-to-4-week period following viral transmission when an individual remains HIV seronegative despite having a detectable viral load. Subsequently, the virus enters a stage of rapid multiplication, resulting in extremely high viral loads and high rates of infectiousness.

We implemented HPTN 062, a pilot study on the feasibility and acceptability of a positive prevention-based motivational interviewing intervention, to reduce forward transmission of HIV among individuals with acute and early HIV infection in Lilongwe, Malawi.

METHODS: Participants were followed for 24 weeks after diagnosis with AHI and were randomly assigned 1:1 to receive either brief education about HIV and AHI or the brief education plus the MI counseling intervention. All participants, regardless of study arm, received brief education at each visit. Participants in the MI-intervention arm received four additional counseling sessions within the first two weeks after diagnosis of AHI and one booster session eight weeks after diagnosis. In this presentation, we describe these participants' understanding of AHI and perceptions of infectiousness during the period of AHI, and how these perceptions influenced their decisions to practice safer sexual behaviors at week eight.

RESULTS: A total of 26 men and women completed the quantitative assessment (14 in the MI-intervention arm and 12 in the brief education arm). All 26 answered questions about their understanding of AHI during the SSIs, with slightly fewer answering questions about perceived infectiousness and changes in sexual behavior (13 in the MI-intervention arm and 11 in the brief education arm). While most participants in both the MI-intervention and brief education arms understood key aspects of AHI, those in the MI-intervention arm gave substantially more detailed descriptions of their understanding. However, nearly all participants, regardless of study arm, understood that they are highly infectious and would be very likely to transmit HIV if they had unprotected sex during AHI.

CONCLUSIONS: Our findings suggest that messages about AHI delivered during the period of AHI are likely beneficial for ensuring that those with AHI understand their level of infectiousness and its association with forward transmission and/or HIV reinfection.

WEPED843

Enhance peer outreach approached help to penetrate the "Gharana" system and identify new case detection among Hijra (Transgender) in Mumbai, India

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BACKGROUND: The Hijra and Transgender (TGs) community is recognized as a high-risk group for HIV/STI in India by National AIDS Control Organisation (NACO). As per 2015-2016 Integrated HIV Bio- Behavioural Surveillance figures, HIV prevalence among the Hijra / Transgender communities is 12.1% in Mumbai and 7.5% nationally. HIV testing among Hijra / Transgender is low as often Gharana and guru-chela (Clans and hierarchies) system acts as a barrier to access HIV related services, thus difficulty in achieving the PEPFAR 90-90-90 HIV cascade performance.

METHODS: The Humsafar Trust under USAID-funded LINKAGES is implementing EPOA model to reach Hijra community who have still not been covered through the HIV interventions. Objective of employed Peer Mobilizer from the Gharana System who act as gate keepers and help in penetrating networks/gharanas of the Hijra community. Community members who have a strong network within the gharana system and not currently part of any interventions are recruited as Peer Mobilizers. We anticipate that through this approach, we would be able to access TG and hijra communities who have not been part of TIs would be reached through this approach. Peer Mobilizers are expected to motivate and refer individuals to access existing HIV interventions. Every successful referral is incentivized thereby motivating KPs to refer people in their network for HIV and syphilis testing.

RESULTS: From Nov 2017 - Jan 2018, registered and tested 140 Hijras with 7.8 percent HIV and 11% Syphilis. 80% of those who have been tested positive have been linked with care and support services. the average age of the respondents was in age group of 18-22 and reported sex work as their main occupation. Most of them reported higher episodes of unsafe sexual practices, alcohol use in sex, experiencing violence from clients thus making them vulnerable to HIV and STIs.

CONCLUSIONS: Under the HIV intervention Programme, EPOA strategy is cost effective and helps penetrate deeper in social networks. EPOA has helped reaching out younger population and increased HIV testing and es-

tablished need to work with youth TG communities New case detection among this group has been high as compared to those who access HIV intervention services.

WEPED844

Willingness to pay for PrEP within high HIV burden counties in Kenya: Results from a population-based survey

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BACKGROUND: PrEP roll-out is ongoing in regions with high HIV burden, mainly through facility-based delivery. Little is known about acceptability of non-facility PrEP delivery and willingness to pay for PrEP in these areas.

METHODS: We conducted SMS-based, population-level surveys of PrEP awareness among individuals ages 18-34 in six high-burden counties in Kenya in June 2018 (Kisumu, Siaya, and Homa Bay) and January 2019 (Kisumu, Nyamira, Kisumu, Siaya, Migori, and Homa Bay). Each wave comprised unique individuals who had not previously been surveyed.

Anonymous data were collected using the mSurvey platform (mSurvey Inc., Nairobi, Kenya), which sends SMS messages via mobile provider networks to a "general audience" pool of subscribers.

Subscribers' demographic information was matched to Kenyan census data by age, gender, and county. Once opened, participants had 72 hours to complete the survey, receiving 0.20 USD upon completion.

RESULTS: Of 3382 subscribers who received an SMS survey invitation in January 2019, 2195 (65%) opened the survey and 2057 (94%) answered all questions. Most (60%) were 18-24 years of age and 68% were male, similar to June 2018.

Overall, 82% had ever heard of PrEP, of which 89% (n=1504) had comprehensible responses to assess PrEP understanding. Over three-quarters (77%) demonstrated understanding of PrEP; others mistook PrEP for PEP (17%) or ART (6%).

Among the three counties surveyed in both waves, PrEP understanding was greater in January than June (80% vs 75%, p=0.038). Among participants who understood PrEP in January 2019 (n=1157), 21% had been offered PrEP at healthcare facilities, 31% knew someone on PrEP, and 12% were taking PrEP themselves.

More than one-third (38%) reported drug shops as the preferred place to obtain PrEP, if available. Over half (780, 60%) were willing to pay for PrEP; willingness to pay was greater among men than women (63% vs 53%; p=0.001). For a one-month supply, the maximum amount participants were willing to pay for PrEP was < 1 USD (24%), 1-4.99 USD (39%), 5-10 USD (34%), and >10 USD (3%).

CONCLUSIONS: Willingness to pay and perception of drug stores as a preferred place to obtain PrEP, if available, suggest importance of expanding delivery to beyond facility-based settings.

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WEPED845

Factors associated with perceived and current HIV risk among men who have sex with men in Brazil, Mexico and Peru

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BACKGROUND: Populations with current HIV risk (CHR) may not report high perceived HIV risk (PHR). Factors associated with CHR and PHR among men who have sex with men (MSM) are poorly understood. This analysis aims to explore these factors among MSM from Brazil, Mexico, and Peru.

METHODS: MSM were recruited to respond to an online survey advertised on gay social-network apps and social media (May-June, 2018). PHR was established with the question: *Considering your sexual practices, in your opinion, what would be your risk of getting HIV during the next 12 months?* CHR was defined using CDC's MSM Risk Index. Both outcomes were dichotomized (low vs. high). Multivariable regression models were used to estimate associations with PHR and CHR.

RESULTS: A total of 19,457 MSM were included in the analysis; median age was 28 years old (IQR: 24-34), most respondents were Brazilian (58%), and had completed high school or higher (68%). More than half had CHR, 10,165 (52%), but only 6,654 (35%) reported high PHR. Among those with CHR, 68% (4,530/10,165), also reported high PHR. After adjusting by country, the factors associated with both CHR and high PHR were non-gay identified MSM, reported anticipated risk compensation if using PrEP, daily use of apps for sex, transactional sex, and STI diagnosis in the previous six months. Low education was only associated with PHR. Young MSM, PrEP awareness, and having a steady partner were only associated with CHR.

	Perceived HIV risk OR (95% CI)	Perceived HIV risk aOR (95% CI)	Current HIV risk OR (95% CI)	Current HIV risk aOR (95% CI)
Age (18-24 vs. ≥35 years)	0.99 (0.92-1.07)	Not significant	1.67 (1.56-1.80)	1.83 (1.69-1.99)
Education (<High school vs. ≥High school)	0.95 (0.89-1.02)	1.15 (1.07-1.24)	1.07 (1.01-1.14)	Not significant
Sexual orientation (other vs. gay)	1.28 (1.16-1.42)	1.29 (1.66-1.44)	1.83 (1.67-2.01)	1.95 (1.72-2.16)
Steady partner (yes vs. no)	0.89 (0.83-0.95)	Not significant	1.15 (1.08-1.22)	1.38 (1.29-1.49)
Anticipated risk compensation if using PrEP (yes vs. no)	2.26 (2.10-2.42)	2.09 (1.94-2.25)	1.97 (1.83-2.11)	2.05 (1.82-2.31)
PrEP awareness (yes vs. no)	1.01 (0.95-1.07)	Not significant	1.20 (1.12-1.28)	1.38 (1.29-1.49)
Use of apps for sex (daily vs. never)	3.86 (3.37-4.44)	4.30 (3.72-4.98)	2.03 (1.82-2.25)	2.05 (1.82-2.31)
Transactional sex, previous 6 months (yes vs. no)	2.20 (1.94-2.50)	1.97 (1.73-2.13)	3.01 (2.61-3.48)	2.51 (2.14-2.95)
STI diagnosis, previous 6 months (yes vs. no)	2.26 (2.06-2.48)	1.92 (1.73-2.13)	1.93 (1.75-2.13)	1.67 (1.50-1.85)

[Factors associated with high perceived and current HIV risk among MSM in Brazil, Mexico, and Peru]

CONCLUSIONS: A high proportion of MSM from Brazil, Mexico, and Peru who had CHR also had high PHR. Many factors associated with PHR were also associated with CHR. Nevertheless, these results highlight that young MSM with daily use of apps for sex, and low education could be a target group for online campaigns focusing on PHR awareness and PrEP demand creation.

WEPED846

Assessment of the change in sexual and health seeking behaviour of men who have sex with men (MSM) and Transgender/Hijra (TG/H) population

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BACKGROUND: NACP in India has established 20,756 facilities for HIV testing, however, HIV testing among MTH populations remained only 60% (NACO, 2014). HIV prevalence is disproportionately higher among MSM and TG as 4.34% and 7.5% respectively as compared to national prevalence of 0.26% (NACO 2016). India HIV/AIDS Alliance implements Samarth community based and led HIV testing clinics in 6 sites to increase HIV testing among the unreached MTH population.

METHODS: The prospective cohort study conducted in order to understand health seeking behaviour change among MTH population (assess knowledge, risk and vulnerabilities related with sexual health and HIV) after utilising Samarth clinic community-based testing services (HIV screening, pre and post testing counselling and linkage for confirmatory test if the need be). Total of 1080 samarth clinics attendees were recruited and followed once in three months for nine months. A structured interview tool was used for data collection. The clients who missed there follow-up has been excluded from the statistical analysis

RESULTS: Findings showed a significant increase in knowledge on HIV transmission (29.9% at baseline to 69.7% at Endline) and knowledge on STIs (from 28.6% to 73.3%) (p<0.05). Many (41.2%) of the MTH people who ensured their partner's HIV status before indulging in sex, which is significantly higher than baseline value of 19.7% (p<0.04). In the same time, there is a significant increase in condom use irrespective of the nature of partners (from 73.5% to 96.9%). However, further bi-furcation of data shows considerable increase of condom usage with regular, casual and commercial partners (6.1%, 9.7% & 1.7% increase respectively) It was also observed that there is a significant reduction in risk activity such as anal sex in the last three months (14.8% at baseline to 4.68% at endline) (p<0.05). As prevention, there is an increase in knowledge on PrEP from 6.4% to 32.8% at endline (p<0.05) and also PEP knowledge increased (7.1% to 32.6%) (p<0.05) among the MTH population.

CONCLUSIONS: Availability of community based HIV screening and testing with regular follow up is an effective entry point for behaviour change for HIV/STI knowledge and risk behaviours and this model can be replicated and scaled up.

WEPED847

Effectiveness of quality improvement on occurrence of needle stick injuries in Harare City, Zimbabwe, 2017: A quasi-experimental study

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BACKGROUND: Globally, healthcare workers (HCWs) incur an estimated two million needle stick injuries (NSIs) per year and 90% of these injuries occur in Africa. In Zimbabwe, neither the prevalence nor the factors associated with HCW-acquired NSI are known. Harare city recorded an increase in NSIs among nurses from 1% in 2013 to 7% in 2016, highest being from the Southern District. We designed and evaluated the effectiveness of a quality improvement (QI) approach towards reduction of NSI incidence.

METHODS: We conducted a quasi-experimental study among 83 purposively selected nurses in southern District. We designed and implemented an intervention package comprising training, deployment of social behavioural change materials and workflow re-organization. We measured effectiveness of the intervention using plan-do check-act cycle (PDCA). Data on intervention effectiveness was collected pre and six months post-implementation using structured questionnaires. Analysis was presented with frequencies, means, and proportions.

RESULTS: Lack of knowledge 99% (82/83), behavioural errors 60% (50/83) and limited space in the treatment rooms 59% (49/83), were the major reasons for NSI before intervention. Pre-intervention, 10% (8/83) of the nurses had good knowledge while 96% (80/83) had good knowledge post-intervention. The NSI incidence rates pre-intervention was 0.97 NSI/month and 0.17 NSI/month post-intervention, a decline rate of 82% ($p < 0.01$). Total cost saved by the intervention was \$5 777.00.

CONCLUSIONS: Lack of knowledge on occurrence of NSI, unorganized activities, and limited working space in the treatment rooms were the major reasons for NSIs before the intervention. The QI intervention was effective in reducing incidence of NSI. We recommend further HCW trainings on NSI, promotion of socio-behavioral change and workflow re-organization.

Reasons	Frequency (%) N=83
Lack of knowledge	82(99)
Unorganized work activities	50(60)
Limited space in the room	49(59)
Recapping of needles	37(45)
Not using gloves	32(39)
Long working hours	24(29)

[Reasons Associated with Needle Stick Injuries among Health Care Workers in Southern District, Harare City, Zimbabwe, 2017 (N = 83)]

WEPED848

How will eventual HIV cure impact prevention behavior?

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BACKGROUND: The majority of research on HIV cure knowledge, attitudes, and perceptions to date has surrounded persons living with HIV. An understanding of the way HIV cure impacts prevention behavior will help develop appropriate social messaging while concurrently promoting HIV prevention. We do not know how a future HIV cure may impact prevention behavior. The purpose of this analysis was to examine knowledge, attitudes, and perceptions about HIV cure in relation to HIV prevention among a sample of HIV-uninfected (HIV-) persons.

METHODS: Data were analyzed from an anonymous convenience sample of adults between 9/2017 and 7/2018. Knowledge, attitudes, and perceptions of HIV cure and cure research, and correlates of potential changes in prevention behavior, were examined. Unadjusted and adjusted characteristics associated with perceiving that HIV cure availability will negatively impact PrEP uptake and other HIV prevention methods were described. The primary outcome of interest (agreement with "If a cure were available for HIV, people will not use PrEP and other methods to stay HIV negative") was examined using logistic regression.

RESULTS: Of 135 HIV- participants, the majority was female (53%), ≥30 years, white (63); 33% had a friend or family member with HIV; 19% considered themselves at risk for HIV; 61% perceived that HIV cure means to them "No risk of transmitting HIV to others." After adjusting for gender identity and sexual orientation, persons who were Black/African American or Latinx [OR 6.30 [95% CI 2.20-18.00, $p < 0.01$] or ≥ 45 [OR 4.78 [95% CI 1.53-14.90, $p < 0.01$] were more likely to perceive that HIV cure availability would be associated with non-use of PrEP and other prevention methods.

CONCLUSIONS: Should HIV cure become available, an understanding of the perceptions of those living without HIV will be essential since the availability of HIV cure may affect utilization of PrEP and other prevention modalities. This analysis underscores that there are potential negative prevention impacts that need to be explored in concert with rollout strategies for future cure.

WEPED849

Perceptions of HIV risk and knowledge of HIV prevention strategies among young minorities recently diagnosed with HIV infection in South Texas, United States (U.S.)

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BACKGROUND: Significant racial/ethnic and geographic disparities exist in new HIV infections among minorities in the Southern region of the U.S. This suggests a need for different HIV prevention strategies. Pre-exposure prophylaxis (PrEP) consists of antiretroviral therapy (ART) taken daily by HIV negative individuals. Despite its benefit in preventing HIV transmission, PrEP uptake among minorities, women and young people in the US remains low. We evaluated HIV risk perception and knowledge and acceptability of PrEP among young people recently diagnosed with HIV infection in a majority minority population.

METHODS: A validated survey was administered prospectively across three HIV clinics in South Texas. Inclusion criteria for participation were age 18-30 years, HIV diagnosis after Jan 1st 2015, and currently on ART. The survey consisted of three sections: demographics, perception of risk, PrEP knowledge and acceptability. Participants received a USD 10 grocery store gift card as an incentive. Interim data were summarized using descriptive statistics.

RESULTS: Of 92 HIV+ participants 87% were male, 38% percent were 24-26 years old. 69% were single and 54% self-identified as gay. A majority were Hispanic (73%), stated they would recommend PrEP to their HIV negative partners (82%), believed PrEP reduced a partner's HIV risk (91%), would ask a medical provider for PrEP for their partner (85%), and would use condoms even if their partner was using PrEP (65%). 75% of responders had heard of PrEP but only 45% knew about PrEP at the time of their diagnosis. When reflecting on likelihood of PrEP use prior to their HIV diagnosis, 43% reported that they would have been embarrassed to ask for PrEP. 11% reported taking PrEP before their diagnosis.

CONCLUSIONS: Although there was understanding of their HIV risk and the benefits of PrEP, the majority didn't know about PrEP at the time of diagnosis; and even if they had known, nearly half would have been embarrassed to request PrEP from a medical provider. Attitudes towards PrEP were favorable but there was a mismatch between knowledge and behavior. Specific strategies are needed to improve PrEP access for young Hispanic men at risk of HIV infection.

WEPED850

HIV prevention knowledge gaps on pre-exposure prophylaxis (PrEP) among adolescents and young people aged 15-24: Insights from formative research in two urban communities in Lusaka, Zambia

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BACKGROUND: Increasing knowledge and use of pre-exposure prophylaxis (PrEP) in settings where condom use is low could reduce sexual transmission of HIV among adolescents and young people (AYP). As part of a formative study to design a sexual reproductive health (SRH) intervention for AYP in two urban communities in Lusaka, we explored AYP's knowledge and use of PrEP.

METHODS: In November-December 2018, we conducted: twenty-two focus group discussions with eighteen AYP, four adult and two healthcare worker (HCW) groups (95 men; 123 women), seven semi-structured interviews with stakeholders (1 man; 6 women) and six in-depth interviews with AYP (3 men; 3 women). Community members were purposively selected

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based on age, sex and community zone. Using participatory activities, researchers asked participants what they knew about various HIV and SRH services. Thematic analysis was used to analyse data.

RESULTS: Most community members (including AYP, regardless of sex and age) were unaware of PrEP as an HIV prevention method. A few AYP involved in HIV support and youth-friendly groups at the health facilities knew about it. PrEP was sometimes confused with post-exposure prophylaxis. For many, it was a surprise that antiretroviral (ARV) drugs were given for PrEP and expressed concerns about side-effects due to taking ARVs – “what if someone does not have the virus then they take that drug... maybe that drug can be harmful in the blood”. Others were confused on duration of taking the drug and thought they risked being on treatment for life. HCWs expressed reservations about providing PrEP to AYP because they considered them too young to make informed decisions about using it and a challenge for parents/guardians to consent for AYP to take PrEP since they had to disclose in case of complications. Providing PrEP was also perceived as potentially encouraging multiple sexual relationships and condomless sex among AYP as the fear of contracting HIV would be eliminated.

CONCLUSIONS: AYP and other stakeholders had little knowledge of PrEP. Given the knowledge gap, community education and HCW's training on PrEP is needed. This will provide AYP with adequate information about available HIV prevention methods, thereby making informed choices on appropriate HIV prevention practices.

WEPED851

What we know and don't know about adolescent girls and young women and HIV Prevention in sub-Saharan Africa: Analysis of insights across completed, ongoing and planned projects

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BACKGROUND: To address the disproportionate number of HIV infections among adolescent girls and young women (AGYW) in sub-Saharan Africa new HIV prevention products are needed, existing products need to be successfully introduced and programs need to meet the needs of girls and young women. A thorough understanding of factors that influence AGYW's awareness, acceptance, uptake, adherence and championing of HIV prevention products and behaviors is essential. Research on AGYW and HIV prevention has uncovered insights along the HIV prevention journey that help to further this understanding. Starting in 2017, the HIV Prevention Market Manager began tracking ongoing, planned and completed work. This analysis maps research insights along ecological and behavioral frameworks to identify insights emerging across projects and those with potential programmatic implications.

METHODS: A review of ongoing and planned research on HIV prevention and AGYW ages 15-28 in sub-Saharan Africa was conducted. Projects with a primary objective other than HIV prevention were not included. Individual insights were plotted along two frameworks designed to pinpoint where each fits in an AGYW's HIV prevention journey—the social ecological model and behavior change framework.

RESULTS: Analysis of final and interim findings found 308 insights from 49 projects. The majority of insights focused on individual knowledge, attitudes and skills of AGYW and fell in the awareness stage of an HIV prevention journey. Several insights spanned across projects, including the need for prevention products designed to fit an AGYW's lifestyle; frequency of misconceptions about prevention products; lack of understanding around reproductive anatomy deterring AGYW from using unfamiliar products; low levels of prevention information available in communities; and bias against AGYW sexual activity skewing the information, counseling, and options providers offer.

CONCLUSIONS: There's a need to share insights on AGYW and HIV prevention emerging from research so they can inform programs in real-time. While individual programs in each setting need to tailor interventions to meet the needs of their population, existing knowledge on AGYW should be shared to inform collaborations and act as a guide to funders and implementers when considering what is already happening, what gaps might exist and what new work is needed.

HIV services in healthcare settings

WEPED852

Differences in ART provider expectations and client knowledge about viral load testing in northern Namibia: A qualitative assessment

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BACKGROUND: Accurate estimation of viral suppression among people living with HIV is essential to measuring progress toward UNAIDS' 90-90-90 goals. Many countries in sub-Saharan Africa, however, face challenges in scaling up to universal viral load (VL) testing. In 2017, an assessment of the rollout of “treat all” guidelines at ten health facilities in northern Namibia reported that over one-third of client health records contained no VL measurements during the previous 12 months. Following this finding, we conducted a qualitative assessment of practices and challenges related to VL testing.

METHODS: Ten focus group discussions were conducted with medical officers, nurses, and counselors at ten district hospitals and ART clinics in northern Namibia. Additionally, 22 in-depth interviews were conducted with facility clients who either had no VL test results recorded in their health passports in the prior 12 months (n=12), or whose most recent VL test results indicated treatment failure (>1,000 copies/ml; n=10). A thematic analysis of interview transcripts was conducted using Atlas.ti 7 to assess ART providers' and clients' understanding of, and experiences with, VL testing.

RESULTS: Results showed that while providers recognized clients' need for education about VL testing, they believed that most clients understood the process and should be ultimately responsible monitoring their own testing schedule. However, many clients interviewed lacked even basic correct knowledge of VL testing. Some clients understood the link between VL and treatment effectiveness, but more had never heard of VL testing. Of those who received VL test results, several confused their results with results from other tests. Others indicated that providers gave only cursory explanations of their results, leaving some feeling frustrated.

CONCLUSIONS: Our findings illustrate challenges at the selected health facilities with ensuring providers complete VL testing at recommended intervals, as well as need to strengthen client participation in own care. As clients demonstrated interest in understanding VL testing and monitoring their health, ensuring that clients are educated about VL measurement may help to increase VL testing rates. Simultaneously, it is essential that providers proactively discuss VL results—and the ramifications thereof—with their clients.

WEPED853

Community ART centres - are they filling the gap and meeting the grade? A comparison of quality and numbers between community-based ART centres and conventional hospitals in Zambia

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BACKGROUND: With the ART coverage gap reduced to less than 29%, it has become increasingly difficult to identify the remaining approximately 300,000 people yet to be initiated on antiretroviral treatment (ART) out of an aggregate population of 15 million people in Zambia. This necessitated the establishment of over 112 community ART centres (CACs) by

the USAID funded DISCOVER-Health project. After two and half years of program implementation, the question on whether or not this undertaking contributes the desired numbers and meets the standard quality of care aspects of patient care begs to be answered.

METHODS: Statistics collected at 34 higher level facilities (HLFs) were compared with those obtained at 38 CACs providing services in the province as the HLFs. Key performance and quality of care indicators were selected for this comparison including number of people tested, initiated on treatment, retained and virally suppressed.

RESULTS: Of the 655,750 people tested for HIV in 2018 on the Copperbelt province, the CACs contributed 30.9%, with the higher level facilities accounting for 69.1%. Positivity yield was, higher (7.3%) at the HLFs compared to the CACs (4.4%). Linkage rates at the CACs were similar to those at the HLFs (88.2% vs. 87.4%). Of the 35,586 clients initiated on treatment in the Province, the CACs contributed 19.8% (7,037) compared to 80.2% from the HLFs. One year retention was much higher (83.2%) at the CACs compared to 65.8% at the HLFs. Viral load suppression stood at 90.4% at the CACs compared to 84.8% at the HLFs.

CONCLUSIONS: Community ART Centres are capable of reaching a significant number of people with HIV services despite being in operation for a short duration. This is particularly important at a time when Zambia is at the verge of HIV epidemic control and when identifying PLHIV yet to be initiated on treatment has become increasingly difficult. With quality of care indicators being either comparable or better at the CACs compared to the HLFs, the CACs are an important platform for the provision of quality HIV services.

WEPED854

HIV provider and vocational driver knowledge of HAND and needs for health management

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BACKGROUND: A significant percentage of the workforce comprises people living with HIV. Since HIV-associated neurocognitive disorders (HAND) may impact work productivity, it is important that clinicians recognize HAND symptoms, be able to screen for HAND, and refer presenting patients to appropriate services. Patients should also be aware of HAND best practices.

However, it is not well understood how cognizant HIV providers in low-and-middle income countries are of HAND and the associated best clinical practices.

We investigated HIV provider knowledge of, and screening practices for HAND, as well as patient knowledge of HAND and related needs.

METHODS: A cross-sectional quantitative descriptive study was conducted, via email survey, of South African HIV providers (e.g., nurses and physicians) employed in workplace settings (n=105) assessing knowledge of HAND symptoms, management, screening, and attitudes towards screening for neurocognitive impairment. In addition, ten HIV+ male professional drivers (mean age=40, SD=6.92; disease duration range=2-18 years) completed questions assessing their HAND knowledge and needs for information about HAND from medical practitioners.

RESULTS: Of all providers, 76% reported awareness of HAND. Provider estimated HAND prevalence was < 40%. Only 11% reported ever screening for HAND, the primary reasons for not conducting HAND screening being lack of expertise (77%), unavailability of screening tools (68%), and limited time (48%). Only 2% of providers received training in HAND; 94% were interested in receiving training. Of the 10 drivers, < 20% had heard of HAND, 10% had a health professional (doctor) ever speak to them about HAND, 30% reported that someone had recently noticed behavioral changes in them, < 20% knew what services to contact if they had concerns about HAND. About a third of drivers reported having cognitive symptoms, and 100% would like education about HAND.

CONCLUSIONS: While providers have some HAND awareness, almost none received formal training on the issue. Screening was rare: major obstacles to screening, and by implication management for HAND, were lack of knowledge and experience, availability of a screening tool, and in-

adequate time. HIV-infected vocational drivers' needs are not being met by medical practitioners. There is a significant need for greater education regarding HAND for both occupational health practitioners and patients.

WEPED855

Occupation and education among youth living with HIV receiving care at two tertiary care hospitals in Bangkok, 2017

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BACKGROUND: Perinatally HIV-infected youth (PHIY) receiving antiretroviral treatment (ART) are living longer. Studies have shown that PHIY are more likely to lose their parents and have impaired cognitive abilities that may affect their education. We report PHIY longitudinal data on the level of education attained and occupation from two tertiary care hospitals in Bangkok.

METHODS: PHIY aged >14 years who were aware of their HIV infection status and receiving care at two hospitals during the years 2014-2016 were invited to join an HIV youth support program, the Happy Teen2 Program (HT2). The HT2 comprises of group and individual sessions that build positive attitudes and aspirations towards educational attainment and provision options of occupation for PHIY. After completion of the HT2, PHIY returned annually for follow-up interviews. Staff collected demographic and clinical information using semi-structured questionnaires and medical chart abstraction. We selected PHIY aged >20 years at the time of the last follow-up interview for analysis.

RESULTS: Among the 192 PHIY who participated in HT2, 135 (70%) PHIY returned for the annual follow-up in 2017 of whom 80 (41.7%) were >20 years. Median age was 21.2 years; 45 (56.3%) were female and 46 (57.5%) reported both parents were deceased. Most PHIY 79 (98.8%) were receiving ART with 66 (83.5%) achieving viral load suppression. Over half, 44 (55.0%) were still studying; 26 (32.5%) had graduated from high school or college and 10 (12.6%) dropped out of school before high school. Among those no longer in school, 31 (38.8%) were working; only 5 (6.3%) were unemployed. For those working, 11 (35.5%) being employed in private companies or government organizations, 10 (32.3%) having their own business, 7 (22.6%) employee, and 3 (9.7%) others. Median monthly income of those working was 308 US dollars which was higher than the monthly minimum wage in Thailand (270 US dollars).

CONCLUSIONS: Almost 90% of PHIY aged >20 years had graduated from high school and/or were still academically engaged in high school or university. This proportion is comparable to the Thai national educational attainment (85% completed high school). Factors associated with educational attainment among PHIY should be further studied.

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Condoms and lubricants

WEPED856

Strategic donor investments for strengthening condom markets: The case of Zimbabwe

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BACKGROUND: Zimbabwe faces an uncertain future for condom funding and potential condom insecurity as international donors prioritize creating more self-sustaining markets. We tested the impact of an intensive intervention on demand and supply after a price increase to the social marketed condom, Protector Plus (PP). The study occurred during a deteriorating economy and pressure to reach sustainability quickly. We test the effectiveness of increased product visibility, in-store point of sale material, condom promotion activities, and improved relations with the condoms traders for increasing condom sales and emotional attachment to the brand.

METHODS: Between November 2016 and December 2017 we conducted a randomized control trial among consumers and traders in 10 districts in Zimbabwe. We tracked sales of PP and distribution of the public-sector condom monthly, and conducted cross sectional baseline and follow-up surveys among consumers and traders. 3,392 consumers were interviewed during each survey; 604 and 628 traders were interviewed at baseline and at follow up, respectively. We used the difference-in-difference method to test the intervention's impact on study outcomes.

RESULTS: PP sales rebounded to previous levels after the price increase. We detected no significant difference in sales between the experimental and control districts. However, among traders there was increased satisfaction on profit returns ($p = 0.028$) and sales volume ($p = 0.01$) in the experimental districts. Among consumers, there was a significant increase in emotional attachment for PP original ($p = 0.007$) and PP Scented ($p = 0.025$) and increased beliefs about condom efficacy ($p = 0.001$ for PP original; $p = 0.004$ for PP Scented) in the experimental districts.

CONCLUSIONS: This study demonstrates how targeted donor investments can improve a CSM program and strengthen the overall condom market. When a disciplined social marketing approach is used, the market benefits: subsidies can be better targeted and branded products can appeal to the right audiences. Subsidies can be used for consumer insight to segment markets, willingness to pay studies to set price points, distribution system improvements to increase efficiency, intensive demand generation to increase condom demand and use, market facilitation across sectors, and market intelligence to inform decision-making.

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Voluntary medical male circumcision

WEPED857

Traditional beliefs on gender roles and HIV risk behaviour among adult men interested in voluntary medical male circumcision, South Africa

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BACKGROUND: Gender role inequalities and risky sexual behaviour among adult South African men may drive the HIV epidemic. Yet screening tools on how to identify men at greater risk for HIV are limited.

METHODS: We assessed whether traditional beliefs on gender roles were associated with high risk sexual behaviour. Cross-sectional data from a parent study (Imbizo) was used. Enrolment for "Imbizo" took place over two years. In year one (1 April - 30 September 2014), we measured characteristics of men presenting for medical male circumcision (MMC). In year two (22 June - 30 November 2015) we implemented an exclusive intervention strategy to increase the number of men (25 to 49 years) presenting for MMC. We analysed behavioural risk data from enrolled men, and controlled for the year of enrolment. Structured questionnaires were administered to men (aged 18 to 49 years) who were eligible for circumcision and able to communicate in one of the study-approved languages. The questionnaire included demographic information, relationship status, sexual partner history, condom use, sexual debut and a scale on gender roles. Men were categorized as having either "traditional (male dominance in relationships)" or "progressive (gender equality)" beliefs on gender roles.

RESULTS: A total of 3,836 men were screened and 2,813 (73.3%) included. Overall median age was 26 years (interquartile range 21-31 years). Reliability of the gender roles scale was 0.6. Men with traditional beliefs on gender roles were more likely to report concurrent multiple partners (Odds Ratio (OR) 1.7 [95% CI 1.2-2.3]; $p < 0.01$) and were unsure of their last partner's HIV status (OR 1.4 [95% CI 1.2-1.7]; $p < 0.01$). Men who enrolled in year 2 (OR 0.8 [95% CI 0.7-0.9] and those ≥ 45 years (OR 0.4 [95% CI 0.2-0.8]; $p < 0.01$) were less likely to have traditional beliefs on gender roles.

CONCLUSIONS: Men with traditional beliefs on gender roles could be good candidates for HIV prevention programmes, as they engage in high risk behaviour. Men (25 - 49 years) with progressive beliefs could be targeted for MMC awareness campaigns. The gender roles scale could be used as a screening tool to identify men at high risk for HIV.

WEPED858

Acceptability of voluntary medical male circumcision in Zambia: Using population-level data to inform demand-creation strategies

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BACKGROUND: Voluntary medical male circumcision (VMMC) is an HIV prevention priority. This study aimed to characterize correlates of VMMC acceptability in Zambia in order to identify potential demand-generation mechanisms.

METHODS: Data come from a nationally representative survey of individuals aged 15-59 in 14 districts across Zambia's 10 provinces. Two-stage sampling proportional to population size was used to select households across residence types (urban/rural) in enumeration areas. The primary outcome, VMMC acceptability, was assessed and dichotomized using a single survey item measuring respondent acceptance of VMMC. Indepen-

dent covariates of interest included socio-demographic factors and other HIV-related factors, including serostatus knowledge. Analytic weights derived from 2010 Zambian census data and 2016 population projections adjusted for clustering and stratification.

Following descriptive analysis, bivariate logistic regression analysis was conducted to identify statistically significant associations between independent variables and VMMC. To identify correlates of VMMC acceptability after adjustment, variables reaching a significance threshold of $p < 0.05$ in bivariate analysis were introduced into a multivariable logistic regression model.

RESULTS: Among 3,532 respondents, 81% ($n=2,861$) reported acceptance of VMMC, and no significant differences emerged in VMMC acceptability between men and women (77.3% vs. 84.7%, $p=0.121$). Circumcision coverage among men, however, hovered under 30% ($n=517$). Female respondents [aOR=1.67, CI: 1.38-2.02] and those in the highest wealth quartile (AOR=1.63, CI: 1.25-2.13) had over 60% higher odds, respectively, of accepting VMMC. Married/partnered participants were 38% less likely to accept VMMC compared to unmarried participants. Among HIV-related factors, HIV knowledge was positively associated with VMMC acceptance (AOR=1.21, CI: 1.16-1.26), while HIV unknown serostatus (AOR=0.63, CI: 0.50-0.80) and stigmatizing attitudes towards people living with HIV (AOR=0.92, CI: 0.87-0.98) were associated with decreased odds of VMMC acceptability.

CONCLUSIONS: Moderately low VMMC uptake accompanied high acceptability, suggesting the need to support men in overcoming barriers to VMMC uptake. Findings reveal that those who do not access HIV testing are also not accessing VMMC, highlighting the need to ensure that the voluntary nature of testing at VMMC is clear. Results highlight gaps in VMMC demand among married and lower-income men as well as opportunities further engage women, who exhibited higher acceptability of VMMC than me, for promoting VMMC uptake.

Antiretroviral therapy, including treatment as prevention

WEPED859

The power of habits for sustained high ART adherence and the use of incentives for building them

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BACKGROUND: Behavioral economic (BE) incentives can significantly change one-time or short-term behaviors, but are less successful at improving chronic behaviors. Habits may be a promising approach to creating long-term behavior change modification as habits rely on automatic responses to external cues and do not require deliberative initiation to carry out the action. Unfortunately, few people are able to create healthy habits on their own, and existing interventions often fail to effectively support habit formation, in particular for those people most in need of them.

In this study, we investigate the role of behavioral incentives in creating sustained pill-taking habits, and the long-term effect of such habits on ART adherence after incentives were withdrawn.

METHODS: In an HIV clinic in Uganda, we randomized 155 men and women to either receive small incentives conditional on high ART adherence and timely clinic visits for 20 months, or to receive the usual standard of care. We develop an objective habit measure, electronically measured as the fraction of pills taken regularly within a one-hour window, and investigate in a multivariate regression framework whether eligibility for incentives creates time-based medication adherence habits, and whether such habits lead to sustained higher levels of ART adherence for six months after the incentives were withdrawn.

RESULTS: Time-based habits are highly correlated with mean ART adherence ($r=0.62$) and are displayed by roughly 49% of the sample, but are not caused by the receipt of behavioral incentives. Conditional on past and contemporaneous ART adherence, the habit measure significantly predicts an additional 10% of future adherence variance and is highly pre-

dictive of behavioral persistence six months after incentive withdrawal (marginal effect 0.33; SE: 0.190). We do not find any difference in these effects by gender or age of the participant.

CONCLUSIONS: Behavioral economic incentives do not seem to establish medication adherence habits if targeted at mean adherence or timely clinic visits, it may therefore be necessary to more directly target the timing of pill-taking to create habits. Habits are found to be predictive of long-term ART adherence even in the absence of incentives and constitute an important area for future study.

Pre-exposure prophylaxis

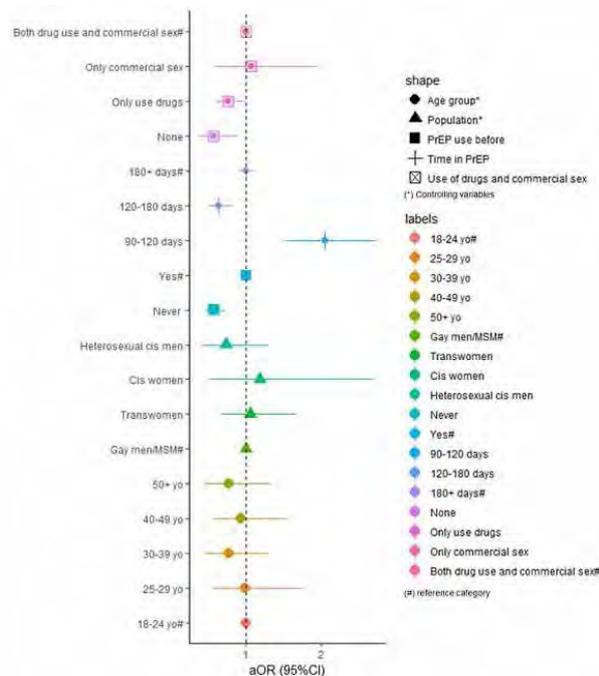
WEPED860

Profile of self-reported adherence to HIV pre-exposure prophylaxis in Brazil

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BACKGROUND: Oral pre-exposure prophylaxis (PrEP) is an effective strategy to reduce the risk of HIV infection. However, PrEP's effectiveness depends on user's adherence. Brazilian PrEP guidelines, published in 2017, recommend daily doses of FTC+TDF for individuals most-at-risk to HIV infection. This study aims at identifying demographic and behavioral factors associated to optimal adherence in Brazil.

METHODS: We analyzed real-life data of individuals aged 18 and over who were on PrEP for at least three months in 2018. Adherence was assessed through medication possession ratio (MPR), based on pharmacy refill data. We defined optimal adherence as a $MPR \geq 0.8$. Multivariable logistic regression was performed to assess the likelihood of optimal adherence, controlling for age and population.



[Figure 1. Adjusted odds ratio (aOR) of optimal adherence (MPR>80%)]

RESULTS: Overall, 3,515 PrEP users (PrEP-U) met inclusion criteria (median age: 32, IQR=27-38), among those 84.3% were MSM and 2.5% were transwomen. About 89% of PrEP-U presented $MPR > 80\%$. In the multivariable analysis, when controlling for age and population, aOR[95%CI] of optimal adherence were: 0.571(0.368-0.884) and 0.763(0.603-0.966) for those PrEP-U who reported drug use only and commercial sex only, respectively, when compared to those who reported both, drug use and

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commercial sex; 2.036(1.522-2.726) among those who were on PrEP for 90-120 days and 0.634(0.49-0.819) among those on PrEP for 120-180 days comparing to those on PrEP \geq 180 days; and 0.577(0.453-0.735) among those who never used PrEP before comparing to those who had used PrEP at least once.

CONCLUSIONS: Individuals who reported both, drug use and commercial sex, had better adherence to PrEP, this might be related to a higher perceived risk to acquire HIV. Adherence was poorer among those who had never used PrEP, indicating the importance of adequate counseling before PrEP initiation. Also, adherence was worse among those who were on PrEP for 120-180 days, showing us the need to reinforce PrEP adherence when users reach 120 days.

WEPED861

Scaling-up PrEP offer in the Brazilian Unified Health System (SUS)

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BACKGROUND: Since 2013, the Ministry of Health of Brazil (MoH) co-financed Pre-Exposure Prophylaxis (PrEP) implementation studies. In 2017, MoH approved its PrEP national guideline, PrEP use was approved by the national regulatory agency and the first purchase of emtricitabine+tenofovir disoproxil fumarate was performed. This study aims at describing how the MoH is scaling-up PrEP offer in the Brazilian Unified Health System (SUS).

METHODS: After PrEP guideline approval, MoH initiated capacity building of health services. As SUS management is shared between federal, state and municipal levels, 75 services were selected by state level, according to their HIV services capacity, since the provision of PrEP occurs within HIV services. These services were trained by MoH and became PrEP trainers in their territories in order to expand PrEP offer. In January 2018, SUS effectively started to offer free-of-charge PrEP. The expansion process began in August 2018. To monitor PrEP implementation, MoH uses its existing antiretroviral control system (SICLON), used in this analysis.

RESULTS: Since August 2018, more than 100 new services have been indicated throughout the country; and until December, we had 82 services with at least one PrEP prescription registered in SICLON. The number of PrEP users is also increasing considerably, especially after the expansion process started in August, as shown in figure O1. In one year of PrEP implementation, the country has reached a total of 7418 PrEP users

CONCLUSIONS: Shared management of PrEP capacity building demonstrated good results in expanding PrEP services and PrEP users in SUS. Nonetheless, the MoH still needs to ease the capacity building of new services in order to accelerate the availability of PrEP nationwide, to be able to impact the country's HIV epidemic.



[Figure O1- Number of PrEP users and PrEP services in Brazil, Jan - Dec 2018.]

WEPED862

Women's perceived barriers and facilitators towards long-acting injectable pre-exposure prophylaxis (PrEP): Results from six cities across the United States

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BACKGROUND: Many HIV-negative individuals report difficulty sustaining adherence to the daily pill form of pre-exposure prophylaxis (PrEP); thus long-acting injectable (LAI) PrEP has the potential to transform HIV prevention. However, little research on LAI PrEP has occurred among women, who may face unique barriers to uptake.

METHODS: We conducted 89 in-depth interviews with HIV-negative (n=30) and HIV-positive (n=59) women across six sites (New York, NY; Chicago, IL; San Francisco, CA; Atlanta, GA; Washington, DC; Chapel Hill, NC) of the Women's Interagency HIV Study, a national ongoing cohort study of HIV-positive and HIV-negative women. The majority were women of color (96%), not currently working (66%), and earned < \$12,000/year (59%); median age was 53. Interviews were recorded, transcribed, and analyzed using thematic content analysis.

RESULTS: Few HIV-negative women expressed an interest in PrEP or felt it would be useful for them, however both HIV-negative and HIV-positive women said they would have taken it when they were younger and more sexually active. When prompted to choose a regimen, 50% of HIV-negative women preferred LAI, 26% preferred pills, and 24% preferred neither. Themes emerged from all women about barriers and facilitators to PrEP use. Barriers to LAI included:

- 1) the fear of new—and perceived untested—injectable products because “there’s not enough evidence of certainty”; and
- 2) potential side effects including injection-site pain, nausea, aggravation of existing medical conditions, and PrEP infecting somebody with HIV. Facilitators of LAI included:

- 1) the belief that shots are more effective and work more quickly than pills;
- 2) confidentiality and not having to hide pills: “with injection nobody knows your business”; and
- 3) ease and convenience because daily adherence was no longer required: “say I go out of town and I left my medication at home? I would take the shot.”

CONCLUSIONS: Few HIV-negative women expressed an interest in PrEP because they did not see themselves as at risk for HIV. When asked to choose, the majority preferred LAI PrEP, though feared potential side effects and the newness of the product. Future studies should incorporate more women into LAI PrEP trials to more comprehensively explore these concerns in order to facilitate uptake.

WEPED863

Willingness to screen for pre-exposure prophylaxis in pharmacies among men who have sex with men

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BACKGROUND: Stark racial inequities exist in HIV among black and white men who have sex with men (MSM). Pre-exposure prophylaxis (PrEP) is the single most effective HIV prevention strategy, yet significantly under-utilized among black MSM (BMSM). Inability to access HIV physicians is an important barrier to PrEP. Pharmacies are an ideal venue for expanding PrEP access. Most (95%) Americans live within five miles of a pharmacy;

pharmacies have flexible hours and pharmacists have high credibility with community members. Moreover, pharmacies have sustainably offered PrEP through pharmacies, albeit reaching mostly white MSM. Pharmacy PrEP access could reduce racial HIV inequities, but it is unclear if BMSM are willing to discuss and be screened for PrEP in a pharmacy setting.

METHODS: In collaboration with Georgia's Fulton County Board of Health, surveyed black and white men who reported same sex behavior and were not using PrEP (n=381) at two Atlanta-based Gay Pride events in 2018. Multivariable regression was used to determine the correlates of willingness to discuss and be screened for PrEP in-pharmacy.

RESULTS: Almost half (47.9%) were willing to be screened for PrEP in-pharmacy and 64.5% were willing to discuss PrEP with pharmacy staff. Black MSM were significantly less willing to be screened in pharmacies than WMSM (prevalence ratio[PR]: 0.49; 95% confidence interval[CI]: 0.25, 0.97), even after adjusting for interest in PrEP (PR: 9.02; 95%CI: 4.48, 18.36) and controlling for those who were unaware/ never HIV tested or HIV negative. Latino ethnicity, employment and insurance status, homelessness, sexual identity and substance use were unrelated to willingness to screen for PrEP in-pharmacy. Compared to insured individuals, those who were uninsured (PR: 0.52; 95%CI: 0.28, 0.99) were less willing to discuss PrEP in-pharmacy, and those interested in PrEP (PR: 3.56; 95%CI: 1.88, 6.75) were significantly more willing to discuss PrEP in-pharmacy compared to those not interested in PrEP. However, race was not related to willingness to discuss PrEP with pharmacy staff.

CONCLUSIONS: Pharmacies may be an optimal setting to expand PrEP access. Pharmacy-based PrEP screening could improve awareness of HIV status and increase PrEP knowledge and uptake. Future studies should determine optimal pharmacy conditions under which PrEP screening and uptake is acceptable for black and white MSM.

WEPED864

Acceptability of and preferences for novel HIV pre-exposure prophylaxis (PrEP) delivery methods among sexual and gender minority (SGM) adolescents assigned male at birth in the USA

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BACKGROUND: Daily oral PrEP was approved in the USA in 2018 for HIV prevention in adolescents under age 18, and novel on-demand, injectable, and implantable PrEP delivery methods are emerging. SGM adolescents' perspectives on these prevention methods have not been well-explored, which can inform PrEP development and implementation for adolescent end-users.

METHODS: In December 2018-January 2019, 53 sexually experienced, HIV-negative SGM adolescents assigned male at birth aged 14-18 participated in 5 online focus groups.

Participants were recruited online across the USA (Mean age = 17.0 years; 28.3% racial minority; 32.0% Hispanic/Latino ethnicity; 75.4% gay; 94.3% cisgender male, 5.6% transgender female/nonbinary).

Participants watched four videos (daily oral, on demand, injectable, implantable PrEP), then answered open- and closed-ended questions on preferences for the different forms of PrEP and condoms. Data were analyzed using descriptive statistics and thematic analysis.

RESULTS: Participants expressed greater interest in daily PrEP over PrEP on-demand, citing the complexity of on-demand dosing and the unpredictability of adolescent sexual encounters, which may render on-demand PrEP less feasible. Those using daily medications perceived lower barriers to daily PrEP. Participants liked the discretion of long-acting PrEP (e.g., parents would not discover pills) and the longer duration relative to pills. Implants were strongly preferred over injections given their longer duration and the potential for fewer clinic visits; however, youth voiced concerns about scarring and implant location and size, which may increase its detectability by parents.

Youth reported that the ability to self-administer injectable PrEP and to take on-demand PrEP immediately before sex would increase their acceptability. Upon rank-ordering different biomedical and behavioral pre-

vention methods, a year-long implant (40.5%) and condoms (38.1%) were most preferred. Convenience, accessibility, and duration were the most important factors driving preferences.

CONCLUSIONS: SGM adolescents preferred the implant over other biomedical options, and of all prevention options the implant and condoms were rated highest. For some, condoms were more practical than PrEP because they did not require clinic visits, procedures, or prescriptions which parents could detect. Adolescent perspectives, including those living in countries where PrEP availability may differ, should be considered when developing novel PrEP methods to facilitate successful implementation and avert youth HIV.

WEPED865

Advancing HIV prevention through public opinion polling: Lessons from the southern United States

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BACKGROUND: Since 2010, the North Carolina AIDS Action Network (NCAAN) has led HIV and viral hepatitis treatment and prevention advocacy and lobbying efforts in North Carolina (NC), a state in the southern United States. The NC Division of Public Health estimates that there are 35,045 people living with HIV in NC. There is limited data related to Pre Exposure Prophylaxis (PrEP) usage, however Emory University estimates through their AIDSvU project that there 1,798 people on PrEP in North Carolina.

METHODS: In 2018, NCAAN commissioned a public opinion survey by Public Policy Polling to determine if NC residents had heard of PrEP and if they supported local health department efforts to increase access to PrEP. The survey was performed on July 30th and 31st, 2018, and surveyed 409 NC residents.

RESULTS: According to the poll results, only 9% of respondents had heard of PrEP, and 59% had not. 32% answered that they were not sure. Once those surveyed were informed about PrEP, a majority (55%) supported efforts in local health departments to fund programs to provide PrEP to low-income individuals who might not be able to access it otherwise. Support was strong across all demographic breakdowns, including political party, gender, race, and age.

The survey results were disseminated via e-mail directly to all local health directors in NC and were shared in a webinar co-hosted by the Latino Commission on AIDS's (LCOA) Latinos in the Deep South project and NCAAN.

CONCLUSIONS: Rigorous, scientifically sound public opinion polls can be a powerful tool to advance HIV prevention efforts. Since publication, the survey results have been presented as justification for increased activity to support PrEP access at Ryan White Planning Council meetings and presentations before local boards of health.

NCAAN and LCOA plan to replicate the survey with broader demographic information and increased questions in 2019.

WEPED866

The negative direct effect of depressive symptoms on PrEP adherence among high-risk South African women in HPTN 067

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BACKGROUND: Oral pre-exposure prophylaxis (PrEP) is highly efficacious but low adherence undermines effectiveness. PrEP implementation programs are working to identify modifiable factors to improve PrEP adherence. Depression has been associated with low PrEP adherence in African women and may affect PrEP use through other psychosocial factors but this has not yet been explored.

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METHODS: We analyzed data from South African women in HPTN 067, a trial of intermittent and daily open-label oral PrEP from 2011-2013. Participants were randomized to daily, time-driven, or event-driven PrEP regimens. Study visits occurred at weeks 0, 4, 12, and 24 post-randomization. PrEP adherence was measured via Wisepill™ adjusted with weekly telephone calls that assessed sexual behavior and dosing.

We considered participants "adherent" if adjusted Wisepill™ data indicated that ≥80% of expected doses were taken. Depressive symptoms were assessed at screening using the 20-item Center for Epidemiological Studies-Depression (CES-D) scale; scores ≥16 indicate likely depression. We used Markov chain Monte Carlo methods to impute missing data and marginal structural models to estimate the direct effect of likely depression on PrEP adherence after controlling for confounders (age, marital status, education, alcohol use, HIV risk perceptions, sexual behavior) and mediating effects of stigma, social support, and PrEP optimism.

We estimated parameters in each imputed dataset and combined the estimates using Rubin's method. We ran models assessing the direct effect after accounting for each mediator individually.

RESULTS: At screening, 79 (45.4%) of 174 women had likely depression. High PrEP adherence at week 24 was detected among 55.1% (N=87) of participants and occurred less often among women who had likely depression (N=35; 44.3%) compared with those who did not (N=52; 54.7%; adjusted relative risk [aRR]: 0.81; 95% Confidence Interval [CI]: 0.62-1.00). We found a direct effect of depression on adherence in models accounting for the mediating influence of stigma (aRR: 0.74; 95% CI: 0.62-0.88) and PrEP optimism (aRR: 0.75; 95% CI: 0.55-0.98). Estimates were robust to sensitivity analyses.

CONCLUSIONS: Depression was common and associated with lower PrEP adherence among South African women after accounting for confounding and mediating variables. Depression screening and services may improve PrEP effectiveness among African women.

WEPED867

High and sustained use of a gamified PrEP adherence app (P3: Prepared, Protected, emPowered) among young MSM

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BACKGROUND: Efficacious interventions to promote and sustain pre-exposure prophylaxis (PrEP) adherence among youth are limited. Smartphone apps provide a platform to address adherence barriers by delivering tailored strategies and culturally-relevant content in an engaging format. We describe the usage results of a one-month field testing of a PrEP adherence app for young men who have sex with men (YMSM).

METHODS: P3 (Prepared, Protected, emPowered) is an iOS and Android app built upon a theory-based health platform, which includes interactive components encouraging peer-to-peer sharing on a social wall and the development of medication self-monitoring behaviors through completion of daily quests and medication tracking. Game-based elements, including virtual and real-world rewards, based on behavioral economics principals, encourage engagement. Virtual bank accounts were seeded with \$30 at Day 1 and participants could either lose (\$1) or gain (\$0.50) money based on daily app usage (max of \$44 could be received if P3 was used daily).

RESULTS: 16 YMSM newly starting PrEP or reporting adherence challenges at three US cities (Philadelphia, PA; Bronx, NY; Houston, TX) participated. Mean age was 21.3 years, 25% were Black and 69% Hispanic. Retention was 94%. There was a mean of 70 log-ins and 120 minutes of total app usage. A mean of 21 posts were initiated and 18 posts "liked" on the social wall. Participants completed a mean of 22 quests; 9 participants (56.3%) completed all. Usage was sustained over the trial with 81.3% of partici-

pants tracking PrEP use within P3 all 4 weeks and 87.5% for 3 weeks. Most participants (87.5%) continued to use P3 after the trial ended. The median amount earned was \$40 indicating high daily usage. Acceptability ratings were high. Most participants (80.0%) were somewhat or very likely to recommend P3 to a friend starting PrEP and 14 (93.3%) reported that P3 met most or all of their needs. The medication tracker and the social wall were the highest rated features.

CONCLUSIONS: Usage metrics and acceptability ratings provide favorable evidence for the possible sustained utility of P3 for increasing PrEP adherence among YMSM. A randomized controlled efficacy trial of P3 will be conducted in Spring 2019.

HIV services in healthcare settings

WEPED868

Multilevel approach in optimizing assisted partner notification services (aPNS): A case study at Awendo Sub County Hospital, Western Kenya; January to August 2018

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BACKGROUND: Globally, HIV case-finding and linkage to care are critical for control of HIV transmission. In Kenya, >50% of seropositive individuals are unaware of their status. Assisted partner notification (aPNS) is a public health strategy that provides HIV testing to individuals with known exposure to HIV and are at risk of infection and disease.

Awendo Sub County Hospital (ASCH) is one of the USAID/Afya Ziwani's Project supported sites in Awendo Sub-county, Migori County in western Kenya. The facility is supported by 6 trained aPNS providers (5 HTS providers and 1 PMTCT nurse). The site has embraced a multilevel elicitation approach in implementing aPNS by having Community Health Volunteers (CHVs) mobilize potential clients, HTS counselors test and provide the first level elicitation, refer and link to the Comprehensive Care Center (CCC); while the CCC clinicians enroll into treatment and provide the next level elicitation.

METHODS: This is a case study of a female client tested at the community, referred and enrolled at ASCH between January and August 2018. This client was mobilized and provided a HIV test at the community level, a first level contact elicitation done, and she was referred and linked to ASCH CCC. At the CCC, a second level elicitation was done by the clinician.

RESULTS: From the multi-level contact elicitation approach described above, 18 contacts all aged 25 to 44years were elicited, 3 being primary index elicited, (2 from first level elicitation and 1 from a second level elicitation); and six being secondary indexes. Eight of the contacts (44%) elicited were as a result of the second level elicitation. Seventeen of the contacts, who were eligible for testing, were tested at the community level, 16 of whom tested HIV positive (94% yield) and all linked into care and treatment. Three families benefited from Counselor Supported Disclosure (CSD).

CONCLUSIONS: Assisted Partner notification Services remains to be an effective strategy in the identification of people living with HIV (PLHIV) with yield of as high as 100%. Use of a multilevel approach of contacts elicitation bring together a blend of skills that ensures there's no missed opportunity from the elicitation process.

Pre-exposure prophylaxis

WEPED869

Knowledge about pre-exposure prophylaxis (PrEP) among sexual and gender minority (SGM) adolescents assigned male at birth in the United States (US)

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BACKGROUND: The US Food and Drug Administration (FDA) approved Truvada for HIV PrEP in minors in 2018. Little is known about SGM adolescents' knowledge about PrEP since FDA approval. We present data on SGM adolescents' PrEP awareness and knowledge, their sources for information on PrEP, and questions they had about PrEP.

METHODS: In December 2018-January 2019, 44 SGM adolescents (ages 14-18, assigned male at birth, sexually experienced, HIV-negative) were recruited online from across the US (Mean age = 16.3 years; 25.0% racial minority; 31.8% Hispanic/Latino ethnicity; 79.5% gay; 93.2% cis-gender men, 6.8% transgender women/non-binary) for five online focus groups. Participants completed a survey assessing demographics and PrEP awareness. During the online focus group, participants watched an animated video about daily oral PrEP and answered questions about what and where they previously heard about PrEP, how they knew to trust the information, and what questions they had about PrEP. We analyzed responses qualitatively.

RESULTS: A majority (84.1%) heard about PrEP before the study. Most learned that PrEP prevents HIV and is a pill, but few mentioned its availability to minors. Participants learned about PrEP on websites (e.g., CDC, Planned Parenthood, Gilead, WebMD), social media advertisements (e.g., Instagram, SnapChat), by participating in research studies, and on dating applications for men who have sex with men. Several learned about PrEP through friends, doctors, and community events (e.g., Pride). Participants trusted information about PrEP that came from reputable sources (e.g., university or government website), after cross-referencing or reviewing multiple sources, based on the professional appearance of the site or advertisement, or if the source or organization focused on SGM health or was SGM-affirming. Participants asked a variety of questions about PrEP with most pertaining to risks (e.g., side effects, medication/drug interactions) and how or where to get PrEP for free or at a low cost and without parents finding out.

CONCLUSIONS: A majority of SGM adolescents were aware of PrEP in this study, but wanted more information about side effects and how to navigate potential barriers to PrEP. Findings can help inform public health efforts and healthcare providers' discussions about PrEP with SGM adolescents.

WEPED870

Scale-up of pre-exposure prophylaxis through reorientation of health services in eight districts in Northern Namibia

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BACKGROUND: Namibia has 12.6% HIV prevalence among 15-64 year-olds; heterosexual intercourse is the main mode of transmission. In November 2016 the Ministry of Health and Social Services (MoHSS) released guidelines for use of oral pre-exposure prophylaxis (PrEP) for HIV-negative individuals at risk of HIV acquisition. USAID HIV Clinical Services Technical Assistance Project (UTAP) implemented by IntraHealth International partnered with MoHSS to scale-up PrEP services in eight districts where the project supports 72 health facilities.

METHODS: UTAP began supporting PrEP rollout in August 2017 through orienting regional and district health managers; community sensitization; in-service training and mentorship of health workers; facility assessments; development of monitoring and reporting tools; job aids for treatment initiation and monitoring; and health education and adherence counselling tools. UTAP worked with facility supervisors and health workers to gradually incorporate PrEP into existing services such as antenatal care, outpatient departments, and HIV testing services. Files of people on ART were reviewed to verify whether partners' HIV status was known. District pharmacies ensured steady stock of PrEP medication in facilities. Data on PrEP initiation and retention collected monthly from October 2017-September 2018 were analyzed quantitatively using Excel.

RESULTS: By December 2017, 44/72 facilities (61%) were providing PrEP and 424 individuals had initiated PrEP. By September 2018, 67/72 facilities (93%) were providing PrEP, with 2,117 individuals cumulatively initiated on PrEP. During risk assessment, 86% reported being in serodiscordant relationships; 14% reported inconsistent condom use, unknown partner status, recurrent STIs, and multiple concurrent sexual partners. 63% of clients were female; 25% of clients were aged 40-49 years; 8% of clients were 15-24 years. Three clients in serodiscordant relationships tested HIV positive at one-month follow-up and were initiated on ART. Eight clients discontinued PrEP due to side effects (4) or not being at risk of HIV acquisition (4). Between July-September 2018, 1,937 (92%) received PrEP follow-up.

CONCLUSIONS: UTAP demonstrated the feasibility of integrating PrEP into pre-existing health services. Continual engagement of health managers, health workers, and communities is needed to ensure smooth transition of services. Future support includes strengthening eligibility screening, retention of clients still at risk, and promotion of uptake by men and young people.

WEPED871

Sexual behavior changes, PrEP and condom use in the ANRS Prevenir study

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BACKGROUND: Risk compensation with decreasing condom use was reported during open-label extension of the ANRS-Ipergay trial, but no risk disinhibition appeared with a constant number of sexual partners or intercourses over time. We investigated sexual behavior changes during the ANRS-Prevenir study follow-up.

METHODS: ANRS-Prevenir is an ongoing PrEP study launched in May-2017 in the Ile-de-France region. Quarterly online self-questionnaires collected participants' sexual behavior. Analysis used data until October-2018. Sexual behavior was assessed by the median number of sexual partners (previous 3 months); PrEP and condom use (systematic or not, previous 3 months); and condomless sex at most recent anal intercourse (CMRAI). Generalized estimation equation models were estimated distinguishing by PrEP use scheme at each visit (daily versus on-demand); and PrEP status at enrolment (already on PrEP versus starting).

RESULTS: Among 2143 participants enrolled in 26 hospitals, 2035 (95%) completed questionnaires. PrEP use scheme and PrEP status information was available for 2004 participants with 5402 questionnaires (visits). Participants using daily PrEP (DPrEP) represented 47.1% of visits. Multivariable estimations showed that participants using DPrEP had 1.5 more sexual partners than those using on-demand PrEP (O-DPrEP) [95%CI(1.36-1.64)]. DPrEP users were 27% more likely to use PrEP systematically with sexual partners than O-DPrEP users. Systematic PrEP use probability increased 71% per year (p.y.) for both groups (1.71, 95%CI[1.54-1.90]). Concerning CMRAI, no difference existed between participants using DPrEP

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and those using O-DPrEP (1.06, 95%CI[0.99-1.18]), CMRAI probability increased 20% p.y. for both groups (1.20, 95%CI [1.14-1.27]). Regarding PrEP status, 44.1% of participants started PrEP at enrolment (PrEP-beginners), representing 40.1% of visits. Participants already on PrEP at enrolment (PrEP-experienced) had 1.3 more sexual partners than PrEP-beginners (95%CI[1.17-1.45]). Systematic PrEP use with sexual partners was 2.6 times higher for PrEP-experienced than for PrEP-beginners (95%CI[2.30-2.86]). Systematic PrEP use probability increased 3.5 times p.y. for PrEP-beginners (95%CI[3.05-3.94]), and 1.23 times p.y. for PrEP-experienced (95%CI[1.14-1.32]). CMRAI was more likely for PrEP-experienced (1.25, 95%CI[1.18-1.34]) than for PrEP-beginners; probability increased 11% p.y. for PrEP-experienced (1.11, 95%CI[1.06, 1.16]) and 32% p.y. for PrEP-beginners (1.32, 95%CI[1.27, 1.43]).

CONCLUSIONS: Risk compensation existed especially for participants initiating PrEP. However, PrEP roll-out does not seem to promote sexual behavior disinhibition.

Post-exposure prophylaxis

WEPED872

Factors associated with adherence to HIV post-exposure prophylaxis among survivors of sexual assault in the Bojanala District, North West, South Africa

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BACKGROUND: Sexual assault is a worldwide public health concern that can place victims at risk for sexually transmitted infections including HIV. A household survey conducted in 2015 by Médecins sans Frontières (MSF) in the North West province, South Africa found that 25% of women have been raped at some point in their lifetime, and that 1 in 5 female HIV infections can be attributed to sexual violence. Post-exposure prophylaxis (PEP) completion among survivors of sexual assault remains a challenge. Understanding factors associated with PEP completion might inform future interventions.

METHODS: Between September 2015 and December 2018, MSF has provided multi-disciplinary services in 4 clinics to 2540 survivors of sexual and gender-based violence, aged from 1yr to 92yrs, in the Bojanala district, North west Province, South Africa. This study included survivors experiencing penetrative sexual assault, presenting within 72 hours, who tested HIV negative. Proportions of those eligible and accepting a full 28 days course of PEP at first presentation, as well as those returning for a visit after 4 weeks, were calculated. PEP completion was measured using self-reporting, utilizing a structured tool. Logistic regression was used to quantify association of demographic and services received factors with PEP completion.

RESULTS: There were 371 sexual assault survivors who were eligible and initiated full 28 days course of HIV PEP; 182 (49.0%) were minors. Furthermore, 353 (95%) were female and 18 (5%) were male. Of those who initiated HIV PEP, 48.0% (95%CI; 42.9-53.1%) returned for first follow up, while 17.2% (95%CI; 13.6-21.4%) of survivors who received HIV PEP returned after 4 weeks and self-reported PEP regimen completion. PEP completion was significantly higher among those who received PEP adherence counselling compared to survivors who did not (AOR=4.58; 95%CI, 2.35-8.98; P< 0.001). However, PEP completion was not associated with age (AOR=1.12; 95%CI, 0.63-2.01), social work support (AOR=0.97; 95%CI, 0.43-2.21), nor area of penetration (AOR=1.50; 95%CI, 0.33-6.89).

CONCLUSIONS: Adherence to a full 28 days course of PEP therapy following sexual assault is low. Strengthening PEP adherence counselling is imperative to ensure optimal PEP completion. Furthermore, proactive follow-up is necessary to increase the likelihood of PEP completion among survivors.

Community-based approaches, including empowerment, outreach, and service delivery

WEPED873

Final HIV outcome for exposed infants: Improving mother-baby pair retention in prevention of mother-to-child transmission care in Eswatini through proactive community follow-up

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BACKGROUND: Determination of final HIV status for HIV-exposed infants (HEIs) after breastfeeding cessation is critical in measuring the success of prevention of mother-to-child transmission (PMTCT) programs and ensuring early treatment initiation. However, high attrition rates after the six-week postpartum visit negatively affect determination of final HIV status.

METHODS: The USAID-funded AIDSFree initiative trained, supervised, and compensated community focal mothers (CFMs) to proactively visit mother-baby pairs (MBPs) each month to encourage facility attendance until determination of final HIV status. CFMs visited mothers at home to help them plan for upcoming facility visits. CFMs visited HIV-positive and HIV-negative mothers to educate and encourage all MBPs to complete scheduled child welfare visits. CFMs also provided health workers at three implementing facilities with relevant information on MBP outcomes (e.g. death, transfer-out) for proper documentation in facility registers. Monthly, AIDSFree measured MBP completion of expected facility visits per the Ministry of Health schedule through 18 months postpartum.

RESULTS: In the pre-implementation period (January 2014 to December 2015), 36% of expected 292 HEIs in implementing facilities were retained in care at 18 months, and only 32% (93/292) had final HIV status determined. In the CFM implementation period (June 2017 to November 2018), 127 HEIs were enrolled, and 100% (18/18) of HEIs who reached 18 months by November 2018 had final HIV status determined. Two infants tested HIV-positive before the 18-month visit and were both initiated on treatment. Overall, 82% of all enrolled MBPs never missed a scheduled visit; the 18% who did were immediately linked back to care. No enrolled MBPs were lost to follow-up.

	HEIs Completing Child Welfare Care Visits (number completed/number expected)							
	6-Week Visit	10-Week Visit	14-Week Visit	6-Month Visit	9-Month Visit	12-Month Visit	15-Month Visit	18-Month Visit
Pre-CFM period (January 2014 - December 2015)	292/292 (100)	257/292 (88%)	228/292 (78%)	187/292 (64%)	172/292 (59%)	111/292 (38%)	6/292 (2%)	105/292 (36%)
CFM period (June 2017 - November 2018)	127/127 (100%)	120/120 (100%)	102/102 (100%)	90/90 (100%)	69/69 (100%)	58/58 (100%)	31/31 (100%)	18/18 (100%)

[Comparative HIV-Exposed Infants' Retention in Child Welfare Care between Baseline and CFM Intervention]

CONCLUSIONS: This initiative demonstrated success in improving MBP retention in PMTCT care through proactive, community-based follow-up with home visits by CFMs, resulting in determination of final HIV status at 18 months, as well as receipt of critical maternal and child health services.

WEPED874

Improving adolescent sexual and reproductive health through participatory parent-child communication interventions in rural communities of Eastern UgandaO. Nalwadda^{1,2}¹Restless Development, Sexual Reproductive Health & Rights, Kampala, Uganda, ²Butabika National Referral Mental Hospital, Research, Kampala, Uganda

BACKGROUND: Adolescent sexual and reproductive health remains a major public health concern in Uganda. Uganda is the second-youngest nation in the world with over 52% of its population below the age of 15 years (World Bank, 2015). Although the country has made progress in scale-up of youth friendly SRHR initiatives, Uganda is still characterized with poor SRHR indicators including high HIV prevalence rate at (6.5%), and high adolescent pregnancy rate at (40%).

Sadly, there is an ongoing ban on comprehensive sexuality education in schools in Uganda, meaning that over 80% of adolescents lack access to accurate information on SRH including HIV. Without comprehensive sexuality education in schools, this vulnerable population is left at risk of risky sexual behaviors. As such, strengthening parent-child communication is crucial for adolescents' access to correct SRHR information to enhance their ability in making informed SRHR choices. Under this project, we identified and addressed cultural, social and structural barriers to parent-delivered out-of-school comprehensive sexuality education in Eastern Uganda.

METHODS: In the study, 1800 parents in Jinja and Mayuge Districts were interviewed in a community-based cross-sectional study and a separate group of 3500 adolescents were interviewed within classroom settings. Parents and adolescents were administered a structured questionnaire to identify the cultural, social and structural barriers to parent-delivered comprehensive sexuality education. 15 focus group discussions with parents and 5 interface meetings between parents and adolescents were held for in depth understanding of these factors.

RESULTS: Among the 1800 parents enrolled in the study, 62% did not have accurate information on HIV transmission and prevention compared to 87% of adolescents. The key barriers to parent-led SRH education at multi-variate ($P < 0.05$) were stringent cultural norms (32%), lack of accurate information (51%), lack of a mentor-ship guide (15%) and lack of time (2%). Notably, 21.8% of parents living with HIV in the study reported self-stigma and 41% reported guilt as the key barriers to parent-child SRH communication.

CONCLUSIONS: Internalized stigma beliefs among parents living with HIV impede parent-child SRH communication. As part of any efforts to scale up uptake/utilization of SRH services including ART, participatory parent-child communication interventions should be strengthened.

WEPED875

Reducing vulnerability to TB co-infection and morbidity of opportunistic infections from biomass fuel-household air pollution amongst positive women & children in rural households in Kisumu County

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BACKGROUND: The level of exposure to Bio-Mass Fuel (BMF) pollutants in rural poor households is 100 times greater than the UN recommended maximums. A normal child is 2 to 3x more likely to contract ALRI while women are 4x more likely to suffer from COPD since most women spend a lot of time indoors with children by their side. However, HIV+ Women and children are 5 - 10 times more exposed to health effects of BMF-Household Air Pollution (BMF-HAP). The health effects of BMF-HAP may arise after just a single exposure and/or long or repeated exposure. The short-term effects are treatable; however, the long term effects can be severely debilitating and/or fatal. BMF-HAP pollutants are involved in altering macro-phage function thus increasing vulnerability to active Pulmonary TB.

METHODS: We conducted a study over a period of 60 months to investigate the general health effects of BMF-HAP in poor rural households of PLWHA in Kisumu County when switching from the traditional BMF sources to

simple low cost modern alternative energy Solutions. Special consideration was given to women, infants and Children under 10 years in each of the households. Analysis was done on all diseases but special emphasis was given to TB, ALRI, COPD and eye infections.

RESULTS: Over 65% children and 66% women reduced incidences of respiratory Tract infections within 21 days. There was a 60% deceleration in the development of ALRI among children and 80% decelerated development of COPD among women within 6 months. Over 95% experienced over 90% reduction in the short-term effects of BMF-HAP. There was 30% reduction in Pulmonary TB infection.

CONCLUSIONS: Using BMF is a common human daily activity that increases the vulnerability to TB and other diseases. A combination of HIV infection and exposure to BMF-HAP is a double tragedy to women & children. BMF-HAP is responsible for the deaths of over 1.1 million women and children. Reducing BMF-HAP is a new frontier and a viable HCBCS strategy that focuses on a Community/Human Behaviour Change in the fight against HIV/AIDS & TB. It improves indoor air quality and lower the health risks and eventually improve health outcomes in the HIV treatment

WEPED876

A qualitative evaluation of the ACCELERATE! initiative: HIV prevention, care and treatment interventions for Black men who have sex with men

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BACKGROUND: Black men who have sex with men (MSM) account for 59% of all HIV diagnoses among African Americans in the South. Jackson, Mississippi is ranked 4th in the nation for HIV infections, with a prevalence of 39.5/100,000. In an effort to increase HIV prevention, retention in care, and treatment among Black MSM in Jackson, ViiV Healthcare launched the ACCELERATE! initiative, which provided local organizations with funding to support interventions specifically targeted towards Black MSM.

The ACCELERATE! interventions focused on the following four domains:

- (1) Make Sex Education Relevant,
- (2) Make Testing a Bridge to Prevention and Care,
- (3) Boost Empowerment and Strengthen Networks, and,
- (4) Strengthen Navigation Services.

A two-phase evaluation of ACCELERATE! is being conducted to assess the effectiveness of the interventions.

METHODS: A mixed methods approach is being used to evaluate the ACCELERATE! interventions that were implemented in Jackson. This report will focus on the outcomes of the first phase of the qualitative strand of the evaluation. Interviews were conducted with 14 Black MSM who participated in ACCELERATE! interventions. The qualitative data was coded by two members of the research team. The Relationship and Expectations domain of the PEN-3 Model was used as a framework to guide the identification of factors that served as barriers and facilitators to participation in HIV prevention, care and treatment.

RESULTS: The participants ranged in age from 20 to 54 years old (mean: 30.2 ± 9.26). The majority of the participants (71%) self-identified as HIV negative at the time of their interview. We found that most participants indicated that participating in the ACCELERATE! interventions increased in their knowledge of HIV prevention and care options, and increased in their sense of empowerment regarding their healthcare.

Furthermore, we identified specific Perceptions, Enablers, and Nurturers, such as social networks and trusted healthcare providers, that played an important role in the participant's engagement in HIV prevention, care and treatment.

CONCLUSIONS: Black MSM experienced significant benefits from health promotion interventions that are specifically targeted towards them regardless of their HIV status. Furthermore, increasing access to such programs may enhance Black MSM's engagement in HIV prevention practices.

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Perceptions of ART outreach services in the community among stable and expert HIV-positive clients: A qualitative focus group discussion from TanzaniaB. Drezgic¹, C. Casalini², A. Mwakibete², G. Mwampeta¹, M. Luvanda¹, F. Hezwa², A. Komba², E. Mlanga³, S. Lwezaula⁴, S. Kelbert⁵¹Engenderhealth, Dar es Salaam, Tanzania, United Republic of, ²Jhpiego, Dar es Salaam, Tanzania, United Republic of, ³USAID, Dar es Salaam, Tanzania, United Republic of, ⁴National AIDS Control Program, Ministry of Health, Dar es Salaam, Tanzania, United Republic of, ⁵Jhpiego, Baltimore, United States**BACKGROUND:** The Sauti Project is a PEPFAR/USAID funded project offering community-based HIV combination prevention services in 14 regions of Tanzania. As part of the national guidelines on differentiated care, from January 2018, the project provided ART outreach services to stable clients at community-based peer support groups (PSG), facilitated by expert clients. Clients received clinical assessment and 3-month supply by health care provider.**METHODS:** Between September and October 2018, semi-structured interviews were conducted with 46 stable adult clients, of whom 16 were expert clients. Stable clients were defined as on ART ≥6 months and virally suppressed. Loss to follow up (LTFU) was defined as having missed ≥3 months' service. Clients who opted out were those who refused to receive ART outreach services in the community. Expert clients were defined as literate stable clients committed to facilitating education at PSG. Interviews were audio-recorded, transcribed, and coded for themes and patterns using a grounded theory approach. Objectives were to understand benefits and shortfalls; reasons to LTFU or opting out.**RESULTS:** The perceived satisfaction with ART outreach services in the community included reduced travel time and associated cost; reduced waiting time for services and increased time for business and family; less crowded and stigmatizing services; service-venue and -time consensually agreed by the group; multi-months' prescription; facilitated disclosure of HIV status through PSG; improved education and counseling and increased social cohesion. Loss to follow up from ART outreach services was due to stigma given the proximity of service-venue to the residence. All groups reported that at times, when conducted in open spaces or government offices, ART outreach services did not offer sufficient privacy and confidentiality. Expert clients emphasized service will increase ART adherence; they were clear on their role, but didn't feel sufficiently capacitated to facilitate group's education.**CONCLUSIONS:** ART outreach services in the community met stable clients' needs. More efforts should be placed to secure privacy and confidentiality, offer anti-stigma and disclosure counseling to those who were lost to follow up and further capacitate expert clients.

WEPED878

Reaching the third 90: Differentiated treatment options involving village health workers in rural ZimbabweM. Munjoma¹, W. Mavhu², A. Sheets¹, E. Gwavava¹, S. Gudukeya¹, G. Ncube³, E. Sall⁴, K. Hatzold⁵¹Population Services International Zimbabwe, Harare, Zimbabwe, ²Centre for Sexual Health and HIV/AIDS Research, Harare, Zimbabwe, ³Ministry of Health and Child Care Zimbabwe, Harare, Zimbabwe, ⁴Sall Family Foundation, Raleigh, United States, ⁵Population Services International, Washington, United States**BACKGROUND:** Engaging village health workers (VHWs) in the provision of HIV testing services (HTS), antiretroviral therapy (ART) drug supply, and adherence support offers opportunities for decentralised HIV service delivery. We present results from mixed-methods research assessing facilitators and barriers to VHW-delivered HTS and care services.**METHODS:** April-May 2018 six in-depth interviews were held with PLHIV (n=3 male; n=3 female), VHWs (n=5 female; n=1 male) and clinic nurses (n=4 female; n=2 male) in Makoni, Zimbabwe. Two focus group discussions were conducted with PLHIV and VHWs (10 participants per group). Audio-recorded data were transcribed and translated verbatim, coded, and ana-

lysed thematically. Quantitative data were collected during structured interviews among VHWs (n=52) to assess job satisfaction, HIV knowledge, and experience levels. Structured interviews were also conducted with PLHIV (n=190). Data were analysed using STATA 13.0.

RESULTS: VHWs had high HIV-related knowledge and were generally job-satisfied. Reports of a lack of tools and finances to support patients in communities were also common. All groups identified VHWs as best positioned to distribute HIV self-test kits and ART refills based on competency and trust by community members, especially hard-to-reach populations with high stigma levels, limited access to clinical services, and reluctance to join community ART refill groups, such as men, adolescents and people with faith healing beliefs. Clinic nurses and VHWs felt distributing HIV drugs would increase empowerment and community members' trust in VHWs. 84% of PLHIV (95% CI:81% - 88%) expressed willingness to work with VHWs. PLHIV and nurses also reported the need to bring care and treatment closer to end-users to address treatment knowledge gaps (especially around reduced HIV transmission risk for virally suppressed PLHIV) in the community and to reduce HIV-related stigma. Major concerns included fear of confidentiality breaches—especially noted by young PLHIV—drug storage safety and VHWs' high workload. All respondents felt most VHWs' shortcomings could be redressed by additional training and monitoring.**CONCLUSIONS:** Expanding VHWs' scope-of-work to include HTS and care services is positively viewed by clinic nurses and PLHIV may be empowering and could provide opportunities for increased community-level treatment literacy, potentially contributing to reduced HIV-related stigma in Zimbabwe.

WEPED879

Impact of a community-based antiretroviral therapy (ART) delivery program for female sex workers (FSWs) in Tanzania - Results of a quasi-experimental studyL. Vu¹, W. Tun¹, L. Apicella¹, J. Kidola², C. Mangya², C. Casalini³, G. Mbata³, N. Makyao⁴, T. Koppenhaver⁵, E. Mlanga⁵¹Population Council/Project SOAR, Washington, United States, ²NIMR, Mwanza, Tanzania, United Republic of, ³Jhpiego, Dar es Salaam, Tanzania, United Republic of, ⁴Ministry of Health, Community Development, Gender, Elderly and Children, Dar es Salaam, Tanzania, United Republic of, ⁵USAID, Dar es Salaam, Tanzania, United Republic of**BACKGROUND:** To increase linkages to and retention in ART care, we designed and piloted the delivery of community-based ART services to FSWs using community-based HIV testing and counseling platforms (mobile and home-based). This abstract presents impact of the intervention on ART linkage, retention, and viral suppression.**METHODS:** The study used a quasi-experimental design. Eligible participants were women who sold sex for money or goods in the past 6 months, aged 18+, HIV-positive, and not currently on ART.

A cohort of 617 eligible FSWs were recruited in July-October 2017. FSWs in the intervention group (n=309/Njombe Region) were enrolled into community-based ART and immediately received one month of ARVs. At refills, each FSW received 3 months of ARVs. FSWs in the comparison group (n=308/Mbeya Region) were referred to public ART facilities (at government facility, fixed refill date, one month of ARVs). At 12 months post-enrollment, we re-interviewed 527 FSWs of the original cohort (Njombe=265; Mbeya=262). Key outcomes were ART initiation, retention, and viral suppression (viral load of ≤1000/ml). We used chi-square tests and multiple logistic regression to compare 12-month ART outcomes between intervention and control groups.

RESULTS: Median participant age was 30 years; half were never married; a third were divorced. One-third learned their HIV-positive status for the first time at study enrollment. Lost-to-follow-up participants (15%) were comparable across the groups.

FSWs in the intervention were more likely to have initiated ART (100% versus 79%; p< 0.001). Among ART-initiated patients, retention was 99% in the intervention and 96% in the comparison (p=0.05). Among patients on ART, viral suppression was 84% in both groups (non-significant). FSWs in the intervention reported higher level of satisfaction regarding their last visit (99.0% versus 80%;p< 0.001). ART initiation and client satisfaction outcomes remained statistically significant in multiple logistic regression.

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CONCLUSIONS: Community-based ART distribution can improve ART linkage and initiation among FSWs. Findings suggest that the most critical part in reaching 90% retention and viral suppression is linking and immediately initiating patients on ART. Once on ART, viral suppression was high regardless of service modality. The national HIV response must seek to expand this community-based model to close the ART initiation gap.

WEPED880

Long term impact assessment of programme titled Pehchan: "Strengthen community institutions and systems for MSM, Hijra and transgender communities to increase reach and quality of services"

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BACKGROUND: India HIV/AIDS Alliance along with consortium partners implemented Pehchan programme (from 2010 to 2016), a Global Fund supported program focused on Men who have Sex with Men, Transgender, and Hijra populations (MTH) in 18 priority states in India and has reached 436,000 MTH with value added services. The program focused around community system strengthening, capacity building of the 200 community based organizations, and creating evidences for policy changes related to MTH. India HIV/AIDS Alliance conducted a study to measure the long term impact of the program.

METHODS: Modified CRISP (Community, Resources, Institutional and Processes) methodology was adopted. Multistage sampling (three stages) method was used to select the respondents for the study with mixed method (quantitative and qualitative) data. 245 structured interview, 21 Focus group discussions, 36 In depth interviews/case studies and 82 Key Informant Interviews were conducted. Descriptive and comparative analyses were carried out using Pehchan endline study as base. CRISP score was also calculated to understand the sustainability of the project.

RESULTS: Findings showed that there is an increase in uptake of HIV services when compare with Pehchan endline data (ever HIV testing from 95 to 98 and taking ART from 14% to 18.8%). Similarly, experience of any type of violence by law enforcement in last 6 months was reduced from 22% to 11%. However there is a significant reduction in condom use during last anal sex with any male partner from 87% at Pehchan endline to 81% (Pehchan baseline 70%) at present which also showed an increase HIV positive from 3% to 10% (5% at Pehchan baseline). 66% of CRISP score (154,192 against a possible maximum of 101,639) suggests that the impact of Pehchan program and its interventions at an overall level have been moderately successful in terms of sustainability.

CONCLUSIONS: Sustainable long term impact of Pehchan is very much evident in increased trend of HIV service uptake and reduced structural barrier. Overall CRISP score also showed the success of pehchan project sustainability in terms of community, results, Institutional and processes. However, decline in safe sex behavior and increased HIV positivity rate insists the need for strengthening of prevention strategy.

WEPED881

Role of WhatsApp in empowering female sex workers in India: Learnings from large scale community-based intervention program in India

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BACKGROUND: FSWs are empowered to use smart mobile phones to access social networking sites and applications. WhatsApp is one of such application, apart from communication, turning out to be a tool that is empowering them. Two rounds evaluation surveys conducted in 2014 and 2017 of Avahan Phase-III program, focused in high prevalence states in India, generated an evidence of increase in using smart phones among FSWs to communicate with co-FSWs and as well as with program staff of Community Organizations. Exploring this trend, we attempted to document what extent FSWs are using WhatsApp and how it has become an integral part of their lives.

METHODS: Post evaluation surveys of AVAHAN Phase III program, qualitative in-depth interviews were carried out with purposively selected FSWs. A total of 30 FSWs who are currently using WhatsApp, identified with the help of CO board members were interviewed face to face. Primary textual data gathered was coded using Atlas-Ti package and analysed using conventional content analysis technique.

RESULTS: Use of WhatsApp among FSWs has influenced not only their individual personal life but also on their professional front. The rise of smartphones and social media (use of WhatsApp) has affected their day to day dealings like; soliciting, negotiation on price and condom use with clients, sharing information about health, child care, parenting and monitoring household activities. Use of WhatsApp has also influenced their engagement in community level activities, events and meetings. Sharing of information about CO, communication with other FSWs program activities were reported. It has been instrumental in building community ownership, collective agency, improving self-efficacy and reducing stigma among FSWs.

CONCLUSIONS: WhatsApp is an emerging internet platform to reach hard to reach population, especially female sex workers. Embedding HIV prevention messages through WhatsApp could be a suitable platform to be considered for digital intervention.

WEPED882

Champion community centers: A Philippine model for strengthening and scaling up community-based HIV services

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BACKGROUND: The Philippines has the fastest growing HIV epidemic in Asia/Pacific. Community-based services are a key strategy to reach out to key populations and increase the rates of testing and treatment among them.

Love Yourself (LYS), a volunteer-driven community-based organization (CBO), pioneered the establishment of community centers in Manila to provide HIV education, testing and counseling among MSM, transgender women, and the youth. Its centers have evolved into a primary treatment hub for HIV and TB, a transgender health clinic, and a proponent of community-led pilot Philippine implementation of PrEP and self-testing.

LYS now strives to replicate its community-based service delivery model by developing the capacity of twelve other CBOs to establish their own champion community centers nationwide.

METHODS: Champion community centers, in the LYS model, are envisioned to be one-stop alternative service delivery settings, expanding differentiated HIV care among key populations through both outreach and facility-based testing and treatment services.

Towards that vision, LYS is providing twelve CBOs holistic assistance including skills training for HIV prevention, counseling, testing and treatment, organizational development, partnership-building, communications, volunteer engagement, monitoring and evaluation, and financing and sustainability, for a minimum period of one year (August 2018 to July 2019), to establish champion community centers that are integrated in their respective local HIV service delivery networks.

RESULTS: From 2012 to 2017, LYS has tested over 68,000 clients, 43% of whom have returned for retesting. LYS' share of the total number of diagnosed cases in Metro Manila stands at 46%, and 17% nationwide. In 2017, LYS' linkage-to-care proportion was 95%, with a median time of two days between diagnosis and care.

Preliminary data from September to November 2018 show that the twelve LYS-supported CBO-led community centers cumulatively reached 4,668 and tested 3,985 MSM and transgender women, 379 (9.5%) of whom were reactive. This comprised 13% of the newly diagnosed cases reported nationwide in that period.

CONCLUSIONS: CBOs, with their established networks of key populations, are evident entry points for expanding testing and treatment coverage among those most at-risk. With sufficient support and a model for replication, they can be developed to establish one-stop alternative settings providing community-based HIV services.

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WEPED883

HIV and sexual health education: An inner city community-based projectT. Magel, J. Holeksa, A. Thiam, L. Chu, R. Yung, D. Truong, B. Conway
Vancouver Infectious Diseases Centre, Vancouver, Canada

BACKGROUND: Approximately 63,000 individuals are infected with HIV/AIDS in Canada, 17.4% of whom are people who inject drugs (PWID). HIV/AIDS education remains an important component of HIV prevention, treatment, and care. Studies have shown that HIV education can lead to reductions in risky behaviors and promote safer sex and drug use practices. There continues to be a critical need for targeted HIV education among marginalized and vulnerable populations. This analysis reports on the outcomes of an HIV education program undertaken among high-risk individuals in the Downtown Eastside of Vancouver.

METHODS: A retrospective cohort analysis was conducted among participants at community-based HIV educational workshops held between October 2016 to November 2018. We report on participant demographic characteristics and HIV education as measured by scoring on a 15-point knowledge-based questionnaire administered before and after a standardized HIV education presentation. For individuals who participated in point-of-care testing for HIV and HCV, test results and subsequent engagement in care are also reported.

RESULTS: A total of 450 individuals were included in this analysis: mean age 51 years, 56% Caucasian, 70% male (2% MSM), 46% marginally housed/homeless, 58% current/recent injection drug users; 64% reported using protective measures for sex (i.e. condoms), 29% rated health as fair/poor. Median scoring prior to the presentation was 8/15. Post-presentation, median scoring increased by 1 point for a median score of 9/15. In total, 179 participants opted to receive point-of-care HIV and/or HCV antibody testing (OraSure[®]). A total of 10 individuals were identified as HIV infected and not currently receiving treatment for it, 4 of whom are now engaged in care to date. A total of 28 individuals were identified as HCV infected and not currently receiving treatment for it, 13 of whom are now engaged in care to date.

CONCLUSIONS: We have designed a novel approach to HIV-related education that is effective and well received by a vulnerable, inner city population. This community-based intervention has allowed for the identification and engagement in care men and women living with HIV and/or HCV. Approaches such as this will be essential to the control of HIV infection in marginalized patient groups.

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WEPED884

The ENABLE model: A community-based approach to eliminate mother-to-child transmission of HIV (eMTCT) in rural Eastern Cape, South AfricaE.K. Chademana Munodawafa*One to One Africa Children's Fund, Cape Town, South Africa*

BACKGROUND: Remarkable progress has been made in reducing mother-to-child transmission of HIV by 60% in 21 of the highest burden countries in sub-Saharan Africa (Global Plan, 2017). South Africa in particular, is on track to eliminating mother-to-child transmission with a rate of 1.3% in 2017 (National Department of Health, 2018). This paper provides evidence for early detection of HIV and prevention of mother-to-child transmission of HIV through a community health worker programme in rural Eastern Cape, South Africa. The objective of the paper is to motivate for and provide evidence that community-based interventions play a critical role in eliminating mother-to-child transmission of HIV.

METHODS: The Enable programme has been implemented in the Eastern Cape province of South Africa since 2016 by One to One Africa Children's Fund. Women from the community are recruited and trained to become Mentor Mothers who are supported and managed by trained nurses. All women recruited are mothers and most of them are living with HIV themselves. These Mentor Mothers provide comprehensive healthcare services expecting and new mothers in rural communities throughout pregnancy, after birth, breastfeeding and till the child is 6 years of age. Services include monitoring and encouraging attendance of antenatal care ap-

pointments, encouraging HIV testing for all pregnant women, adherence, encouraging mothers to go for second PCR tests as well as general vital checks (BP, Sugar levels). In addition, the Enable programme works with local community health facilities and provides referrals to these facilities. To reduce home deliveries, patient transport to the hospital is provided.

RESULTS: Between 2016 and 2018, the programme has reached 1452 women and children. Of the current pregnant women, 97.8% (784/802) are attending ANC appointments, 96% (769/802) know their status; 92% (180/196) are on ART treatment. Of those who have delivered, mother-to-child transmission was at 0.68% (1/147).

CONCLUSIONS: There is strong evidence to suggest that community health outreach services play a critical role in the elimination of mother-to-child transmission of HIV/AIDS.

Social, political, and legal advocacy

WEPED885

Advocates in action: Peer supporters driving change on the frontlines of service deliveryH.S. Soeters¹, D. Mark¹, A. Ronan¹, L. Papier¹, T. Burdock¹, M. Davids¹, C. Ninahazwe², N. Munyaburanga², G. Caswell³, L. Essink⁴, N. Westerhof⁴, L. Hatane¹¹*Paediatric-Adolescent Treatment for Africa, Cape Town, South Africa,*²*Global Network of Young People Living with HIV, Amsterdam, Netherlands,*³*International HIV/AIDS Alliance, Hove, United Kingdom, ⁴Aidsfonds,**Amsterdam, Netherlands*

BACKGROUND: Adolescents are the only age group for whom AIDS-related deaths are increasing. Engaging young people living with HIV (YPLHIV) as peer supporters has shown to improve facility-level health outcomes and viral suppression through improved linkage, adherence, retention and psychosocial support. However, the potential power of young peer supporters to act as drivers of change and influence service delivery has not been explored.

METHODS: In 2018, Paediatric-Adolescent Treatment Africa (PATA) conducted a cross-sectional semi-structured survey with 63 YPLHIV engaged as peer supporters in 49 health facilities across 12 sub-Saharan African countries. Surveys aimed to better understand young peer supporters' perspectives and experience of power to influence adolescent programmes. Univariate statistics and thematic coding were used to analyse quantitative and qualitative data.

RESULTS: Respondents were 60% female, with a mean age of 22 years. Almost all (98%) peer supporters considered themselves advocates. Advocacy activities included community outreach and awareness-raising, peer representation on various platforms and providing peer-to-peer education and support. Most felt they had a major (53%) or fair amount (41%) of influence on improving services. The majority (90%) reported they frequently inform health providers about challenges peers face or make recommendations on adolescent-friendly health services. Most (81%) reported that these lead to service improvement. Examples of changes resulting from their advocacy include improvements in existing services and facility procedures, as well as additional services being introduced.

CONCLUSIONS: Findings suggest that peer supporters understand themselves to be agents of change beyond their better-understood role of task-shifting and supporting service delivery. Young peer supporters report being advocates for their peers, and frequently leverage their experience to proactively raise issues, challenge existing practice, provide feedback and make recommendations. Peer supporters are well-placed to mobilise and facilitate patient, health provider and facility-level advocacy. With linkage to peer-led networks and community structures, peer supporters can participate in broader health system advocacy. Advocacy training should be integrated into peer support curricula to build skills and capacity to successfully effect change. Additionally, health facility staff should be orientated toward receiving feedback from peer supporters, with facilities establishing mechanisms for intergenerational dialogue between service users and providers to leverage this advocacy potential.

WEPED886

A qualitative analysis of the link between violence against women and quality of HIV programming in 8 African Countries

T. Muyunga-Mukasa

Most at Risk Populations' Society in Uganda (MARPS in Uganda), Women and Gender Equity, Kampala, Uganda

BACKGROUND: Effective and quality HIV programming is linked to reduced risk to violence. This study explored negative stereotypes of hegemonic masculinity and the social structures linked to it. An exploration of 8 Sub-Saharan African countries found 3 country-specific definitive social structures impacting the stereotypes, i.e., Enabling; Restrictive; and Hindering structures.

METHODS: A meta-analysis of data from 2013-2017 of relationship between violence and comprehensive combination HIV prevention strategies, political commitment, rule of law, enforcement of legal gender equality, religious and traditional support for respect and dignity of women, uptake of gender-specific prevention services, Domestic Violence (DV) reports and HIV trends. 175 articles were identified and 80 met inclusion criteria.

RESULTS: Stereotypes of hegemonic masculinity exist in all 8 countries studied. Politics, religion and tradition influence risk reduction, e.g., enforcement of legal gender equality, political commitment and accountable judiciary ensure women can report abuses. Male dominance beliefs; traditions e.g. precarious toxic masculinity, forced marriage, genital cutting; and gender of breadwinner are linked to violence-related risks. Compared to all 8 countries, Rwanda, Ethiopia and Kenya have a hindering structure promoting significant risk reduction with institutions fostering increased rule of law, political commitment, enforcement and risk-reduction consciousness. However, HIV criminalization and stigma subvert risk-reduction goals. Uganda and Tanzania have a restrictive structure characterised with legal loopholes, irregular enforcement and ambivalent political commitment to address acts of violence against women. In Senegal, South Africa and Nigeria political, religious and traditional factors blatantly backing traditional negative stereotypes of hegemonic masculinity foster violence enabling structures entrenching repressive acts and hate crimes against women. Clinical trials and male medical circumcision (MMC) in the 8 countries are poorly received. Negotiating for safer sex by women is circumscribed as a threat to male dominance.

CONCLUSIONS: Justice dispensation, economic autonomy, religion and traditional backing contribute effectively to risk-reduction. Contexts hindering violence prevail where state-led commitment thrives and these have far reaching benefits e.g., more people engage in clinical trials, TB prevention, Hepatitis screening and immunization. Political and legal commitment are key in violence risk reduction. Effective and quality HIV programming in the countries studied is possible if it is designed to address hegemonic masculinity practices too.

of Pre-Exposure Prophylaxis (PrEP). This abstract documents the demand creation approach developed for Project PrEP - an initiative integrating PrEP into comprehensive services for adolescent girls and young women (AGYW), funded by Unitaid, implemented in collaboration with the South African National Department of Health (NDoH).

METHODS: Project PrEP, in collaboration with NDoH, is implementing across SA in four districts through nine facilities supported by four roving mobile clinics. Utilising existing formative knowledge through engagement with AGYW, the project created a strategy focussing on combining innovative methods in a comprehensive approach - campaigns, print materials, social media, community engagements, social mobilisation, mobile application supporting adherence, capacitated youth navigators and demand creation agents utilising various effective strategies to create demand and support linkage to care.

RESULTS: The strategy focusses on reaching a diverse audience, especially youth, through various channels and tactics (Figure 1) with correct information in an effort to reduce stigma, create awareness, normalise HIV prevention and subsequently create an enabling environment where access to PrEP and other sexual and reproductive health services is supported. The project utilises SA's national She Conquers Campaign to reach young people through layering of interventions and networks thus ensuring meaningful youth engagement throughout the implementation of the strategy.

CONCLUSIONS: The multi-faceted demand creation strategy aligns to SA's need to reach a diverse audience with communication campaigns integrated into programmes providing PrEP to AGYW. It will generate evidence on the role of comprehensive demand creation to stimulate PrEP uptake and serve as a model to follow and adapt as needed for national service delivery to AGYW.



[Figure 1: Demand Creation Approach Project PrEP]

Community mobilization and demand creation

WEPED887

Holistic demand creation and community mobilisation for PrEP integration into comprehensive sexual reproductive and health (SRH) services for adolescent girls and young women (AGYW) supporting South African National PrEP programmeE. Briedenhan¹, L. Rambally-Greener¹, P. Rosenberg¹, N. Sheobalak¹, H. Subedar², S. Mullick¹*¹Wits Reproductive Health & HIV Institute (Wits RHI), Implementation Science, Johannesburg, South Africa, ²National Department of Health, Pretoria, South Africa*

BACKGROUND: The HSRC (2018) South African (SA) National HIV Prevalence and Incidence Survey, indicated a need for innovative social behaviour communication campaigns to improve knowledge, access and uptake

WEPED888

Finding the men that matter most: Creating demand for HIV prevention services among very high-risk men in ZambiaL. Aladesanmi¹, M. Lukobo-Durrell², M. Habel³, C. Laube², O. Chitwuo⁴, C. Toledo³, H. Mtonga¹*¹Jhpiego, affiliate of Johns Hopkins University, Lusaka, Zambia, ²Jhpiego, affiliate of Johns Hopkins University, Baltimore, United States, ³Centers for Disease Control and Prevention (CDC), Atlanta, United States, ⁴Centers for Disease Control and Prevention, Lusaka, Zambia*

BACKGROUND: Zambia has the seventh highest HIV prevalence globally with more men unaware of their HIV status than women. Testing and circumcising HIV- males at highest risk of HIV acquisition achieves the most immediate impact on the epidemic; however, finding and engaging men in prevention services remains challenging. Innovative and unconventional demand creation approaches are needed to identify and engage high risk (HR) men.

METHODS: Phase 1 findings (June-December), including risk profiles of 4,639 enrolled men and circumcision outcomes by recruitment venue, revealed the proportion of men who self-reported ≥ 2 risks was highest

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among men recruited at workplaces (83%), with 22% self-reporting ≥ 5 risks. 9% of men at community service points and a university campus reported ≥ 5 risks. Most HR men were enrolled at entertainment venues and community service points; however, the proportion of men opting for circumcision from these points was lower compared to men recruited at health facilities (3%-4% vs. 19%).

RESULTS: Phase 1 findings (June-December), including risk profiles of 4,639 enrolled men and circumcision outcomes by recruitment venue, revealed the proportion of men who self-reported ≥ 2 risks was highest among men recruited at workplaces (83%), with 22% self-reporting ≥ 5 risks. 9% of men at community service points and a university campus reported ≥ 5 risks. Most HR men were enrolled at entertainment venues and community service points; however, the proportion of men opting for circumcision from these points was lower compared to men recruited at health facilities (3%-4% vs. 19%).

CONCLUSIONS: Workplaces, community service points, and universities are prime locations for identifying the highest risk subgroups of men and are opportunity points for engaging these men in community based HIV prevention and testing services. Recruiting men within health facilities can be a quick win for increasing circumcision uptake among HR men. Phase 2 implementation will introduce new motivators to improve circumcision uptake among HR men.

Recruitment Venue	Number enrolled	% enrolled reporting 2 or more risk factors	% enrolled reporting 3 or more risk factors	% enrolled reporting 4 or more risk factors	% enrolled reporting 5 or more risk factors	n(%) circumcised
Workplaces- Cane cutters, Fishing camps	169	83%	54%	37%	22%	2(1.2)
Community Services- Markets, Bus stops, churches, barber shops	1196	79%	45%	22%	9%	34(2.8)
University Campus	333	57%	34%	26%	9%	1(0.3)
Entertainment Venues- bars, sports grounds, music shops	2002	74%	41%	19%	6%	78(3.9)
Health Facility-STI clinics, OPD	234	77%	38%	15%	5%	44(18.8)
Others	705	60%	29%	13%	4%	27(3.8)
Total	4639	72%	40%	20%	7%	186(4.0)

Note: High risk is defined as self-reports of one or more of the following in the past 6 months - sex with an HIV-positive partner; multiple concurrent sex partners; sex in exchange for money; treatment for sexually transmitted infections (STIs); sex after drinking alcohol; and illicit drug use.

[Risk profile and circumcision rate by recruitment venue]

Prevention of vertical transmission

WEPED889

Using knowledge exchange platforms with quality improvement (QI) approaches in the Partnership of HIV-Free Survival to improve prevention of mother to child transmission (PMTCT) of HIV services in sub-Saharan Africa

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BACKGROUND: The Partnership for HIV-Free Survival (PHFS), a USAID initiative implemented in Kenya, Lesotho, Mozambique, South Africa, Tanzania, and Uganda between 2012 and 2016, was designed to use basic quality improvement (QI) practices to reduce mother-to-child transmission of HIV. Along with improved prevention of mother-to-child transmission (PMTCT) service delivery, participating facilities saw improvements in retention in care for HIV-infected mothers and their infants and HIV-free child survival at two years. Knowledge exchange platforms (i.e. structured opportunities for peer-to-peer learning across facilities at district, provincial, and national forums) were a key component of the PHFS design.

METHODS: In 2017-2018, MEASURE Evaluation, funded by USAID, conducted a legacy evaluation of PHFS. The team conducted an extensive review of QI records at PHFS facilities and qualitative semi-structured interviews with national, provincial, community and facility-level partners across all six countries.

RESULTS: Stakeholders described knowledge exchange platforms as a cornerstone element of PHFS in all six countries. While the specific structure of knowledge exchange events varied across countries, they provided supportive space for health facility staff and community health workers to present and model their patient-focused local innovations and improved outcomes on common PMTCT QI indicators. These events propelled PHFS work forward, motivating participants to continue implementing successful change ideas and providing an opportunity to learn from other facilities' successes, adopt innovative change ideas, and tailor innovations to their local facility and community. For example, in Kenya, an innovative patient scheduling strategy with designated PMTCT clinic days for mother-baby pairs, presented by one health facility at a county-level knowledge exchange event, spread to nearly all 28 PHFS sites in the following months.

CONCLUSIONS: In the context of QI, knowledge exchange platforms that bring together PMTCT stakeholders for inter-facility sharing of successful QI work and local innovations has potential to be an impactful strategy. Sharing innovations that are simple, low-cost, and locally developed, facilitates adoption to other facilities. Knowledge exchange platforms should be scaled up alongside QI efforts, for PMTCT and other health areas, to promote collaboration of stakeholders, motivation of frontline staff, adoption of change ideas, and improvement of local health services.

WEPED890

Mother-to-child transmission of HIV: A racial phenomenon in Brazil

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BACKGROUND: Detection rates of HIV among pregnant women have been increasing over the last ten years. In 2007, there were 2.3 cases per thousand live births; in 2017, there were 2.8 cases per thousand live births. Most of them (57.6%) occurred in pregnant black women. Epidemiological data according to race are crucial to the planning of policies to reduce interracial inequalities, in order to minimize - for everyone - the risk of mother-to-child transmission (MCT) of HIV and of unfavorable postnatal outcomes involving exposed children.

METHODS: Data were obtained from the national laboratory system. They included all children born in 2018 who had at least one HIV viral load (VL) count and whose mothers were registered in the system with known race. We used chi-square tests to check if there were any associations between the mother of the HIV-exposed child's race and clinical factors, such as use of antiretroviral therapy (ART) used during pregnancy and mother's last VL before childbirth.

RESULTS: Among the 3,075 HIV exposed children, 1,671 (54.3%) had black mothers and 1,404 (45.7%), non-black mothers. The percentage of black mothers not on ART during pregnancy was higher (black: 11.9%; non-black: 7.3%; $p < 0.000$). Among black mothers, 20.9% had no VL count during pregnancy; 12.5% had a VL count $> 1,000$ copies/mL; and 66.6% had undetectable VL or VL $> 1,000$ copies/mL. Among non-black mothers, percentages were respectively 13.4%, 10.0% and 76.6% ($p < 0.000$).

CONCLUSIONS: The differences suggest that, in Brazil, there is a vulnerability process involving children who are exposed to HIV/AIDS and are born of black mothers. The use of race/color as an analytical category leads to better understanding of how cultural and socioeconomic conditions produce and reproduce disadvantages in the exposure of black pregnant women to the risk of MCT. In this sense, it is crucial to support political strategies to overcome social inequalities based on stigma and racial discrimination.

WEPED891

Too little, too late: Early lessons on Maternal MTCT risk from HIV positive infant case investigation in Zimbabwe

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¹Organization for Public Health Interventions and Development, Harare, Zimbabwe, ²Ministry of Health and Child Care Zimbabwe, National PMTCT Program, Harare, Zimbabwe

BACKGROUND: In 2018, Zimbabwe introduced routine case-reporting for all new HIV infections among children 0-24 months. The FACE HIV Program supported MOHCC with entry and analysis of case reports from public health facilities in 6 provinces of Zimbabwe from Jan-Sept 2018. Our objective was to describe maternal characteristics of newly diagnosed HIV positive infants.

METHODS: Routinely completed paper-based case reporting forms of children testing HIV positive from Jan-Sept 2018 were entered electronically into MS Forms. Anonymised data was abstracted into MS Excel and descriptive analysis with chi-square tests of proportion conducted using StataV13.

RESULTS: A total of 106 HIV positive child case investigation were entered. The median age of mothers was 26yrs (IQR: 23-34). The majority of mothers of positive infants were married (62%; 66/106), while over half (52%; 55/106) indicated HIV status of their partner was unknown. Few women had a known HIV positive status prior to the current pregnancy (24/106), with 25% (27/106) testing positive in labour and delivery or post-natally, and 19% (20/106) testing positive in antenatal care in the current pregnancy. The majority of mothers of HIV positive children (53%; 56/106) were initiated on ART less than 8 weeks before delivery or post-delivery, had stopped ART, or were never ART initiated. While 76.5% of forms had no standardized maternal HIV transmission risk factor documented (80/106; 75.5%), 6.6% of health care workers indicated maternal mobility as contributing to transmission risk in patient notes.

CONCLUSIONS: We document late HIV diagnosis and limited time on ART among mothers that have transmitted HIV to their infants. Despite significant progress reducing vertical transmission rates in Zimbabwe, our findings underscore the need for enhanced efforts to ensure early diagnosis and treatment of all HIV infected women. Future research should routinely compare mother-infant characteristics of infected infants with HIV-exposed uninfected infants to inform evidence-based interventions to identify and support women at risk to adhere to ART and retain in care throughout the exposure period to achieve EMTCT in high prevalence settings.

WEPED892

Routine evidence for informing eMTCT: Early lessons from case-based investigation of newly diagnosed infants 0-24 months in Zimbabwe

K. Webb¹, V. Chitiyo¹, S. Page-Mtongwiza¹, P. Nesara¹, D. Patel¹, P. Mbetu¹, T. Chinyanga¹, S. Mukungunugwa², A. Mushavi²

¹Organization for Public Health Interventions and Development, Harare, Zimbabwe, ²Ministry of Health and Child Care Zimbabwe, National PMTCT Program, Harare, Zimbabwe

BACKGROUND: On the path to elimination of mother to child transmission (EMTCT), in 2018, Zimbabwe introduced case-reporting for all new HIV infections among children 0-24 months. The FACE HIV Program supported MOHCC with entry and analysis of case reports from public health facilities in 6 provinces of Zimbabwe. Our objective was to document case reporting data from HIV positive infants.

METHODS: Routinely completed paper-based case reporting forms of children testing HIV positive from Jan-Sept 2018 were entered electronically into MS Forms. Anonymised data was abstracted into MS Excel and descriptive analysis with chi-square tests of proportion conducted using StataV13.

RESULTS: A total of 106 HIV positive child case investigation forms were completed and entered. Routine laboratory data indicate coverage of form completion was less than 50%. The majority of newly diagnosed HIV positive infants recorded were male (56%; 60/106), had facility-based delivery (78%; 83/106), and were reported to be exclusively breastfed in the first 6

months (71%; 75/106). Median number of days old at time of HIV diagnosis was 89 days (IQR: 43-317 days). Just over half of HIV positive infants were documented as having received infant prophylaxis (56/106; 52.8%). The majority of infants had documented ART initiation (77%; 85/106), with a significantly greater proportion of boys initiated on ART than girls (54% vs. 46%, p=0.03). Among the 24 infants not initiated on ART, 50% had undocumented outcomes, with most frequent documented reasons being mother did not return to clinic following results receipt, death of infant, and caregiver refusal.

CONCLUSIONS: We documented low coverage and high rates of missing data from retrospective case investigation of HIV positive children. Findings have informed development of national electronic case investigation reporting systems using DHIS2 and standard operating procedures for case investigation form completion at time of results return with quarterly 'match' of all positive laboratory diagnoses with completed case investigation forms for monitoring implementation fidelity. Active follow up of children with unknown outcomes and ensuring all HIV positive children are initiated on sustained ART are required.

WEPED893

Predictors of HIV-exposed infant feeding knowledge and counseling practices among health workers' in a tertiary center in Northern Nigeria

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BACKGROUND: A proportion of infants in sub-Saharan Africa still acquire HIV through inappropriate feeding practices despite evidence-based infant feeding guidelines. Health workers serve as valuable sources of information for HIV-infected mothers in such settings. We set out to identify predictors of HIV-exposed infant feeding knowledge and counseling practices among health workers in a tertiary facility in Kano, Nigeria.

METHODS: A cross section of health workers (n=262) were interviewed using a 24-item structured, pretested survey questionnaire. Knowledge and infant feeding counseling practices were analysed with bivariate methods. Multivariate logistic regression was used to identify independent predictors of knowledge and infant feeding counselling practices in the study sample.

RESULTS: Most (86.6%, n=227) of the respondents were aware of the risk of HIV transmission through breastfeeding. The proportion of respondents with good, fair and poor knowledge of recommended feeding options for HIV-exposed infants were 58.0% (n=152), 36.0% (n=94) and 6.0% (n=16), respectively. The most common feeding options mentioned by respondents were exclusive breastfeeding (57.6%, n=151), and breast milk substitutes (45.4%, n=119). Over half (57.3%, n=150) of the respondents have ever counseled a HIV-positive mother on infant feeding options. Knowledge of feeding options was predicted by respondent's sex (female versus male, Adjusted Odds ratio (AOR) =2.47, 95% Confidence Interval (CI): 1.35-4.52, profession (physician versus laboratory scientist, AOR=4.00, 95%CI: 1.25-12.87), and number of children (1 versus 0, AOR=1.20, 95%CI: 1.11-6.12). Infant feeding counseling practice was independently predicted by respondent's sex (female versus male, AOR=2.85, 95%CI: 1.39-5.85), age (30-39 versus < 30 years, AOR=1.58 95%CI: 1.15-4.85), knowledge of infant feeding options (good versus fair/poor, AOR=3.96, 95%CI: 2.07-7.59), and profession (physician versus laboratory scientist, AOR=10.7, 95%CI: 2.85-40.54).

CONCLUSIONS: Health workers' practice of infant feeding counselling were associated with respondent's sex, profession, and parity. Health workers in this setting require training on HIV-exposed infant feeding.

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WEPED894

Using financial diaries to understand the economic lives of women enrolled in PMTCT in Zomba, Malawi

L. Lorenzetti, M. Swann, A. O'Regan
FHI 360, Durham, United States

BACKGROUND: In Malawi, Option B+ has increased the number of HIV-positive pregnant women and new mothers (PWNM) on antiretroviral therapy (ART). However, attrition from prevention of mother-to-child transmission (PMTCT) services endangers infants and mothers. Economic strengthening (ES) interventions can address structural barriers to PMTCT, but there is limited information on how to tailor ES activities for this population. We used financial diaries (FDs) to understand the economic lives of women in PMTCT to recommend appropriate ES interventions.

METHODS: We collected quantitative FD data from a stratified sample (n=238) of HIV-positive PWNM enrolled in PMTCT from three clinics in Zomba, Malawi. For 30 weeks, participants met weekly with staff to record cash and in-kind inflows and outflows. Women also completed intake and exit surveys, which collected demographic, economic, PMTCT, and social support information. All quantitative data were compiled and summarized using R.

RESULTS: For PWNM in Zomba, daily expenses were small but consistent; inflows came at sporadic intervals but were generally larger. The median number of weekly cash outflows per participant was 10, and the median value for outflow transactions was US\$0.41. The majority (81%) of cash expenses were on food/drink. Of all cash expenditures, 8% were self-reported as PMTCT-related, with most categorized as food/drink. Participants had a median of 1 weekly inflow, and the median value of inflow transactions was US\$3.42. The primary source of cash inflows was gifts (46%), with earnings from work accounting for only one-quarter of cash inflows as the second largest source. Over time, cash outflows remained relatively constant, while cash income began to increase when the rainy season brought more work opportunities.

CONCLUSIONS: PWNM control very small amounts of cash; weekly imbalances of cash inflows to outflows were common. The reliance on gifts rather than economic activity and the high proportion of expenses spent on food indicate a cash-poor population. PMTCT-related costs were a modest portion of total cash outflows but highlight the importance of sufficient quantities of nutritious foods for PMTCT success. PWNM would benefit from ES interventions centered on food support or income generating activities in the agriculture sector.

Financial incentives, micro-finance, and other economic approaches

WEPED895

Exploring the conceptual pathways linking savings group participation to medication adherence in Mozambique

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BACKGROUND: Although the test-and-start strategy increased the number of people living with HIV (PLHIV) initiating antiretroviral therapy (ART) in Mozambique, in 2016 just two-thirds of clients were retained in care after 12 months. Economic strengthening (ES) interventions such as savings groups (SGs) may support medication adherence and retention in care by addressing structural barriers, including transportation costs and food insecurity. However, evidence linking SGs with adherence is sparse.

METHODS: We conducted 13 focus group discussions (FGDs) with n=79 18-49-year-old HIV-positive SG members in Beira and Chimoio to explore whether and how SGs influence ART adherence. Discussions examined participants' experience of seven social and financial conditions: food security, economic security, access to community resources, coping with economic shocks, community acceptance, supportive personal relation-

ships, and future outlook. Discussions then explored: 1) the effect of SGs on these social and financial conditions, if any, and 2) how these conditions affect adherence, if at all. Groups also ranked conditions based on 1) the extent to which they are influenced by SG participation, and 2) the extent to which they influence ART adherence. FGDs were transcribed, translated, and consensus coded by two investigators following the development of an inductive codebook.

RESULTS: Participants spontaneously described SGs as facilitators of one or more conditions in half of FGDs. When asked directly, most groups reported SGs influenced all conditions. The most consistently noted effects were on food, economic security, and future outlook where groups described concrete economic and social pathways of influence. Specifically, SG participation supports business activities, investments in land, and affordability of additional food expenses associated with HIV. SGs also provide emotional support, encouraging optimism and planning for the future. In quantitative rankings, SGs also most strongly affected these three conditions. All groups also described the influence of food, economic security, and future outlook on their ART adherence. Other conditions were less consistently linked to adherence outcomes.

CONCLUSIONS: Results indicate SGs may support better ART adherence in this population by increasing economic security, enhancing food security, and improving future outlook. These conditions were reported to positively influence ART adherence, suggesting they may moderate the pathway from SG participation to adherence.

WEPED896

Preferences for conditional economic incentives to improve adherence to pre-exposure prophylaxis: A discrete choice experiment in Mexico City

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BACKGROUND: Antiretroviral-based interventions are effective in preventing HIV transmission; yet preferences for programs to improve adherence to pre-exposure prophylaxis (PrEP) for HIV prevention among male sex workers (MSWs) have not been investigated. MSWs are at great risk of acquiring HIV, and having high adherence to PrEP is important to achieve protection. Characterizing MSWs' preferences for PrEP is relevant to curb the epidemic in Mexico and other countries with concentrated HIV epidemics. Conditional economic incentives to improve HIV prevention and treatment are generally effective and have not been used to improve adherence to PrEP among MSWs. The aim is to measure preferences for conditional economic incentives (CEIs) to improve adherence to PrEP among MSWs.

METHODS: We conducted a discrete choice experiment (DCE) in Mexico City to collect stated preference data from n=200 self-reported HIV-negative MSWs. Participants were asked to choose between two hypothetical CEI programs to improve PrEP adherence considering four attributes emerged from previous qualitative research:

1. Incentive amount;
2. Incentive format (electronic gift card v. physical food & grocery voucher);
3. Incentive type (fixed incentive v. lottery), and;
4. Verification of adherence (blood test v. hair analysis).

We estimated the willingness-to-accept (WTA) attributes as well as the influence of socioeconomic status through interaction effects.

RESULTS: The respondents' median age was 26 years (range: 18-38). The MSWs were mostly street-based (50%) but also engaged clients through the internet (44%). Most (86%) would be willing to start PrEP if it was offered for free. The incentive amount was the most important attribute. Doubling the offer amount, increased the average probability of accepting the program by 34%. Respondents preferred an electronic gift card (over a physical food & grocery voucher); and they preferred fixed incentives over lotteries: they would be willing to forgo 120 pesos in incentives in order to keep a fixed incentive (instead of a lottery).

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CONCLUSIONS: MSWs are very interested in PrEP, especially if it is provided for free. New and innovative adherence-enhancement programs are needed, including use of incentives. These results from Mexico have clear implications for PrEP programs in Latin America and other settings with concentrated HIV epidemics.

WEPED897

Cost of cash transfer programs applied to HIV: A systematic review

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BACKGROUND: Highly effective strategies to prevent HIV transmission are imperative to reduce the HIV burden. Cash transfer programs (CTP) have been implemented with the aim of preventing and improving retention to the HIV care cascade. The results of these programs on the reduction of HIV transmission are encouraging. However, there is little information on the costs of these programs and policy-makers have not enough information to efficiently allocate resources on CTP. The aim of this work is to summarize available cost data for CTP applied to HIV.

METHODS: We conducted a systematic literature review in Medline, Web of science, Econlit, and gray literature. We included all articles published between January 2008 and May 2018 that evaluated the effects of a CTP on HIV and reported any cost information. The studies were grouped into five categories: HIV prevention (P), testing (T), linkage to care (LC), adherence (A) and viral suppression (VS). Information about population, country, conditional of payment, the incentive offered, and costs were extracted. All costs were standardized to cost per person per year (\$US2018) to compare within and between programs. The economic evaluation of programs was evaluated using the CHEERS checklist.

RESULTS: We identified 688 articles. Of those 54 met the inclusion criteria (P=29, T=12, LC=2, A=4, VS=3, A+VS=4). In total we found 49 different CTP, 69% of these programs were applied in Africa and 12% are focused on key populations. Nine studies were economic evaluations (P=4, T=2, A=2, VS=1) and seven of them were cost-effective. All papers reported at least the value of the incentive offered.

CONCLUSIONS: The information of economic evaluation in CTP is scarce, this makes difficult to compare cost between existing programs. In 82% of the programs, no information about the total costs or cost-effectiveness was found. All articles identified in this review reported the monetary value of the incentive, but this is not representative of the total costs incurred in delivering CTP. This revision provides information to a field that had not been analyzed.

Harm reduction

WEPED898

Stigma, trauma, HIV risk: The closure of a rural syringe services program in West Virginia (USA)

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BACKGROUND: Syringe services program (SSP) utilization is associated with decreases in high-risk injection practices (e.g., syringe sharing) among people who inject drugs (PWID). Although there is a consensus in the literature regarding the public health utility of SSPs, their implementation in rural communities can be challenging due to stigmatization of drug use. These challenges can be exacerbated by policymakers who attempt to undermine public health via the propagation of fear-based messaging in favor of their own political gains, particularly during election years. The purpose of this research is to explore the experiences of rural PWID surrounding the closure of the SSP at the Kanawha-Charleston Health Department (KCHD) in Charleston, West Virginia (USA).

METHODS: We conducted semi-structured interviews with 27 PWID (59% male, 88% non-Hispanic white) to understand their experiences surrounding the closure of the KCHD SSP. Participants were recruited from street locations frequented by PWID. Interviews were audio-recorded and transcribed verbatim. We employed thematic content analysis to systematically code and synthesize textual interview data.

RESULTS: Participants perceived the KCHD SSP as closing with little warning and primarily due to stigma. Reasons for the closure were described in terms of the community fundamentally not understanding the purpose of the SSP and community dislike for PWID. Participants reported experiencing a range of traumatic events and adverse community-level responses to injection drug use, including being photographed for a local Facebook group that shames PWID and homeless individuals. Because of these traumas, PWID described living in a general state of despair and feeling that their community turned their backs when they most needed help. In addition, participants reported feeling apathetic toward their personal health and discouraged from attempting to access services.

CONCLUSIONS: When politicians turn evidence-based public health programs into political footballs, the most vulnerable suffer. The closure of the KCHD SSP ushered in an era of stigma and dislike for PWID, leading to increases in community-level risks for an HIV outbreak. PWID described experiencing a multiplicity of traumatic events that were driven by stigma. There is an urgent need for policymakers to support harm reduction initiatives and efforts to destigmatize addiction.

Access to appropriate healthcare services, including for co-infections and co-morbidities

WEPED900

Civil unrest and late entry into HIV care and impact on HIV-related mortality, Juba Teaching Hospital, South Sudan 2013 - 2018

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BACKGROUND: Worldwide, a high proportion of HIV-infected individuals enter into HIV care late, particularly in low-income countries affected by armed conflict and civil unrest. This paper aimed to quantify the impact that late diagnoses and entry to care and treatment had on HIV-related mortality in South Sudan.

METHODS: We conducted a retrospective review of outpatient records at the Juba Teaching Hospital HIV/AIDS clinic. Inclusion criteria were patients with lab-confirmed HIV diagnosed between May 2013 and August 2016. Those included in the study were classified as early (CD4 >350, WHO stage <2) or late (CD4 <350, WHO stage >2) entry to care and treatment. Data were entered into MS-Excel, and descriptive and associative statistics were calculated with MS-Excel and Open-Epi software.

RESULTS: A total of 401 clients were included in the study, with mean age of 33.71±4.54 years, 59% female, 307 (77%) diagnosed at late-stage of infection, and 57 (14%) died within the study period. A total of 65 (16%) were lost to follow-up. Among clients who died, 33 (58%) were male, 52(91%) had CD4 counts <350 T cells and WHO stages 3 to 4 at diagnosis and initiation of antiretroviral therapy. Late entry to care was significantly (p<0.01) associated with death during the study period (OR=4.18; 95% CI 1.6-10.85). The etiologic fraction analysis showed that earlier diagnosis and initiation of care and treatment reduced the odds of HIV-related death within 12 months of diagnosis by 76%.

CONCLUSIONS: Early entry to care and treatment has a tremendous impact on survival. Strengthening program activities (e.g., provider-initiated testing), Mobile HIV and TB treatment centers and viral load test for screening the positives to treatment also impact survival and spread of disease. Destruction of health faculties providing HIV care and drop-outs from care are challenges that facilitate late entry to care in conflict zones.

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WEPED901

Challenges in access and quality of care for HCV in Ukrainian women's prisonsS. Leontieva¹, B. Scherbak-Verlan¹, K. Gamazina¹, E. Rowley², S. Vasyliov³, O. Shved⁴¹PATH, Ukraine Country Program, Kyiv, Ukraine, ²PATH, Washington, DC, United States, ³Center of Health Care, State Criminal Executive Service of Ukraine, Kyiv, Ukraine, ⁴Gender Consultant, PATH Ukraine Country Program, Kyiv, Ukraine**BACKGROUND:** The hepatitis C virus (HCV) is a blood-borne infection affecting an estimated 184 million people globally. The Ministry of Health of Ukraine estimates two million Ukrainians are HCV-positive. HCV/HIV coinfection is particularly high among individuals with a history of intravenous drug use.

A study of 2,050 HIV-positive childbearing women in Ukraine (2016) found 33% were HCV co-infected, of whom 79% had an IDU history. In 2018, PATH conducted an assessment through the USAID Serving Life project to assess female prisoners' access to HIV, TB, and HCV-related medical services.

METHODS: PATH conducted 45 in-depth interviews with female inmates and prison staff in three female prisons in Poltavaska, Cherkaska, and Chernihivska oblasts in Ukraine. The assessment consisted of two questionnaires with semi-structured questions for prison staff and female prisoners. Interview feedback was reviewed thematically and synthesized across the areas of health education and awareness, access to services, confidentiality and stigma, post-release planning, and other related services for female prisoners.**RESULTS:** While female prisoners had sufficient knowledge about HIV and TB, and ample access to medical services for these diseases, few had knowledge about HCV in general. HCV testing is available in one of the three prison colonies included in the assessment, and only through an NGO providing supportive services to the female prisoners. Testing is occasionally available when the NGO has adequate supplies. Only those respondents with a confirmed HCV diagnosis knew that medical care and treatment for HCV exists. Those women enrolled on non-specific treatment provided by the NGO stated that they were receiving glutargin, antral, seligor, hepabene, as well as nutrition and diet advice.**CONCLUSIONS:** In Ukrainian female prisons included in the assessment, inmates with HIV and TB receive adequate diagnosis and treatment. However, access to HCV diagnosis and treatment is limited, inconsistent or not available. In addition to the existing efforts around HIV and TB, there is a need to expand HCV testing and treatment options in these facilities and incorporate modern and innovative approaches to providing informational and educational materials to both prison staff and prisoners to receive information on HCV.

mental healthcare services received by people evaluated with people that did not receive baseline psychological evaluation due to administrative reasons.

RESULTS: We included 160 patients enrolled in care of whom 113 (71%) were evaluated by a psychologist at the clinic. Evaluated patients were younger (Median=31.3 vs. 32.8, $p=.02$), with lower education (Median=13y vs.16y $p=.03$) and more frequently naive to treatment (70.2% vs. 43.9% $p<.01$) when compared to their counterparts. Most frequent psychological symptoms were anxiety (41%), sadness (38%) and uncertainty (36%). Most frequent psychiatric symptoms were sleep disturbances (40%), fatigue (33%), loss/increased appetite (23%). Twenty-two (19%) patients expressed suicide-related symptoms. Sixty-two (55%) evaluated patients were referred to CBT but only 34 (55%) received some BCT intervention. Forty-one (36%) were referred to psychiatry but only 9 (22%) went to the psychiatry visit. Among the 47 not evaluated, only 3 (6.4%) received CBT and 4 (8.5%) psychiatric consultations after referrals by their attending physicians.**CONCLUSIONS:** A high-proportion of PLWHIV in this third-care level hospital in Mexico City have unmet health care needs that are rarely identified during routine HIV care. Systematic psychological evaluations with brief screening tools offered to all patients receiving care for HIV would contribute to identify the healthcare needs in this population. A better integration of mental healthcare services in HIV clinics may increase assistance to mental healthcare services.Tuesday
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WEPED902

Mental health systematic evaluation in newly enrolled adults into a third-care level HIV clinic in Mexico City reveals a very high frequency of mental health care needsJ. Mejía-Castrejón, E. Barlandas-Quintana, B. Crabtree-Ramírez, Y.N. Caro-Vega, P.F. Belaunzarán-Zamudio, J.G. Sierra-Madero
*Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán, Clínica de Inmunoinfectología, Mexico City, Mexico***BACKGROUND:** People living with HIV (PLWHIV) have an increased risk of psychiatric disorders and substance abuse. Provision of HIV healthcare *should* include mental healthcare services; nonetheless, little is known about mental healthcare needs in PLWHIV in Mexico.**METHODS:** Observational, retrospective, cross-sectional analysis. Adult PLWHIV enrolled in care between Apr/2013-Nov/2015 were systematically offered psychological evaluation using a brief checklist designed to assess 8 psychological and 9 psychiatric symptoms. Patients with ≥ 2 symptoms, 1 suicidality symptom or 1 symptom affecting any sphere of life were referred to cognitive-behavioral therapy (CBT), psychiatry consultation or both, as needed. We measured the frequency of need of referral to CBT and psychiatry, and assistance to these referrals. We compared

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Oral Abstract Sessions

MOAD04 Big, bold and effective: Multi-level strategies that work

MOADO405LB

Improving uptake for VMMC in traditional initiation settings

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BACKGROUND: Traditional male circumcision as a rite of passage is seen as critically important in some cultures in South Africa. It marks the right of passage from adolescence to manhood and occurs at ages between 15 and 20 years of age depending on the cultural group involved.

The study aimed at increasing the number of adolescent boys over a two year period who underwent initiation school training but opted to be circumcised by qualified medical practitioners and nurses to ensure the full removal of the foreskin as a HIV prevention measure.

METHODS: The research was conducted on behalf of the National Department of Health (NDoH) by the Clinton Health Access Initiative (CHA) and engaged accredited PEPFAR funded partners to offer circumcision services in collaboration with local chiefs, Traditional Leadership authorities and local traditional Fora representing medical professions within the traditional leadership. Data were collected and verified in accordance with national proscribed standards in Nkangala district where there were known to be initiation cycles taking place amongst adolescent males. Data focussed on the number of initiates in traditional camps and the number of initiates circumcised per year.

RESULTS: Numbers were compared against agreed PEPFAR targets for each district over a two year period Financial years 2017 -18 and 2018 -19. The 2016 -17 financial year was used as a baseline to show the expansion in uptake of service.

Generally, initiation camps occur on a four year cycle and there were expectations that the numbers would decrease in a non initiation cycle year but instead have continued to climb.

Year	Annual Target	Annual Performance	Initiation Campaign Target	Initiation Campaign Performance
2016 - 17 (baseline)	30,852	6,188	0	3,472
2017 - 18	28,649	44,508	13,697	19,964
2018 -19	26,445	43,362	7,645	39,777

[MMC undertaken in traditional initiation sites in Nkangala District]

CONCLUSIONS: Integration of traditional initiation and MMC techniques is possible.

Engagement of traditional and cultural leadership and gender sensitive medical staff is key to a successful sustained MMC programme based in traditional initiation schools.

There is potential to increase uptake of MMC overall in districts outside of the traditional initiation time cycles.

The provision of data collection teams that feed into the NDoH systems in initiation schools is key to monitoring and evaluating effective programmes.

WEAX01 IAS 2019 Co-chairs' choice

MOAX0101LB

HPTN 078: primary results of a randomized study to engage men who have sex with men (MSM) living with HIV who are virally unsuppressed in the US

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BACKGROUND: HIV infection in the United States (US) is increasingly concentrated among men who have sex with men (MSM), particularly MSM of color. To achieve the goals of "Ending the HIV Epidemic: A Plan for America," everyone living with HIV, including MSM, must be identified, linked to care and supported so that they achieve and maintain viral suppression for their own health and to prevent onward HIV transmission.

METHODS: MSM who were living with HIV and virally unsuppressed were recruited in four US cities (Birmingham, AL, Atlanta, GA, Baltimore, MD, and Boston, MA) and were randomized to either an enhanced case management (CM) intervention or standard of care (SOC). The CM intervention had three components: access to a CM and referral services, counseling using motivational interviewing techniques, and automated adherence and motivational messaging. Critically, participants determined intervention intensity by choosing frequency and content of CM interactions and automated messaging. Viral suppression (< 200 copies/mL) across arms was compared at Month 12 using logistic regression. Those who did not provide a 12-month sample (aside from deaths) were treated as unsuppressed.

RESULTS: 1305 MSM were screened; 154 were living with HIV and unsuppressed; 144 were enrolled. 91% were retained at Month 12. The enrolled cohort was 84% Black, 7% Latinx and the average age was 39. Most were educated (90%≥ high school diploma), but not employed (67%), with an income below \$20,000 (64%). 81% had health insurance. The majority (86%) were ART experienced by self-report. At baseline, the median viral load was 19,459 copies/mL, and at Month 12, 48% were virally suppressed, with no difference between the CM and SOC arms [OR = 0.615 [p = 0.1526, 95% CI = 0.315, 1.197]].

CONCLUSIONS: HPTN 078 demonstrated that MSM living with HIV, but out of care, are willing to re-engage when reached, with nearly half achieving and maintaining viral suppression at 12 months. The CM intervention did not, however, enhance viral suppression; half of the men, overall, were not virally suppressed at 12 months. Greater investment for more intensive interventions is likely needed to address the multiple societal and behavioral challenges among disenfranchised MSM in the US.

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MOAX0102LB

Progressive rises in weight and clinical obesity for TAF/FTC/DTG and TDF/FTC/DTG versus TDF/FTC/EFV: ADVANCE and NAMSAL trialsA. Hill¹, W.F. Venter², E. Delaporte³, S. Sokhela², C. Kouanfack⁴, M. Moorhouse², K. McCann⁵, B. Simmons⁵, A. Calmy⁶¹University of Liverpool, Translational Medicine, Liverpool, United Kingdom, ²University of Witwatersrand, Health Sciences, Johannesburg, South Africa, ³INSERM, University of Montpellier, Montpellier, France, ⁴Hôpital Central de Yaoundé, Hôpital Militaire, Site ANRS, Yaoundé, Cameroon, ⁵Imperial College, Faculty of Medicine, London, United Kingdom, ⁶University Hospital and University Geneva, Geneva, Switzerland**BACKGROUND:** In previous clinical trials and cohort studies, dolutegravir (DTG) has been associated with rises in body weight and clinical obesity. These effects have been most pronounced in black people and women; the use of tenofovir disoproxil fumarate (TDF) is associated with lower body weight, compared to tenofovir alafenamide (TAF), abacavir or NRTI sparing treatment.**METHODS:** In the 96 week NAMSAL trial, 613 treatment naive patients in Cameroun were randomised to TDF/3TC/DTG or TDF/3TC/EFV. Body weight was measured at baseline and Week 48. In the 96-week ADVANCE trial, 1053 treatment naive patients in South Africa were randomised to TAF/FTC/DTG, TDF/FTC/DTG or TDF/FTC/EFV. Body weight was measured at baseline and every 12 weeks; DEXA scans evaluated limb and trunk fat at baseline, Week 48 and Week 96. For both trials, changes in body weight, Body Mass Index (BMI), and trunk fat (ADVANCE only) were compared between treatments.**RESULTS:** In the NAMSAL trial, mean weight rose +7.3% for TDF/3TC/DTG versus +5.3% for TDF/3TC/EFV ($p < 0.001$); treatment-emergent clinical obesity (BMI > 30 kg/m²) was recorded for 12% on TDF/3TC/DTG versus 5% for TDF/3TC/EFV ($p = 0.004$). BMI rose +1.7 kg/m² for TDF/3TC/DTG versus +1.2 kg/m² for TDF/3TC/EFV. In ADVANCE (Results in Table), there were progressive, linear rises in body weight to Week 96 for women treated with TAF/FTC/DTG and TDF/FTC/DTG (Table 1); in men, mean body weight rose in the DTG arms to Week 48 and then stabilised to Week 96. Trunk fat also rose significantly in the TAF/FTC/DTG arm of ADVANCE.**CONCLUSIONS:** In the NAMSAL and ADVANCE trials first-line DTG is associated with rises in body weight, clinical obesity and increased trunk fat. These rises are higher if used in combination with TAF/FTC. Rises in body weight on TAF/FTC/DTG are progressive: longer-term follow up and re-analysis of other studies is required to evaluate clinical consequences.

Treatment arm	TAF/FTC/DTG	TDF/FTC/DTG	TDF/FTC/EFV
Change in weight, men to Wk 48 (96)	+5kg (+5kg)	+3kg (+4kg)	+1kg (-2kg)
Change in weight, women to Wk 48 (96)	+6kg (+10kg)	+3kg (+5kg)	+2kg (+3kg)
Clinical obesity, men, by Wk 48 (96)	+8% (0%)	+3% (0%)	+4% (0%)
Clinical obesity, women, by Wk 48 (96)	+20% (23%)	+10% (16%)	+7% (5%)
% Change in weight, men, to Wk 48 (96)	+7% (+7%)	+5% (+7%)	+1% (-2%)
% Change in weight, women, to Wk 48 (96)	+10% (+16%)	+5% (+9%)	+3% (+5%)
Change in Trunk fat, men, to Wk 48 (96)	+0.2kg (+0.2kg)	-0.3kg (-0.2kg)	-0.5kg (-1.2kg)
Change in Trunk fat, women, to Wk 48 (96)	+1.7kg (+1.6kg)	+0.5kg (+1.1kg)	0kg (-0.7kg)

[ADVANCE trial - changes in weight, clinical obesity and trunk fat at Week 48 (96)]

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MOAX0103LB

Comparison of pregnancy incidence among African women in a randomized trial of intramuscular depot medroxyprogesterone acetate (DMPA-IM), the levonorgestrel (LNG) implant, and the copper intrauterine device (IUD)M. Onono¹, K. Nanda², K. Heller³, D. Taylor², P. Gichangi⁴, R. Heffron³, M. Kasaro⁵, C. Louw⁶, C. Morrison², N. Mugo⁷, Z. Nhlabatsi⁸, J. Smit⁹, I. Wakhungu¹, I. Yakobson², J. Baeten³, on behalf of the ECHO Trial team ¹Kenya Medical Research Institute, Center for Microbiology Research, Kargeno Research and Policy Hub, Kisumu, Kenya, ²FHI360, Durham, United States, ³University of Washington, Seattle, United States, ⁴Technical University of Mombasa, Mombasa, Kenya, ⁵University of North Carolina Kamwala, Kamwala, Zambia, ⁶Madibeng Centre for Research, Madibeng, South Africa, ⁷Kenya Medical Research Institute, Center for Clinical Research, Nairobi, Kenya, ⁸Family Life Association of Eswatini, Manzini, Eswatini, ⁹MatCH Research Unit (MRU), University of the Witwatersrand, Johannesburg, South Africa**BACKGROUND:** Sub-Saharan Africa is disproportionately affected by high rates of unintended pregnancy. Contraceptive method failure is an important contributor to unintended pregnancy. Few data are available that compare pregnancy rates among different long acting contraceptive methods.**METHODS:** We analyzed data from the ECHO Trial, which assessed HIV incidence among 7829 women from 12 sites in Kenya, the Kingdom of Eswatini, South Africa, and Zambia who were seeking effective contraception and consented to be randomized to DMPA-IM, LNG implant, or copper IUD. Cox proportional hazards regression adjusted for condom use during last vaginal sex was used to compare pregnancy incidence during both perfect use (from initiation of method until first discontinuation for any reason) and typical use (from initiation of method until decline or change to a different contraceptive method). Cumulative pregnancy probabilities at 12-months were estimated using Kaplan-Meier methods.**RESULTS:** 7710 women contributed to this analysis. 70 pregnancies occurred during perfect use and 85 during typical use. Perfect use pregnancy incidence rates were 0.61 per 100 woman-years (wy) for DMPA-IM (95% CI 0.36-0.96), 1.06 for copper IUD (95% CI 0.72-1.50), and 0.63 for LNG implants (95% CI 0.39-0.96), with 12-month cumulative probabilities of 0.62% (95% CI 0.37-1.03), 1.09% (95% CI 0.73-1.64), and 0.64% (95% CI 0.39-1.04), respectively. Typical use incidence rates were 0.87 per 100wy for DMPA-IM (95% CI 0.58-1.25), 1.11 for copper IUD (95% CI 0.77-1.54), and 0.63 for LNG implants (95% CI 0.39-0.96) with 12-month cumulative probabilities of 0.90% (95% CI 0.59-1.36), 1.05% (95% CI 0.71-1.57), and 0.64% (95% CI 0.39-1.04), respectively. Typical use of copper IUD was associated with statistically significant higher risk of pregnancy compared to LNG implants (aHR 1.74; 95% CI 1.01-2.99).**CONCLUSIONS:** In a randomized contraceptive trial of African women, both perfect and typical use of all contraceptive methods resulted in low pregnancy rates. Although we found that women using copper IUD had somewhat higher pregnancy rates than those using LNG implants, our findings provide strong justification to improve access to a range of contraceptive options including LNG implants and copper IUD for African women.Wednesday
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MOAX0104LB

No occurrences of neural tube defects among 382 women on dolutegravir at pregnancy conception in Brazil

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BACKGROUND: In May 2018, a potential risk of neural tube defects (NTD) in infants born to HIV-positive women exposed to dolutegravir (DTG) at pregnancy conception was announced. With widespread availability of DTG since 2016, Brazilian public health leaders initiated a national evaluation of birth outcomes of women exposed to DTG at conception.

METHODS: Women who became pregnant while on ART containing DTG, efavirenz (EFV), or raltegravir (RAL) within +/- 8 weeks from estimated date of conception (EDC) between January 2015 and May 2018 were identified using the Brazilian ART database. Every woman with DTG exposure and three women receiving EFV-based antiretroviral therapy (ART) from similar locations were investigated. Trained personnel systematically collected demographic, medical, obstetric, radiographic, laboratory, and birth outcome data. The primary outcome was the occurrence of NTD; 95% Wilson confidence intervals (CI) were calculated. Characteristics at EDC and during antenatal care were evaluated.

RESULTS: Overall, 1468 women were included, of which 382 were DTG-exposed and 1086 EFV- and/or RAL-exposed. At conception, DTG-exposed women were slightly younger, more recently diagnosed with HIV, had lower CD4 cell counts, and were less likely to have virological suppression. During pregnancy, 48 and 45% of DTG-exposed and -unexposed women, respectively, received folic acid supplementation. Prenatal syphilis occurred in 11% of DTG-exposed women (vs. 6% in unexposed, $p < 0.01$) and gestational hypertension occurred in 7% (vs. 3%, $p < 0.01$). There were a total of 1493 birth outcomes (Table 1). There were no NTD in either exposure group [0 [95%CI 0, 0.0099] in DTG-exposed and 0 [95%CI 0, 0.003] in DTG-unexposed]. Twenty-five (6.5%) and 48 (4.3%) stillbirths/abortions occurred among DTG-exposed and -unexposed fetuses, respectively ($p=0.09$).

CONCLUSIONS: DTG-exposure was not associated with NTD in our cohort; the incidence of NTD is likely well under 1% among DTG-exposed HIV-positive women in Brazil. Ongoing pharmacovigilance of pregnancy outcomes from diverse settings is necessary for clarification of NTD risk associated with DTG.

	DTG exposed N=384	DTG unexposed N=1109	p value
Birth outcome, N (%)			0.01
- live birth	359 (93.5)	1061 (95.7)	
- stillbirth	2 (0.5)	16 (1.4)	
- abortion	23 (6.0)	32 (2.9)	
Neural tube defects	0 (0)	0 (0)	NA
Gestational age in weeks, median (IQR)	39 (38-39)	39 (38-39)	0.91
Birth weight in grams	3011 (2745-3310)	3050 (2741-3360)	0.39

[Table 1- Birth outcomes by DTG exposure at conception]

MOAX0105LB

Neural tube defects by antiretroviral and HIV exposure in the Tsepamo Study, Botswana

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BACKGROUND: We previously reported a preliminary safety signal associating dolutegravir exposure from conception and neural tube defects (NTDs), impacting antiretroviral choices for women of reproductive potential. Planned analysis of NTDs with data collected through March 2019 in the Tsepamo Study is now reported

METHODS: We conducted birth outcomes surveillance at 8 government hospitals throughout Botswana from 2014-2018, expanding to 18 hospitals in 2018-2019. Trained midwives performed surface examinations of all live births and stillbirths and described abnormalities. Research assistants photographed major abnormalities after maternal consent, which were reviewed by a birth defects expert blinded to exposures. Prevalence of NTDs and major structural defects detectable by surface exam were determined by maternal HIV and antiretroviral exposure status (95%CI by Wilson method). The primary analysis evaluated prevalence differences by exposure status (95%CI by Newcombe method).

RESULTS: From August 2014 through March 2019, 119,477 deliveries were captured in surveillance; 119,033 (99.6%) had an evaluable infant surface exam, with 98 (0.08%, 95%CI 0.07%, 0.10%) NTDs identified (60 with photo, 38 by description only). Among women on dolutegravir from conception, 5/1684 NTDs occurred (0.30%; 95%CI 0.13%, 0.69%); 2 myelomeningoceles, 1 anencephaly, 1 encephalocele, and 1 iniencephaly. In comparison, NTDs occurred in 15/14,792 (0.10%; 95%CI 0.06%, 0.17%) women delivering on any non-dolutegravir antiretrovirals from conception, 3/7959 (0.04%; 95%CI 0.01%, 0.11%) on efavirenz from conception, 1/3,839 (0.03%; 95%CI 0%, 0.15%) on dolutegravir started in pregnancy, 70/89,372 (0.08%; 95%CI 0.06%, 0.10%) HIV-uninfected women. NTD prevalence differed significantly between dolutegravir and any non-dolutegravir antiretrovirals from conception (0.20% difference; 95%CI 0.01%, 0.59%), and for all other comparisons with dolutegravir (Table). Major structural defects were observed in 0.95% (95%CI 0.59, 1.54) of DTG-conception exposures and 0.68% (95%CI 0.56, 0.83) of non-dolutegravir exposures from conception (0.27% difference; 95%CI -0.13, 0.87).

CONCLUSIONS: NTDs occurred in 3 per 1000 deliveries among women on dolutegravir from conception, a small but significant increase compared with all other antiretroviral exposures. Ongoing NTD surveillance in the Tsepamo Study is planned.

Exposure Group Comparisons	% Prevalence Difference (95% CI)
DTG at conception vs. Non-DTG at conception	0.20% (0.01%, 0.59%)
DTG at conception vs. EFV at conception	0.26% (0.07%, 0.66%)
DTG at conception vs. DTG started in pregnancy	0.27% (0.06%, 0.67%)
DTG at conception vs. non-DTG started in pregnancy	0.25% (0.05%, 0.64%)
DTG at conception vs. HIV-uninfected	0.22% (0.05%, 0.61%)

[Table. Differences in Neural Tube Defect Prevalence by HIV- and ART-exposure status]

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MOAX0106LB

Addressing the safety signal with dolutegravir use at conception: Additional surveillance data from Botswana

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BACKGROUND: In May 2018, the Botswana Tsepamo study reported a higher rate of neural tube defects (NTDs) among infants of women who were using dolutegravir (DTG)-based antiretroviral treatment (ART) regimens at conception. The Botswana Ministry of Health and Wellness (MoHW) expanded NTD outcome surveillance in health facilities not covered by the Tsepamo study to capture additional pregnancies that were exposed to DTG at the time of conception.

METHODS: Data on all deliveries (live births and stillbirths) at 22 facilities were collected from October 2018-March 2019 including maternal HIV status, exposure to ART at conception, and infant birth outcomes. Potential NTDs were identified by midwives before infant discharge from the facility and suspected NTDs were reviewed and classified by a clinical geneticist who was blinded to HIV and ART exposure status.

RESULTS: The surveillance system captured of 3076 pregnancies. Of these, 76% (n=2328) pregnancies were among HIV-negative women, 24% (n=742) among HIV-positive women, and < 1% (n=6) among women with unknown HIV status. At conception, the majority (73%, n=544) of HIV-positive women were on ART; of these 28% (n=152) were on DTG. (Table 1).

HIV Status	Number	%
Negative	2328	76%
Unknown	6	< 1%
Positive	742	24%
On ART at conception		
Yes	544	73%
No	176	24%
Unknown	22	3%
ART regimen at conception		
DTG	152	28%
Non-DTG (EFV)	381	70%
(Non-EFV)	(261)	(69%)
Unknown	(120)	(31%)
Unknown	11	2%

[Table 1. HIV status of the study population (n=3076)]

	Exposure category			
	DTG	Any non-DTG ART	EFV	HIV negative
Number of NTDs	1	0	0	2
Number of Pregnancies	152	381	261	2328
% with NTD (95% CI)	0.66% (0.02%, 3.69%)	0% (0%, 0.79%)	0% (0%, 1.15%)	0.09% (0.1%, 0.31%)
Prevalence difference (95% CI)	ref	-0.66% (-0.73%, 4.16%)	-0.66% (-1.25%, 4.16%)	-0.57% (-0.10%, 4.10%)

[Table 2. Neural tube defect (NTD) prevalence difference by maternal antiretroviral treatment (ART) exposure at conception]

Six suspected NTDs were identified. Of these, one NTD was confirmed, two were classified as not NTDs, two as "probably NTDs", and one as a "possible NTD". Three NTDs were included in the final analysis (1 confirmed, 2 probable). One of these NTDs occurred among the 152 DTG-exposed HIV-positive mothers for a prevalence of 0.66% [95% CI 0.02% - 3.69%; Table 2]. The other two NTDs occurred in the 2328 HIV-negative mothers for a prevalence of 0.09% [95% CI 0.01% - 0.31%].

CONCLUSIONS: Our findings suggest an increased birth prevalence of NTDs among infants born to HIV-positive mothers on DTG at the time of conception when compared to infants born to HIV-negative mothers, which is consistent with previous findings from the Tsepamo study.

The number of observed pregnancies in this study alone is too small to reliably detect differences in NTD prevalences that might exist. As such, these findings should be considered in combination with data from other studies to better assess any differential risks of NTDs associated with DTG.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

MOSY01 We're engaged! Strategies for enhancing community-researcher relationships

MOSY0105LB

Community-led delivery of HIV self-testing targeting adolescents and men in rural Malawi: a cluster-randomised trial

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BACKGROUND: Community-led interventions using participatory methods can ideally provide better outcomes at lower costs than conventional approaches. We conducted a cluster-randomised trial evaluating community-led HIV self-testing (HIVST).

METHODS: Thirty village-head catchment areas in rural Mangochi, Malawi were randomised to community-led HIVST or standard of care (SOC), including periodic community-based testing. Participatory workshops and trainings supported planning and implementation of 7-day HIVST campaigns by village health committees (VHC) and community volunteers. Volunteers receiving standardised gratuity (US\$10) distributed HIVST kits, provided HIV prevention information and supported linkage to routine services.

The primary outcome was lifetime testing in adolescents (15-19 years). Secondary outcomes included recent testing (last 3 months) in men and older adults (≥40 years), mutual knowledge of status within sexual partners, knowledge of prevention methods, and antiretroviral therapy initiation (ongoing). Analysis compared cluster-level outcomes by arm measured through post-intervention surveys.

RESULTS: From October 2018-January 2019, 15 VHCs oversaw distribution by 188 volunteers of 24,347 kits. Post-intervention surveys showed 74.4% of HIVST arm participants reporting self-testing, with 2.3% testing positive and 0.39% pressured to self-test.

Lifetime testing in adolescents was 84.6% versus 67.1% in HIVST and SOC arm (adjusted risk ratio [aRR] 1.25, 95%CI 1.10-1.43), with differences greatest for younger ages and males (Table).

	Community-led HIVST arm % (n/N)	Standard of care arm % (n/N)	Risk difference (95% CI), p-value	Risk ratio (95% CI), p-value	Adjusted risk ratio (95% CI), p-value
Total population surveyed	3974/30371 adults in 15 clusters	3906/25580 adults in 15 clusters			
Primary outcome: Adolescents 15-19 years ever tested	84.6% (773/914)	67.1% (579/863)	16.4% (7.8-25.0%), <0.001	1.26 (1.11-1.43), <0.001	1.25 (1.10-1.43), 0.001
Stratified by age: 15-17 years	79.8% (320/401)	57.2% (219/383)	22.3% (9.6-35.1%), 0.001	1.46 (1.15-1.86), 0.003	1.45 (1.14-1.85), 0.004
18-19 years	88.3% (453/513)	75.0% (360/480)	11.7% (4.5-18.9%), 0.002	1.16 (1.06-1.27), 0.002	1.16 (1.05-1.27), 0.004
Stratified by sex: Males	79.7% (310/389)	57.3% (217/379)	22.6% (12.1-33.1%), <0.001	1.42 (1.19-1.68), <0.001	1.40 (1.18-1.67), <0.001
Females	88.2% (463/525)	74.8% (362/484)	11.9% (2.8-21.0%), 0.01	1.18 (1.04-1.33), 0.01	1.18 (1.03-1.33), 0.01
Secondary outcome: Males tested in last 3 months	74.5% (1180/1584)	33.9% (504/1488)	40.7% (33.1-48.4%), <0.001	2.22 (1.92-2.56), <0.001	2.21 (1.92-2.55), <0.001
Secondary outcome: Adults ≥40 years tested in last 3 months	74.2% (871/1174)	31.6% (348/1103)	42.0% (34.5-49.5%), <0.001	2.36 (1.99-2.80), <0.001	2.37 (2.00-2.80), <0.001

Adjusted for sex, age, education level and marital status. P-value for interaction by age group: 0.02. P-value for interaction by sex: 0.01.

[HIV testing coverage by study arm]

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A higher proportion of males reported recent testing in the HIVST than SOC arm (74.5% versus 33.9%, aRR 2.21, 95%CI 1.92-2.55), with similar effects among older adults (74.2% versus 31.6%, aRR 2.37, 95%CI 2.00-2.80). Knowledge of status within couples was higher in the HIVST than SOC arm (71.3% versus 56.9%, aRR 1.24, 95%CI 1.08-1.42), but prevention knowledge did not differ.

CONCLUSIONS: Community-led HIVST following participatory workshops and brief didactic training achieved high HIVST uptake, reaching more adolescents, men, older adults and couples and with minimal harm. Testing coverage was greater than recent community-based HIVST models, supporting community-led approaches as highly promising.

TUAA02 50 shades of reservoirs

TUAA0205LB

Contribution of naïve CD4+ T cells to the intact HIV reservoir

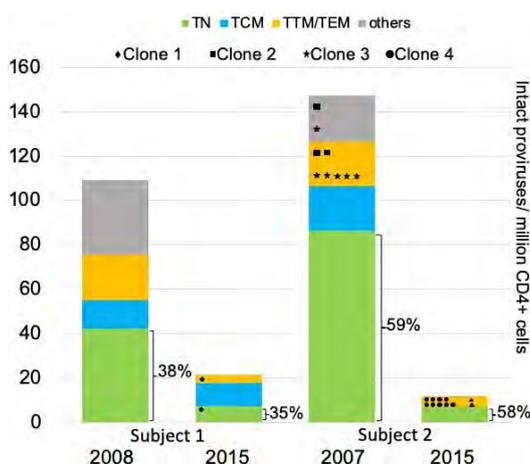
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BACKGROUND: Recent findings suggest that naïve CD4+ T cells (TN) may contain a significant amount of replication-competent HIV DNA. We studied the contribution of different CD4+ T-cell subsets to the reservoir in 2 male Caucasian subjects on ART at ~2 and 9 years after ART initiation, both virologically suppressed at the time of the donations.

METHODS: We sorted T CD4+ subsets from CD3+CD8- PBMCs, defined as follows: naïve (CD45RA+, CCR7+, CD27+), central memory (CD45RA-, CCR7+, CD27+), transitional memory (CD45RA-, CCR7-, CD27+), and effector memory (CD45RA-, CCR7-, CD27-). We measured total HIV DNA and sequenced 890 and 513 near full-length proviruses for Subject 1 and 2, respectively.

RESULTS: Among the subsets TN showed the highest percentage of intact proviruses. The contribution of TN to the intact reservoir was stable overtime, representing 38.5 and 34.7% for Subject 1 and 58.7 and 58.3% for Subject 2 at the two timepoints. The intact proviral sequences appeared to be mostly unique in TN while mostly clonal in effector memory cells (Figure 1).



[Figure 1. Genetic evidence that naïve T cells contribute significantly to the replication competent reservoir a) The number of intact proviruses per million CD4+ T cells for both subjects was determined after two years on suppressive ART. By sorting PBMCs into naïve (green), central memory (blue), transitional and effector memory (yellow) and other subsets (gray), the number of intact proviruses in all the subsets were determined, Naïve T cells was a major contributor to the intact reservoir and the contribution was stable overtime.

Abbreviations: TN, Naïve CD4+ T cells; TCM, central memory CD4+ T cells]

CONCLUSIONS: TN appear to contribute significantly to the intact reservoir in two subjects followed on ART for nearly one decade. After reducing the clones, even a greater fraction of the reservoir was harbored in TN. Given their long half-life and lower metabolic activity, the TN reservoir may represent a unique hurdle to HIV eradication.

A limitation of our study is that the sorted TN population is a mixture of naïve, stem cell memory and T cells that have divided. In our opinion to sequence two individuals deeply at two time points provided us a better understanding of reservoir dynamics within subsets. Moreover, these individuals represent a spectrum of HIV infection.

Subject 1 is a slow progressor with only CCR5-tropic proviruses while Subject 2 is a rapid progressor with a majority of CXCR4-tropic proviruses.

TUAC02 Upping the ante: Prevention for impact

TUAC0205LB

Sitakhela Likusasa Impact Evaluation: results of a cluster randomized control trial (cRCT) of financial incentives for HIV prevention among adolescent girls and young women (AGYW) in Eswatini

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BACKGROUND: Eswatini still has the highest HIV prevalence globally, and very high HIV incidence among AGYW. Cash transfers linked to school attendance were protective against HIV (Baird et al. 2012), but subsequent studies have not shown impact on HIV incidence (Karim et al. 2015; Pettifor et al. 2016).

METHODS: From Nov2015 to April2016, the Sitakhela Likusasa Impact Evaluation enrolled 4389 HIV-negative AGYW aged 15-22 -- 50% of whom were not in education -- in a cRCT of periodic financial incentives for HIV prevention, with HIV incidence as the main outcome.

Using a 2x2 factorial design to create 4 sub-arms, 50% of participants were eligible for financial incentives conditional on education enrollment and attendance, and 50% were eligible for periodic raffle prizes conditional on periodic random selection into the raffle, on negative tests for syphilis and *Trichomonas vaginalis* (TV) if selected, and on being a periodic raffle winner. Education data were collected throughout.

The endline survey, 3 years later, included behavioral and risk profile data, and HIV, syphilis and TV testing.

RESULTS: HIV incidence among participants in the education incentive arm was statistically significantly lower compared to those not eligible for the education incentive, 6.34% vs 8.08% (p=0.041); OR: 0.770 [0.599-0.989]; aOR: 0.751 [0.579-0.974].

HIV incidence in the sub-arm offering both the education and raffle incentive was significantly lower than incidence in the control arm (participants not eligible for any of the two incentives), OR: 0.634 [0.442-0.910]; aOR: 0.618 [0.429-0.889].

CONCLUSIONS: The financial incentives conditional on education participation significantly reduced odds of HIV infection among AGYW in Eswatini. Raffle incentives on their own did not lead to a statistically significant impact, but it amplified the effect: the combination of both incentives statistically significantly further reduced the odds of HIV infection. Financial incentives can be useful for HIV prevention among AGYW in high prevalence settings.

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		HIV incidence over study period, % (n/N)	OR [95%CI]	P-value	aOR1 [95% CI], adjusted for being in the raffle arm or the education arm	P-value	aOR 2 [95% CI], being in school, rural-urban residence, region of residence, age, altitude towards risk and assets based social economic status, as well as, in rows 3 and 5 only, for being in the raffle arm or the education arm, as relevant	P-value
Education Incentive arm	Education Incentive control	8.08% (153/1894)	1		1		1	
	Education Incentive treatment	6.34% (119/1878)	0.770 [0.599-0.989]	0.041	0.766 [0.596-0.985]	0.037	0.751[0.579-0.974]	0.031
Raffle incentive arm	Raffle control	7.85% (145/1851)	1		1		1	
	Raffle treatment	6.61% (127/1921)	0.833 [0.648-1.070]	0.147	0.827 [0.644-1.063]	0.137	0.823[0.641-1.056]	0.126
Randomization sub-arms	Control	8.84% (80/905)	1				1	
	Raffle only	7.38% (73/989)	0.822 [0.588-1.149]	0.252	n/a		0.823[0.589-1.149]	0.253
	Education only	6.87% (65/946)	0.761 [0.542-1.069]	0.115	n/a		0.751[0.528-1.069]	0.112
	Raffle and Education	5.79% (54/932)	0.634 [0.442-0.910]	0.013	n/a		0.618[0.429-0.889]	0.010
TOTAL		7.21% (272/3772)						

[Sitkhela Likusasa Impact Evaluation in Eswatini: HIV incidence by randomization arms and sub-arms]

TUAC03 Start stop restart: Supporting effective PrEP use

TUAC0305LB

Frequent detection of tenofovir-diphosphate among young Kenyan women in a real-world PrEP implementation program

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BACKGROUND: Programmatic PrEP delivery is scaling-up in African settings with adolescent girls and young women as a priority population, yet few data exist on real-world adherence. We evaluated tenofovir-diphosphate (TFV-DP) detection in dried blood spots (DBS) collected from young women in Kenya who initiated PrEP within routine maternal child health (MCH) and family planning (FP) clinics.

METHODS: The PrEP Implementation in Young Women and Adolescent (PriYA) Program was an implementation program providing PrEP integrated within MCH and FP clinics in Kisumu, Kenya. Between November 2017 and December 2018, women seeking MCH and FP services at 16 facilities were screened for behavioral risk factors and offered PrEP per national guidelines. Follow-up visits were scheduled at 1-month and then 3-monthly post-PrEP initiation. TFV-DP levels were measured in DBS from a randomly selected subset of follow-up visits among women continuing PrEP. **RESULTS:** Overall, 4,376 women initiated PrEP: 90% from MCH and 10% from FP clinics. Median age was 24 years (IQR 21-28), 78% were married, and 8% had a known HIV-positive partner. DBS were tested from 232 randomly selected follow-up visits (5% of all visits) at a median of 8 weeks (IQR 4-21) post-initiation. Overall, 66% had detectable TFV-DP with a median concentration of 535 fmol/punch (IQR 357-719). Almost all (62/65, 95%) samples among women with HIV-positive partners had detectable

TFV-DP versus 68/109 (62%) for women with partners of unknown HIV status and 23/58 (40%) for women with HIV-negative partners ($p < 0.001$). Detectable TFV-DP was less frequent among visits with pregnant women (52% pregnant vs 70% non-pregnant, $p=0.019$) and younger women (53% < 24 years vs 76% ≥ 24 years, $p < 0.001$). One woman tested HIV-positive during follow-up; TFV-DP was not detected in DBS collected at seroconversion.

CONCLUSIONS: In this programmatic evaluation of PrEP delivery to Kenyan women, two-thirds of blood samples had detectable TFV-DP. Women who had known HIV-positive partners, were not pregnant, and were ≥ 24 years were more likely to have TFV-DP detected, but the majority of women with partners of unknown status and those < 24 years also had detectable TFV-DP. These data suggest that PrEP programs for African women can achieve reasonable PrEP adherence.

TUAC04 Hot off the press: What's new in HIV prevention

TUAC0401LB

First-in-human trial of MK-8591-eluting implants demonstrates concentrations suitable for HIV prophylaxis for at least one year

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BACKGROUND: Preexposure prophylaxis (PrEP) with antiretroviral drugs has demonstrated efficacy in reducing new HIV infections, although efficacy is tightly linked to good adherence, especially in women. HIV infection continues to be a global epidemic, however, with ~1.8 million new infections reported in 2018. MK-8591 is a nucleoside reverse transcriptase translocation inhibitor with high potency, high barrier to resistance, long $t_{1/2}$, and distribution to sites of HIV sexual transmission at levels comparable to those observed in PBMCs. In addition, MK-8591 has demonstrated efficacy with weekly dosing in an SIV challenge prophylaxis study. Thus, MK-8591 appears to have potential as an agent for PrEP.

METHODS: Drug-eluting implants were studied in preclinical species to establish general tolerability and pharmacokinetics (PK) of MK-8591 parent and of the active MK-8591-TP (triphosphate). These data, along with data from the SIV challenge study and from previous Phase 1 trials, formed the basis of models for predicting long-term exposures and for establishing a threshold concentration of 0.05 pmol/10⁶ TP in PBMCs. In a double-blind placebo-controlled Phase 1 trial, a single MK-8591 (54mg or 62mg) or placebo implant was placed in subjects for 12 weeks. Safety and tolerability were assessed throughout the trial, and PK was collected for MK-8591 parent and MK-8591-TP until 4 weeks after implant removal. Modeling was conducted to extrapolate and predict MK-8591-TP concentrations.

RESULTS: Implants were generally well tolerated, and PK showed concentrations above target for both implants throughout the study. PK parameter values for MK-8591-TP and the projected duration of the implant above the target are depicted in the table.

	Panel A	Panel B
MK-8591 Implant Dose (mg)	54	62
N	6	6
Geometric Mean C85d (%GCV) (pmol/10 ⁶ cells)	0.135 (27.3)	0.272 (45.2)
Estimated mean C365d (pmol/10 ⁶ cells)	0.02	0.08
Projected duration range (months)	8-10	12-16

[PK parameter values for MK-8591-TP and projected duration of the implant]

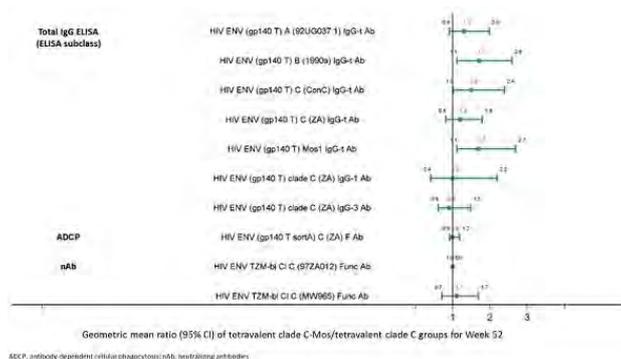
CONCLUSIONS: MK-8591-eluting implants provide drug release projected to be sufficient for HIV prophylaxis for at least one year. A PrEP implant could provide an attractive option for individuals in whom adherence to a daily PrEP regimen is challenging.

TUAC0402LB

ASCENT: Phase 2a, randomized, double-blind, placebo controlled study evaluating safety and immunogenicity of two HIV-1 prophylactic vaccine regimens comprising Ad26.Mos4.HIV and either clade C gp140 or bivalent gp140

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BACKGROUND: Mosaic HIV-1 antigens induce broad immune responses and aim to provide protection against diverse HIV-1 strains. Heterologous vaccination regimens including Ad26 and gp140 have conferred significant protection in NHP, and were safe and immunogenic in humans. To optimize breadth, and refine the vaccine composition, ASCENT assessed adding Mosaic1 gp140 to clade C gp140 in the regimen.
METHODS: This study was conducted in adults in Kenya, Rwanda and the USA. Participants were randomized to Ad26.Mos4.HIV at weeks 0 and 12, and Ad26.Mos4.HIV and alum adjuvanted gp140 Env protein (250µg clade C gp140 or bivalent clade C-Mosaic1 gp140, each 125µg) at weeks 24 and 48 or placebo.
 Serious adverse events (AEs) were assessed throughout the study, unsolicited AEs until 28 days post-each vaccination, and solicited AEs until 7 days post-each vaccination.
RESULTS: 152 healthy adults (18-50 years; 59% females) were vaccinated with Ad26.Mos4.HIV and clade C gp140 (n=26), Ad26.Mos4.HIV and bivalent gp140 (n=100) or placebo (n=26). Active regimens were well tolerated (most AEs were mild/moderate; no serious AEs). HIV Env-specific binding antibody levels and subclass distribution showed both regimens induced binding and functional antibodies to all antigens tested (Figure). Clade C responses were not attenuated by replacing half the clade C dose with Mosaic1 gp140, while clade B responses improved (p< 0.05).
 At week 28, similar PTE Env ELISpot responses were observed, with medians of 444 and 452 SFU/10⁶ PBMC in bivalent or clade C groups, respectively. CD4+ (but not CD8+) T-cell ICS responses increased to Mos1 gp120 peptides in the bivalent relative to clade C group (0.147% vs 0.123% IL-2 and/or IFNγ+ CD4 T-cells, 81% vs 50% response, respectively).
CONCLUSIONS: Both regimens were well tolerated and immunogenic. ASCENT supports using bivalent clade C-Mosaic1 gp140 with Ad26.Mos4.HIV for expanded clade coverage in the phase 3 efficacy study trial starting in 2019.



[Geometric mean ratio (95% CI) of tetraivalent clade c-Mos/tetraivalent clade C groups for Week 52]

TUAC0403LB

DISCOVER study for HIV pre-exposure prophylaxis (PrEP): F/TAF has a more rapid onset and longer sustained duration of HIV protection compared with F/TDF

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BACKGROUND: In DISCOVER, F/TAF was statistically noninferior to F/TDF. However, there were numerically 53% fewer HIV infections in the F/TAF arm vs. F/TDF. We explored HIV risk, STIs, adherence, and pharmacokinetic (PK) data to evaluate this imbalance.
METHODS: In all participants (N=5,387), we compared HIV risk from computer-aided self-interview, lab-assessed STIs, and adherence by pill count and self-report. In a randomized subset, we measured adherence by intracellular TFV-DP concentrations in peripheral blood mononuclear cells (PBMCs) (Week 4; n=324) and in dried blood spots (DBS) (every 12 weeks; n=309). We assessed the relationship between adherence (TFV-DP in DBS) and efficacy using exact conditional logistic regression in a nested case-control-study; every incident HIV case paired with 5 controls matched by treatment arm, diagnosis date, rectal STI, and geography (cases=22, controls=109). We estimated duration of protection using PK data from historic Phase 1 studies to simulate TFV-DP concentrations for TAF and TDF.
RESULTS: There were no differences in HIV risk, STIs, or adherence by pill count or self-report (N=5,387). Week 4 PBMC TFV-DP levels were 6.3 fold higher with F/TAF vs. F/TDF; 98% of F/TAF vs 65% of F/TDF participants had TFV-DP above the protective threshold (p< 0.001). The median duration of protection after last dose at steady state was 60% longer for F/TAF vs. F/TDF. Low DBS TFV-DP levels (adherence < 2 doses/week) were associated with increased risk of HIV for F/TAF: odds ratio [OR] 29.4 and F/TDF: OR 13.2 (p< 0.001 for both) with similar results from sensitivity analyses excluding suspected baseline infections.
CONCLUSIONS: Low TFV-DP concentrations were associated with an increased risk of HIV acquisition. There was no difference in HIV risk or adherence between arms, but there were significant differences in TFV-DP levels. TAF has advantageous PK parameters for HIV prevention compared to TDF including a more rapid, higher, and longer sustained duration of TFV-DP levels above the protective threshold in PBMCs, which may explain the lower number of HIV infections in the F/TAF vs. F/TDF in DISCOVER.

Drug (Active Moiety)	TAF 25 mg (TFV-DP)	TDF 300 mg (TFV-DP)
Median (IQR) PBMC C _{24h} fmol/10 ⁶ cells (C _{24h} [trough] is the concentration at 24 hrs post dose)	404 (226, 711)	61 (34, 105)
Protective Threshold in PBMCs (EC ₅₀) fmol/10 ⁶ cells	40 (Anderson, 2012)	40 (Anderson, 2012)
Time to Protective Threshold	1-2 hrs post single dose (historic Phase 1 data from GS-US-380-4017, Schwartz, 2018)	3-4 days (Anderson, 2012)
Median Duration of Protection after Last Daily Dose (after steady state achieved)	16 days	10 days

[Table 1: Key HIV Prevention Clinical Pharmacology Parameters: TFV-DP with F/TAF and F/TDF]

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TUAC0404LB

Safety, early continuation and adherence of same day PrEP initiation among MSM and TGW in Brazil, Mexico and Peru: the ImPrEP Study

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BACKGROUND: The HIV epidemic in Latin America persists unabated among men who have sex with men (MSM) and transgender women (TGW). Pre-exposure prophylaxis (PrEP) implementation in the region is still very limited. Same day PrEP initiation can increase PrEP uptake where access to health care services for key populations is scarce. ImPrEP is an ongoing demonstration study that aims to assess safety and feasibility of same day PrEP (daily oral tenofovir+emtricitabine [TDF/FTC]) for MSM and TGW at high risk for HIV infection in Brazil, Peru and Mexico. We herein report results on same day PrEP initiation, safety, early continuation and adherence.

METHODS: MSM and TWG eligible for recruitment (i.e. HIV uninfected, ≥18 years old, reporting 1+ risk criteria) were screened and enrolled on the same day and received a 30-day supply of TDF/FTC. Creatinine, hepatitis B, C and STI testing were performed. Main outcomes were PrEP early continuation defined as attendance to the first 2 follow-up visits within 120 days of PrEP initiation; and PrEP adherence using pharmacy refill data defined as having at least 16 days of PrEP medication filled per 30-day period (medication possession ratio ≥0.53).

RESULTS: From February 2018 until April 2019, 4954 individuals were enrolled in Brazil (3205), Peru (1010) and Mexico (739), accumulating 1329.6 person-years of PrEP use. Median age was 29 years (IQR 24-36); 94% (4648/4954) were MSM and 6% (306/4954) TGW; 44 (1.1%) had an eGFR < 60 mL/min. Baseline active syphilis, rectal chlamydia and rectal gonorrhoea prevalence were, respectively, 9.9% (95%CI: 9.0-10.8), 11.7% (95%CI: 10.7-12.7) and 7.4% (95%CI: 6.6-8.2). Overall, early continuation was achieved by 79.8% of participants and PrEP adherence was 96.9%. Early continuation was significantly lower among TGW, 56% (OR=0.29; CI 95%: 0.21-0.40), and young MSM, 71 % (OR=0.52; CI 95%: 0.40-0.67). HIV incidence was 0.8 per 100 person years (CI 95% 0.4-1.4).

CONCLUSIONS: Our study offers evidence that same day PrEP initiation in Latin America is feasible and safe, with overall good levels of early continuation and adherence. TGW and young MSM may require differentiated care to improve PrEP continuation.

TUAD03 It's the costs, stupid: Why financial and economic policies matter

TUAD0305LB

Achieving low antiretroviral (ARV) costs through competitive national tendering and strategic reference pricing: Results from the Republic of South Africa's recently awarded ARV tender (RT71-2019)

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BACKGROUND: The Republic of South Africa (RSA) has the largest national HIV program in the world, with over four million patients on treatment and is the most significant single country procurer of ARVs globally.

Given its significant HIV burden, national ownership of funding ARVs, and limited funding envelope, RSA relies heavily on efficient national tendering to ensure cost savings through low prices, while ensuring access to optimal ARVs for patients.

METHODS: In August 2018, RSA advertised RT71-2019, a three year ARV tender with effective dates from July 1, 2019 through July 31, 2020. RT17-2019 included 147 million packs of product. For the first time, included within the advertised tender, were ceiling reference prices for ARVs. As an example, RSA employed the innovative pricing agreement for the new, best-in-class product "TLD" at \$75 per patient per year. To be competitive, suppliers would be required to bid at or below these prices.

RESULTS: In February 2019, RSA released the awards for RT71-2019. For TLD, the focal ARV for optimizing treatment, the weighted-average price per year for the product was ~\$62, a 17% decrease from the global benchmark. On commodities costs alone, when compared to the previous tender, RSA is expected to save over \$530 million, which will allow RSA treat an estimated additional 2 million patients.

CONCLUSIONS: As national governments start transitioning away from global donor resources for funding ARVs, it is imperative for them to employ efficient national tendering mechanisms. RSA's approach for tendering, through use of global reference prices and transparent pricing system, could be adopted elsewhere to ensure access to optimal ARVs at affordable prices.

Component	Year 1	Year 2	Year 3	Total	%
Savings attributed to commodities price reduction	\$147,000,000	\$185,000,000	\$206,000,000	\$538,000,000	89%
Savings attributed to healthsystem cost reduction	\$ 6,000,000	\$ 26,000,000	\$ 34,000,000	\$ 66,000,000	11%
Total Estimated Savings	\$153,000,000	\$211,000,000	\$240,000,000	\$604,000,000	100%
Number of additional patients able to be treated	2,000,000	2,700,000	3,100,000	7,800,000	

[Total estimated savings due to South Africa's domestic tendering system and ceiling price agreement]

WEAA02 Pathogenesis: And the band plays on

WEAA0205LB

Early ART initiation in acute HIV infection generates long-lived memory HIV-specific CD8⁺ T cells endowed with efficient proliferative and cytolytic recall response

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BACKGROUND: ART initiation before peak viremia during acute HIV infection (AHI) partially preserves B and T cell responses, and memory potential of HIV-specific CD8⁺ T cells. However whether these memory responses can be recalled efficiently is unknown. Here, we compared the proliferation and cytolytic capacity of memory HIV-specific CD8⁺ T cells after ART initiation in AHI or in chronic HIV infection (CHI).

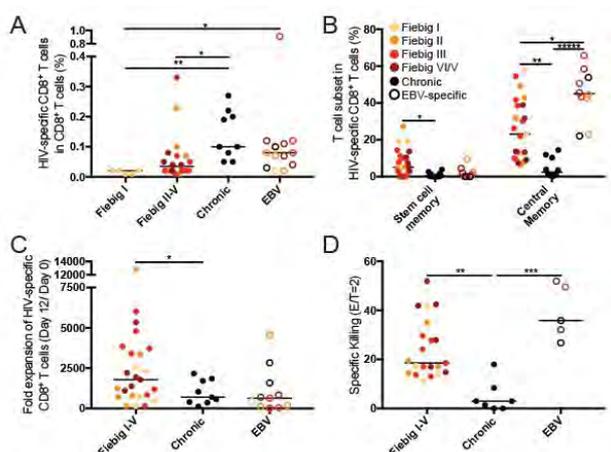
METHODS: PBMCs from 30 RV254 Thai participants treated in AHI (PTAHI, Fiebig I-V; median of 2.1yrs of ART) and 8 participants treated in CHI (PTCHI, median of 1.8yrs of ART) were analyzed. Phenotype of HIV-specific CD8⁺ T cells was analyzed by flow cytometry using tetramer staining. Proliferation was assessed after peptide stimulation at 6 and 12 days. Cytotoxicity was measured by co-culturing the PBMCs at day 13 post-stimulation with autologous peptide-pulsed CD4⁺ T cells as targets.

RESULTS: Ex vivo memory HIV-specific CD8⁺ T cells were at lower frequency in PTAHI (Fig.A), but exhibited more stem cell-like (Tscm) and central memory (CM) phenotype compared with PTCHI (Fig.B). After stimulation, their magnitude of expansion was significantly higher in PTAHI than in PTCHI (Fig.C). This expansion positively correlated with the ex vivo ex-

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pression of the IL-7 receptor, transcription factor TCF-1, and percentages of Tscm and CM. Recalled HIV-specific CD8⁺ T cells showed significantly higher cytolytic capacity in PTAHI than in PTCHI (Fig.D). PD-1 expression levels were higher over the course of culture in PTCHI compared to PTAHI. The strong cytolytic capacity correlated with the magnitude of expansion and lower expression of PD-1.

CONCLUSIONS: Early ART in AHI promotes differentiation of long-lived memory CD8⁺ T cells that have higher expansion and cytotoxic capacity after recall than those in PTCHI. These data suggest that HIV remission strategies in PTCHI will likely require a combination of reversing T cell exhaustion and boosting the HIV-specific CD8⁺ T cell response.



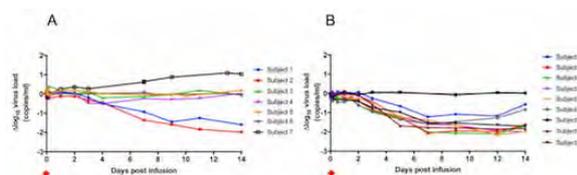
[Ex vivo and recalled memory HIV-specific CD8⁺ T cells]

B) in treatment naive HIV-infected adults. The study objectives were to evaluate safety and tolerability (primary) and antiviral activity and pharmacokinetic (PK) parameters (secondary).

METHODS: 16 HIV-infected viremic adults between the ages of 18-70 were enrolled. Seven participants in Part A received one intravenous (IV) dose of 40 mg/kg VRC01LS, and nine participants in Part B received one IV dose of 40 mg/kg VRC07-523LS. Safety was evaluated by collection of local and systemic reactogenicity symptoms for three days and adverse events (AEs) for 56 days post product administration. Blood samples were collected at pre-specified study timepoints for viral load and PK analysis as well as CD4/8 T-cell counts and safety labs. The study is ongoing at the time of this report.

RESULTS: In Part A, VRC01LS was safe and well tolerated. No local reactogenicity was reported and systemic reactions (n=1) were mild. There were no AEs related to the study product. Seven days post-infusion, 3/7 participants had at least a 0.5 log₁₀ decrease in viral load (Fig. 1A). In Part B, VRC07-523LS was safe and well tolerated. Local (n=3) and systemic (n=2) reactogenicity were mild. Two AEs were assessed as related to the study product; infusion site paraesthesia and decreased neutrophil count, both which resolved with no residual effects the day of infusion and 8 days following onset, respectively. Seven days post-infusion, 8/9 participants had at least 1.2 log₁₀ decrease in viral load (Fig. 1B).

CONCLUSIONS: Both VRC01LS and VRC07-523LS were safe and well-tolerated when administered to viremic HIV-infected adults. Antiviral activity > 0.5 log was observed in 3/7 VRC01LS recipients and >1.2 log for 8/9 VRC07-523LS recipients.



[Figure 1. 14-day post-infusion HIV viral load (copies/mL) for 40 mg/kg IV VRC01LS (panel A) and 40 mg/kg IV VRC07-523LS (panel B). Red arrow indicates product administration occurred on day 0.]

WEAA03 Mission remission: Challenge accepted

WEAA0305LB

Safety and virologic effect of the HIV-1 broadly neutralizing antibodies, VRC01LS or VRC07-523LS, administered to HIV-infected adults in a phase 1 clinical trial

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BACKGROUND: VRC 607/ACTG 5378 is a two-part study conducted by the VRC and ACTG investigating the CD4 binding site HIV-1 broadly neutralizing antibodies (bNAbs) VRC01LS (Part A) and VRC07-523LS (Part

WEAB04 Recent developments in antiretroviral therapy

WEAB0401LB

Pharmacokinetics of dolutegravir 5mg dispersible tablets in children weighing 6 to < 20kg dosed using WHO weight bands

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BACKGROUND: Dolutegravir (DTG) 5mg dispersible tablets (DT) are small, child-friendly and allow easy scaling. We describe a pharmacokinetic (PK) substudy of DT DTG in children weighing 6-< 20kg dosed by WHO weight bands (WB) conducted within ODYSSEY, an ongoing phase-III trial of DTG (NCT02259127).

METHODS: Children weighing 6-< 10kg, 10-< 14kg, 14-< 20kg received DTG 5mg DT at 15, 20, and 25mg QD, respectively. At steady-state, 24-hour PK profiles (7 samples) were constructed after DTG intake. DTG plasma

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concentrations were measured by UPLC-MS/MS; Phoenix64 was used for non-compartmental analysis. Results were compared to historical PK parameters from adults taking 50mg DTG filmcoated tablets (FCT) QD or BID, previous ODYSSEY PK data and published data from IMPAACTP1093. **RESULTS:** 28 children [29 PK curves] from Zimbabwe and Uganda were included in the analysis. PK results (table 1) from WBs 10-< 14kg and 14-< 20kg were similar to PK data from children receiving same DT doses in IMPAACTP1093, and GM C_{trough} values were similar to children 20-< 40kg in ODYSSEY on DTG FCT 50mg and adults on 50mg DTG FCT QD. In children 14-< 20kg, exposures were ~1.8-2-fold higher on 25mg DT than 25mg FCT, similar to relative bioavailability of DT/FCT in adults. Our data from the 6-< 10kg WB showed lower GM exposure to DTG compared to IMPAACTP1093 with high variability, and 3 of 8 children had observed C_{trough} below EC_{90} (0.32mg/L).

CONCLUSIONS: DTG DT in children weighing 10-< 20kg, dosed QD in WHO WBs achieves similar C_{trough} to adults and older children on the adult DTG dose and young children on DT in IMPAACTP1093. Some children in the 6-< 10kg WB had C_{trough} levels below EC_{90} , and PK profiles showed high variability in this WB. Further PK data collection in children 3-< 10kg is ongoing and all children are followed up for safety.

	Odyssey Lower weightband PK substudies			Reference adults	
	6-<10kg	10-<14kg	14-<20kg	≥40kg	≥40kg/50mg FCT BID
DTG dose and (N)	15mg DT (8)	20mg DT (8)	25mg DT (13)	50mg FCT (10) ^a	50mg FCT BID (12 ^b ; 24 ^c)
Age (years)	1.3 (0.6-3.0)	3.0 (1.6-4.2)	6.0 (4.9-8.5)	34 (22-53)	48 (31-59) ^b ; 47 (33-68) ^c
Weight (kg)	7.6 (6.7-9.7)	11.5 (10.0-12.6)	18.0 (14.9-19.9)	-	-
Dose/weight (mg/kg)	2.0 (1.5-2.2)	1.7 (1.6-2.0)	1.4 (1.3-1.7)	-	-
C_{trough} (mg/L); %below EC_{90}	0.43 (207); 37.5%	0.77 (62); 0%	0.85 (67); 0%	0.83 (26) ^a	2.41 (77) ^b ; 2.72 (70) ^c
AUC _{0-24h} (mg ^h /L)	46.3 (90)	76.0 (25)	69.6 (30)	43.4 (20) ^a	92.7 (55) ^b ; 93.4 (50) ^c
C_{max} (mg/L)	5.3 (58)	8.0 (25)	7.1 (21)	3.3 (16) ^a	5.6 (49) ^b ; 5.4 (40) ^c

Pharmacokinetic parameters are expressed as geometric mean with coefficient of variation (%), median (range) for age, weight and dose/weight. Doses represent once daily doses, unless otherwise specified. FCT, film-coated tablet; DT, dispersible tablet; BID, twice daily. ^aFasted HIV-positive adults. ^bFasted healthy HIV-negative adults. ^cHIV-positive treatment experienced adults, fed state not specified.

[Table 1]

WEABO402LB

MK-8591 at doses of 0.25 to 2.25 mg QD, in combination with doravirine establishes and maintains viral suppression through 48 weeks in treatment-naïve adults with HIV-1 infection

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BACKGROUND: MK-8591 is the first nucleoside reverse transcriptase translocation inhibitor (NRTTI) in development for treatment of HIV-1 infection. Doravirine (DOR) is a recently approved non-nucleoside reverse transcriptase inhibitor (NNRTI). We present efficacy and safety data for MK-8591 with DOR through 48 weeks.

METHODS: Phase 2B, randomized, double-blind, comparator-controlled, dose-ranging trial to evaluate efficacy and safety of MK-8591 with DOR. For the first 24 weeks, equal proportions of participants received one of three doses of MK-8591 (0.25 mg, 0.75 mg, or 2.25 mg) plus DOR (100 mg) and 3TC (300 mg) or DOR/3TC/TDF once daily with placebo. After

24 weeks of treatment, participants taking MK-8591 who achieved HIV-1 RNA< 50 copies/mL switched to a two-drug regimen of MK-8591 and DOR. Efficacy endpoints included the overall proportion of participants at week 48 with HIV-1 RNA< 50 copies/mL using the FDA snapshot approach. Protocol-defined virologic failure (PDVF) was defined as rebound with confirmed HIV-1 RNA≥50 copies/mL after suppression or non-response with confirmed HIV-1 RNA≥50 copies/mL by week 48. Safety was assessed by adverse event (AE) reporting.

RESULTS: 121 participants received drug and were included in analyses (mean age 31 yr, 92.6% male, 76.0% white, 22% HIV-1 RNA>100,000 copies/ml). At week 48, 89.7% (26/29), 90.0% (27/30), 77.4% (24/31), of participants achieved HIV-1 RNA< 50 copies/mL in the 0.25mg, 0.75mg, 2.25mg dose of MK-8591 respectively, compared to 83.9% (26/31) with DOR/3TC/TDF. The mean change in CD4+ T-cell count from baseline to week 48 was similar for all groups. The proportion of participants on the 2-drug regimen for 24 weeks with HIV-1 RNA< 50 copies/mL was similar across doses (88.9%-90.0%). Six participants by week 48 met the definition of PDVF, 5/90 (5.6%) in the MK-8591 groups (4 rebound, 1 non-response) and 1/31(3.2%) in the DOR/3TC/TDF group (rebound); none had HIV-1 RNA>200 copies/mL or documented resistance to study drugs. No serious drug-related AEs were reported by MK-8591 participants. A higher rate of drug-related AEs was reported for DOR/3TC/TDF (19.4%) participants compared with any of the doses of MK-8591 (combined 7.8%).

CONCLUSIONS: Similar proportion of participants achieved and maintained viral suppression at week 48 across all treatment groups. MK-8591+DOR was well tolerated regardless of dose.

WEABO403LB

Switching to DTG+3TC fixed dose combination (FDC) is non-inferior to continuing a TAF-based regimen (TBR) in maintaining virologic suppression through 24 weeks (TANGO Study)

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BACKGROUND: DTG+3TC 2-drug regimen (2DR) is noninferior to DTG+TDF/FTC 3 drug regimen in HIV-1 infected ART-naïve adults. Efficacy and safety of switching to DTG+3TC in ART-experienced adults suppressed on 3DRs have been demonstrated in smaller studies.

METHODS: TANGO, a randomized, open-label, multicenter, non-inferiority Phase III study evaluates efficacy and safety of switching to DTG+3TC once daily in HIV-1 infected adults on TBR with HIV-1 RNA< 50c/mL for > 6 months, without prior virologic failure, no historical NRTI or INSTI major resistance mutations. Participants were randomized 1:1 (stratified by baseline 3rd agent class: PI, NNRTI, INI) to switch to DTG+3TC or continue TBR through Wk148. Primary endpoint: proportion of participants with plasma HIV-1 RNA≥50c/mL at Week 48 (FDA Snapshot algorithm) for Intention To Treat-Exposed (ITT-E) population. Planned Wk24 interim analysis assessed non-inferiority of DTG+3TC with 4% non-inferiority (NI) margin. Secondary endpoint: Virologic suppression (HIV-1 RNA< 50c/mL by FDA Snapshot, ITT-E) with 8% NI margin.

RESULTS: 741 randomized/exposed participants (DTG+3TC: 369; TBR: 372), demonstrated switching to DTG+3TC was non-inferior to continuing TBR at Week 24 - Snapshot Virologic Failure: < 1% vs. < 1%; adjusted difference: -0.5% (95% CI: -1.6%, 0.5%). Proportion with plasma HIV-1 RNA< 50 c/mL was high and similar in both arms and demonstrated non-inferiority (Table 1). Zero participant on DTG+3TC and 1 participant (< 1%) on TBR met protocol-defined virologic failure with no resistance mutations observed at failure. No unexpected AEs were identified for DTG or 3TC.

Week 24 Study Outcome by Snapshot Analysis (ITT-E Population)	DTG + 3TC (N=369) n (%)	TBR (N=372) n (%)
HIV-1 RNA ≥ 50 c/mL (Snapshot Virologic Failure)	1 (<1)	3 (<1)
HIV-1 RNA <50 c/mL (Snapshot Virologic Success) ^a	350 (95)	358 (96)
No Virologic Data at Week 24 Window	18 (5)	11 (3)
Key Safety results (Safety Population)	(N=369)	(N=371^b)
AEs or death leading to withdrawal ^c	12 (3)	1 (<1)
Drug-related Grade 2-5 AEs ^c	15 (4)	3 (<1)
Serious Adverse Events (none related to study treatment)	14 (4)	8 (2)

^aSnapshot Virologic Success adjusted difference in (DTG+3TC) - TBR: -1.4% (95% CI: -4.4%, 1.6%). Estimates and confidence intervals were based on a stratified analysis using Cochran-Mantel-Haenszel weights adjusting for baseline 3rd agent class. ^bOne subject was excluded due to receiving a TDF-based regimen instead of a TAF-based regimen. ^cOne death (homicide) unrelated to treatment occurred in the DTG+3TC arm.

[Efficacy and Key Safety Results for the ITT-E and Safety Population]

CONCLUSIONS: At Wk24, switching to DTG/3TC FDC was non-inferior to continuing a TAF-based 3DR in maintaining virologic suppression in HIV-1 infected ART-experienced adults. The safety profile of DTG/3TC FDC was consistent with the DTG and 3TC respective labels. DTG/3TC 2DR offers a new robust switch option with reduced ART exposure, without increased risk of virologic failure or resistance. The study is ongoing; conference presentation will include Wk48 results.

WEAB0404LB

Durable efficacy of dolutegravir (DTG) plus lamivudine (3TC) in antiretroviral treatment-naïve adults with HIV-1 infection - 96-week results from the GEMINI studies

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BACKGROUND: Compared with 3-drug regimens, two-drug regimens (2DR) have the potential to reduce cumulative drug exposure during life-long antiretroviral therapy in HIV-1 infected patients. In GEMINI-1 and GEMINI-2 (ClinicalTrials.gov: NCT02831673/NCT02831764), the efficacy of the 2DR of DTG+3TC was non-inferior to DTG+ tenofovir/emtricitabine (TDF/FTC) at week 48 in treatment-naïve adults.

METHODS: GEMINI-1&2 are identical double-blind, multicentre Phase III studies. Participants with HIV-1 RNA $\leq 500,000$ c/mL at screening were randomised 1:1 (stratified by plasma HIV-1 RNA and CD4+ cell count) to once-daily treatment with DTG+3TC or DTG+TDF/FTC. The primary endpoint was the proportion of participants with plasma HIV-1 RNA < 50 c/mL at week 48 (Snapshot algorithm). We present efficacy and safety data from prespecified 96-week secondary analyses. Estimates and confidence intervals were based on a stratified analysis using Cochran-Mantel-Haenszel weights.

RESULTS: 714 and 719 adults were randomised and treated in GEMINI-1&2, respectively. At baseline, 20% had HIV-1 RNA >100,000 c/mL, 8% had CD4+ < 200 cells/mm³. At week 96, DTG+3TC was non-inferior to DTG+TDF/FTC in both GEMINI-1&2 and in the pooled analysis (using a 10% non-inferiority margin) [Table]. Response rates in participants with baseline HIV-1 RNA >100,000 c/mL were high and similar between arms. Consistent with week 48 outcomes, response remained lower in DTG+3TC participants with CD4+ < 200 cells/mm³. Across both studies, 11 participants on DTG+3TC and 7 on DTG+TDF/FTC met protocol-defined virologic withdrawal criteria through week 96; none had treatment-emergent integrase strand transfer inhibitor or NRTI resistance mutations. Overall rates

of AEs were similar, with low rates of withdrawals due to AEs in both arms. Numerically, more drug-related AEs were reported with DTG+TDF/FTC. Post-baseline changes in markers of bone and renal function favoured DTG+3TC through week 96.

		GEMINI-1	GEMINI-2	Pooled
Snapshot responders	DTG+3TC	300/356 (84%)	316/360 (88%)	616/716 (86%)
	DTG+TDF/FTC	320/358 (89%)	322/359 (90%)	642/717 (90%)
Adjusted Difference (95% CI)		-4.9 (-9.8, 0.0)	-1.8 (-6.4, 2.7)	-3.4 (-6.7, 0.0)

[Proportion of participants with plasma HIV-1 RNA <50 c/mL at week 96 - Snapshot analysis - ITT-E population]

CONCLUSIONS: DTG+3TC remains non-inferior to DTG+TDF/FTC in treatment-naïve adults at week 96, with no increased risk of virologic failure and no treatment-emergent resistance. Both regimens were well tolerated; biomarkers of bone turnover and renal function significantly favoured DTG+3TC. The results demonstrate durable efficacy and potency of DTG+3TC, further supporting it as a compelling option for HIV treatment. GEMINI-1&2 continue until week 148.

WEAB0405LB

The ADVANCE trial: Phase 3, randomized comparison of TAF/FTC/DTG, TDF/FTC/DTG or TDF/FTC/EFV for first-line treatment of HIV-1 infection

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BACKGROUND: In low- and middle-income countries, most treatment-naïve people living with HIV (PLWH) take tenofovir disoproxil fumarate (TDF) with FTC (or 3TC) and efavirenz (EFV). Dolutegravir (DTG) and tenofovir alafenamide fumarate (TAF) are recommended in international guidelines, but clinical experience with these ARVs in sub-Saharan Africa is limited. In South Africa, over 10% of patients have transmitted NNRTI drug resistance.

METHODS: We conducted a 96-week, open-label randomised trial in South Africa, comparing TAF/FTC/DTG, TDF/FTC/DTG and TDF/FTC/EFV. Inclusion criteria included age ≥ 12 years, no prior ART >30 days, creatinine clearance >60 mL/min (>80 mL/min if <19 years), and HIV-1 RNA >500 copies/mL. Pregnancy and tuberculosis (TB) were exclusion criteria. There was no screening for baseline drug resistance, consistent with South African treatment guidelines. The primary treatment failure endpoint was 48-week HIV-1 RNA >50 copies/mL, discontinuation or missing data (Intent-to-treat population, non-inferiority margin -10%, significance level $p=0.017$, adjusted for multiple comparisons). We report 48-week efficacy and safety data.

RESULTS: We randomised 1053 PLWH between February 2017 and May 2018: 99% black, 59% female, mean age 32 years, with mean CD4 336 cells/ μ L. At week 48, the percentage of participants with HIV RNA < 50 copies/mL was 83.8% for TAF/FTC/DTG, 84.9% for TDF/FTC/DTG and 78.6% for TDF/FTC/EFV.

In the on-treatment analysis, 96% of participants on TAF/FTC/DTG, 94% on TDF/FTC/DTG and 95% on TDF/FTC/EFV had HIV RNA < 50 copies/mL at Week 48. Both DTG arms demonstrated non-inferior efficacy versus the EFV arm. Over 70% of participants with HIV RNA >50 copies/mL re-suppressed after adherence counselling and re-testing. Overall, 136/185 (74%) of treatment failures were from discontinuation. Clinical adverse events and laboratory abnormalities were similar between treatment arms.

CONCLUSIONS: In the ADVANCE study, TAF/FTC/DTG and TDF/FTC/DTG demonstrated non-inferior efficacy versus TDF/FTC/EFV, with low rates of virologic failure in all three arms despite country-level background NRTI/NNRTI resistance. There were more discontinuations for adverse events in the TDF/FTC/EFV arm.

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Treatment arm	TAF/FTC/DTG	TDF/FTC/DTG	TDF/FTC/EFV
n	n=351	n=351	n=351
Week 48 Efficacy			
HIV RNA <50 copies/mL	294 (83.8%)	298 (84.9%)	276 (78.6%)
HIV RNA >50 copies/mL	16 (4.6%)	19 (5.4%)	14 (4.0%)
Discontinuation for adverse events	2 (0.6%)	1 (0.3%)	12 (3.4%)
Discontinuation for other reasons	39 (11.1%)	33 (9.4%)	49 (14.0%)

[ADVANCE trial results at Week 48]

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WEABO406LB

ANRS 170 QUATUOR 4/7 days maintenance strategy in antiretroviral treated adults with HIV-1 infection: an open randomised parallel non-inferiority phase III trial

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BACKGROUND: Intermittent treatment could improve the convenience, tolerability and cost of ART. We have previously shown a 96% success rate of a maintenance 4 days a week (4/7 days) antiretroviral strategy in the ANRS 162 4D pilot study. The current study was designed to demonstrate the non-inferiority of this strategy versus 7/7 days in patients with controlled viral load (VL) under triple therapy with either PI, NNRTI, or InSTI based regimen.

METHODS: We conducted an open-label, randomised, multicentric, non-inferiority phase III trial evaluating efficacy and safety of a maintenance 4-days a week therapy (4/7 days) versus current triple ART regimen (CAR). Adults with plasma VL < 50 copies/mL for >12 months and no resistance mutations to CAR were randomly assigned (1:1) with stratification by third-agent class. The primary endpoint was the Kaplan-Meier estimated proportion of participants with treatment success (VL < 50 copies/mL and no treatment strategy modification) at week 48 among those starting the study strategy. We calculated the Cochran-Mantel-Haenszel treatment difference adjusted for the stratification factor, with a 5% non-inferiority margin. [ClinicalTrials.gov: NCT03256422](https://clinicaltrials.gov/ct2/show/study/NCT03256422).

RESULTS: Participants were screened from Sep 7, 2017, to Jan 22, 2018. Among 647 randomised participants, 636 were included in the modified intent-to-treat analysis (318 in each arm). At entry, median age was 49 years (IQR 41-55), 85% were male, with VL < 50 copies/ml for 5.8 (3.3-9.6) years, median CD4 689 (533-884) cells/mL; NRTI: 56.3% TDF/FTC, 16.3% TAF/FTC, 27.4% ABC/3TC; 3rd agent: 6% PI, 46% NNRTI, 48% InSTI. At week 48 (last patient visit was April 4, 2019), the treatment success rate was 95.6% in the 4/7 days arm vs 97.2% with CAR (adjusted difference of -1.6%, 95% CI -4.5% to 1.3%), demonstrating the non-inferiority. Six (1.9%) and 4 (1.3%) participants experienced virological failure with selection of resistance mutations in 3 and 1, respectively. No difference in adverse events was observed between the two arms. A moderate improvement of eGFR was observed in the 4/7 days arm, +5.5[-1.2-+13.6] ml/min vs +1.3[-6.1-+7.5] ml/min in CAR, P < 0.001.

CONCLUSIONS: The ANRS 170 QUATUOR randomised trial demonstrates the non-inferiority of a 4/7 days maintenance strategy vs a 7/7 days regimen.

WESY08 Stop worrying about the definition and get to work! Implementation science for policy and programme application at scale

WESY0802LB

Qualitative evaluation of PrEP implementation in Brazil - ImPREP stakeholders study

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BACKGROUND: Pre-exposure prophylaxis (PrEP) became available in Brazil in 2018 to populations at substantial risk of HIV infection as an additional prevention tool under a combination prevention strategy. The Implementation PrEP Project (ImPrEP) aims to generate evidence to support the incorporation of PrEP in Brazil. There is scarce qualitative evidence around PrEP implementation globally. This abstract presents initial findings from a qualitative study conducted with key PrEP stakeholders to gather insight on facilitators and barriers to PrEP implementation within a public health context.

METHODS: Qualitative study, based on in-depth structured interviews conducted face-to-face with 4 categories of HIV stakeholders in 6 capital cities implementing ImPrEP. Views, perceptions and experiences regarding PrEP and PrEP service incorporation were collected. Interviewees signed consent forms. Interviews were recorded and transcribed, organized and categorized using NVivo 12 Plus software. Discourse was systematized and analyzed based on narrative categories to extract meanings, perceptions and concerns of PrEP policy, its related conceptions, and experiences of key public health HIV program managers, civil society leaders and PrEP users as interlocutors of PrEP policy implementation.

RESULTS: A total of 60 interviews have been conducted: 15 service managers; 14 health professionals; 16 PrEP users; 7 MSM and 7 Transgender community leaders, and 1 HIV+ leader. All health service managers, community leaders and PrEP users expressed prior knowledge of PrEP. Stigma and discrimination were cited as the main obstacle for most vulnerable populations to access PrEP services. Service providers and community leaders highlighted that transgender people are the ones who least frequent PrEP services. There is a narrative consensus that combined HIV prevention including PrEP is a step forward in public health policy. An aspect emphasized by health professionals and service managers was that PrEP puts HIV prevention under the individual's control. Structural health service issues stand out as a restriction to meet increasing demand such as limited business hours and number of health professionals.

CONCLUSIONS: Perceptions about PrEP and difficulties of implementation were raised, particularly access barriers of populations at greater risk. Study findings point-out that PrEP scale-up within a public health context has culturally specific needs to be addressed.

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Poster Discussions

MOPDA01 HIV transcription: The sound of silence

MOPDA0104LB

Highly sensitive, limiting dilution-multiplex seminested quantitative PCR-based assay reveals a large active HIV-1 reservoir in infected ART-suppressed individuals and elite suppressors

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BACKGROUND: Improved assays are necessary to better characterize the HIV-1 reservoir and to reliably monitor curative interventions. Here we describe a novel highly sensitive assay to measure the size of the active HIV-1 reservoir in infected individuals.

METHODS: We developed a new limiting dilution-multiplex seminested quantitative PCR-based assay that allows measuring frequencies of cells transcribing HIV-1 cell-associated unspliced (US, *gag*) and multiply spliced (MS, *tat/rev/nef*) RNA, bypassing the need to partition the samples for measuring different HIV-1 RNA species. This approach results in improved assay sensitivity with the theoretical detection limit of one HIV-1 RNA+ cell in 7.6 million cells, based on the typical experimental setup.

RESULTS: Levels of total and integrated HIV-1 DNA, as well as frequencies of HIV-1 US RNA+ and MS RNA+ cells, were measured in PBMC from three HIV-infected viremic therapy-naïve individuals, five ART-treated individuals with undetectable plasma viremia, and two elite suppressors, in the absence of *ex vivo* stimulation.

All HIV-1 forms were detectable in all individuals, with the highest levels of HIV-1 DNA and frequencies of HIV-1 US and MS RNA+ cells measured in therapy-naïve, intermediate in ART-treated, and the lowest in elite suppressors (averages of 1136-340-14 US RNA+ cells and 66-7-0.3 MS RNA+ cells per million PBMC, respectively).

Surprisingly, in ART-treated individuals and elite suppressors, the majority (averages of 57.6% and 68.1%, respectively) of HIV-1 integrated DNA-positive cells transcribed US RNA, but only 3.0% and 2.3% of these US RNA+ cells, respectively, transcribed MS RNA.

However, in therapy-naïve individuals, only 25.6% of HIV-1 integrated DNA-positive cells transcribed US RNA, but of the latter, 8.9% transcribed MS RNA.

CONCLUSIONS: This sensitive assay revealed a large, previously underestimated, HIV-1 US RNA+ reservoir in ART-treated individuals and elite suppressors. However, only a small percentage of US RNA+ cells transcribe MS RNA, suggesting post-transcriptional latency blocks or genetic defects. The relatively smaller active reservoir in therapy-naïve individuals might be explained by a higher percentage of intact proviruses coupled to more robust immune responses that eliminate HIV RNA+ cells. This assay can serve as a robust tool for the measurement of HIV-1 active reservoir, even without *ex vivo* stimulation.

MOPDA0105LB

CD8+ lymphocyte mediated suppression of HIV expression in CD4+ T cells

L. Franchitti, A. Willemsse, J. Yoon, E. White, B. Cox, G. Silvestri, D. Kulpa
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BACKGROUND: The persistence of HIV infection under ART is due to a reservoir of latently infected cells that remain indefinitely despite suppression of virus replication. Defining the mechanisms responsible for the establishment and maintenance of the HIV reservoir under ART has been the focus of HIV cure strategies. Recent studies have suggested that

CD8+ T cells inhibit virus production in ART-treated SIV-infected rhesus macaques. However, the mechanisms responsible for this antiviral effect remain poorly understood.

METHODS: To test the hypothesis that CD8+ T cells suppress virus production through silencing of HIV transcription, we used an innovative *in vitro* HIV latency model to examine the effect of CD8+ T cells in the establishment and reversal of HIV latency. To first examine HIV latency establishment, CD4+ T cells from HIV naïve donors were infected *in vitro* and then co-cultured with activated CD8+ T lymphocytes at 1:1 or 1:5 ratios. CD4+ cell monoculture was included as a control. After 3 days of co-culture, we assessed Gag expression by flow cytometry, and quantified the frequency of integrated HIV DNA by qPCR. To examine CD8+ T mediated suppression of HIV latency reversal, we stimulated latently infected CD4+ T cells and examined the frequency of Gag+ cells in the presence or absence of CD8+ T cells (1:1 or 1:5 ratio).

RESULTS: During HIV latency establishment, Gag expression in CD4+ T cells was reduced when co-cultured with CD8+ T cells an average of 9-fold ($p < 0.0001$) and 18-fold ($p < 0.0001$) at 1:1 or 1:5 target: effector ratios respectively, without significantly reducing the frequency of HIV-infected cells ($n=21$). Notably, significant suppression of HIV latency reversal was observed upon TCR activation of latently infected CD4+ T cells in the presence of CD8+ lymphocytes, with a 6-fold decrease at 1:1 target: effector ratio ($p = 0.0156$) and 14-fold decrease at 1:5 ratio ($p = 0.0156$).

CONCLUSIONS: Our studies demonstrate that CD8+ T cells suppress HIV expression in CD4+ T cells in a way that promotes the establishment and maintenance of latency. Further understanding of the mechanisms by which CD8+ lymphocytes suppress virus transcription may support the design of new approaches for HIV eradication.

MOPDA0106LB

The inexorability of latent reservoir formation: HIV induces quiescence in effector CD4+ T cells

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BACKGROUND: HIV preferentially infects activated effector cells but is unable to infect quiescent memory cells. It is therefore generally believed that the latent reservoir forms when a few rare effector cells enter quiescence and generate a memory cell population. Using polarized primary cell models, we have recently shown that virtually all productively infected cells become latently infected when they are forced into quiescence.

METHODS: To identify the molecular pathways regulating T-cell entry into quiescence, we performed RNA-seq analyses of uninfected and HIV-infected primary human CD4+ T cells during proliferation, upon induction of quiescence using a defined cocktail of cytokines, and following reactivation through TCR stimulation.

RESULTS: In uninfected primary CD4+ T cells, entry into quiescence is associated with a dramatic downregulation of cellular pathways involved in the positive regulation of transcription, translation, cellular metabolism and the cell cycle. To our surprise, HIV infection strongly downregulated each of the cellular pathways involved in quiescence, leading to an overall gene expression pattern that closely resembled quiescent cells, whereas mock infected cells retained a proliferative phenotype. Re-analysis of published RNA-seq studies confirmed these transcriptomic signatures, demonstrating the reproducibility of these results in CD4+ T cells from different donors and after infection with different HIV strains. The shift to a quiescent phenotype is due to the upregulation of a number of a few key regulators, including the transcription factor KLF2 and a number of long non-coding RNAs. Flow cytometry studies indicated that HIV-infected cells have a reduced growth rate, which can be reversed by knockdown of KLF2 and other regulatory factors.

CONCLUSIONS: Our results demonstrate that rather than being a rare and random event, HIV entry into latency, and the consequent seeding of the HIV reservoir, is a direct result of the HIV-induced shutdown of effector cell proliferation. This implies that intensification of antiviral treatment and early initiation of treatment will never be able to block the establishment of latency, and that interventions to reactivate the reservoir and enhance immune surveillance will be needed for the eradication of the HIV reservoir and develop a functional cure for HIV infections.

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Monday
22 July**MOPDD01 More than HIV care: Integrating services for positive health outcomes**

MOPDD0106LB

Tuberculosis preventive therapy in select PEPFAR supported countriesC. Godfrey, M. Bochnowitz, S. Ally, W. Paul, J. Cavanaugh, T. Al-Samarrai
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BACKGROUND: Tuberculosis preventive therapy (TPT) reduces mortality in people living with HIV (PLH) and is a critical element in strategies to eliminate tuberculosis. Programmatic uptake has been limited even in countries where TPT is routinely recommended. In November 2018 PEPFAR committed to rapid and complete scale-up of Tuberculosis Preventive Treatment (TPT) over two years. All eligible individuals who are on ART are expected to complete treatment by the end of 2020. In April 2019 each country was given a target for 2019 that represented approximately half of all eligible individuals receiving ART from PEPFAR supported facilities. The 2020 targets require that the remaining 50% of individuals receive TPT by the following year. This report evaluates baseline rates of TPT initiation and completion in 2018 prior to scale up of TPT throughout PEPFAR in 2019.

METHODS: We conducted a descriptive analysis including sex differences of the number of PLH who were initiated and completed a course of isoniazid as preventive therapy in 2018. We restricted our analysis to PEPFAR supported countries in which TPT was initiated in more than 5% of PLH. We then tabulated these with the targets and designated budgets that were communicated to the country teams.

RESULTS: Few PLH on ART were offered TPT in the target population. Completion rates were variable but did not exceed 75%. We did not observe sex differences in either individuals offered TPT or in completion rates (data not shown). The country targets for TPT completion and budget available for this activity is presented.

Country	PLH on ART 2018	PLH who initiated TPT	TPT completion 2018 (completed 6 months INH/# scheduled)	Country Target 2019	Country Budget (USD)
Democratic Republic of the Congo	72143	20%	57%	45083	252464
Haiti	959697	9%	59%	48587	272087
Kenya	1066579	9%	75%	138951	778125
Lesotho	190569	2%	13%	132566	742370
Mozambique	1077726	9%	75%	138951	2604532
Nigeria	799718	8%	75%	382500	2142000
Eswatini	169272	6%	75%	43678	244597

[TPT Initiation, Completion and Targets 2018-2019]

CONCLUSIONS: Uptake of TPT is currently low in PEPFAR supported countries, but mandated targets and budgeting activities are expected ameliorate this since PEPFAR funding is dependent on reaching targets. Strategies to improve completion rates, including the use short-course regimens are required.

TUPDA01 Mucosal tissues: What's 'crobes got to do with it?

TUPDA0107LB

Contraceptive-induced changes in genital tract HIV-1 cellular targets and microbiota among women enrolled in the ECHO TrialH. Jaspan^{1,2,3}, R. Bunjun³, B. Brown¹, R. Tanko³, M. Onono⁴, G. Nair⁵, T. Palanee-Phillips⁶, C. Scoville², K. Heller², S. Jaumdally³, S. Dabee^{1,3}, H. Gamielidien³, J. Baeten², S. Bosinger^{7,8}, A. Burgener^{9,10}, J.-A. Passmore^{3,11}, R. Heffron²

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BACKGROUND: Changes in vaginal microbiota, inflammation and mucosal HIV-1 cellular targets may underlie the increased HIV-1 risk observed in some studies of women using intramuscular depot medroxyprogesterone acetate [DMPA-IM].

METHODS: Within ECHO, designed to compare the relative HIV-1 incidence among women randomized to DMPA-IM, copper intrauterine device (Cu-IUD) or levonorgestrel implant (LNG-implant), this nested three-site substudy aimed to evaluate the impact of these contraceptives on genital tract cytokines, T cell activation and microbiota. Women were randomly selected from among the 430 in the substudy for analyses of samples collected at enrollment (pre-contraceptive initiation) and 1-month post-contraceptive initiation. From 72 women in Cape Town only, multiparameter flow cytometry was used to measure activation (CD38) and frequencies of cervical cytobrush-derived Th17-like cells (CD4+CCR6+CCR10-) ex vivo. From 201 women in Cape Town, Johannesburg, and Kisumu, the 16S rRNA gene was amplified and sequenced from fluid collected via lateral vaginal wall swabs and 27 cytokine concentrations were measured via multiplex bead array on menstrual cup cervicovaginal secretions.

RESULTS: Women randomized to DMPA-IM, but not Cu-IUD nor LNG-implant, had significant increases in genital CD4+ Th17 cell frequencies relative to their baseline (median 44.9% to 57.9%, Wilcoxon p=0.012). Th17 cell frequencies 1-month post-initiation were also significantly higher compared to women randomized to Cu-IUD (p< 0.001) and LNG-implant (p=0.038). Activated CD38+ Th17 cells significantly increased between pre- and post-contraceptive initiation among women in the DMPA-IM arm (p=0.040) but not in the other arms. There were no changes in cervicovaginal cytokine concentrations after contraceptive initiation in any arm. Vaginal bacterial diversity increased significantly among women assigned to Cu-IUD (mean Shannon index 1.22 versus 1.54, paired t-test p=0.025) between baseline and post-contraceptive initiation but not for women assigned to LNG-implant or DMPA-IM. Beta diversity significantly differed between arms post-contraceptive initiation (PERMANOVA p=0.021), with women assigned to Cu-IUD transitioning to more diverse bacterial communities.

CONCLUSIONS: These are the first data comparing markers of HIV-1 risk among women randomized to effective contraceptives. Our observation that DMPA-IM elicits increases in the frequency and activation status of Th17 cells, critical target cells for HIV, provides a plausible mechanism by which DMPA-IM may influence HIV transmission.

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TUPDD02 Thinking and doing: Novel conceptual and methodological approaches

TUPDD0206LB

Quantifying the contribution of different aged men and women to onwards transmission of HIV-1 in generalised epidemics in sub-Saharan Africa: A modelling and phylogenetics approach from the HPTN071 (PopART) trial

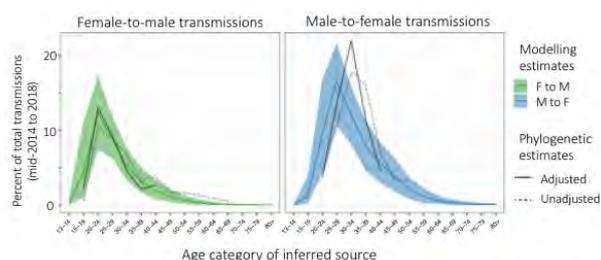
W. Probert¹, M. Hall¹, X. Xi², R. Sauter¹, T. Golubchik¹, D. Bonsall¹, L. Abeler-Dörner¹, M. Pickles¹, A. Cori², J. Bwalya³, S. Floyd⁴, N. Mandla⁵, K. Shanaube⁶, B. Yang⁵, H. Ayles^{3,4}, P. Bock⁶, D. Donnell⁶, K. Grabowski⁷, D. Pillay⁸, A. Rambaut⁹, O. Ratmann², S. Fidler², R. Hayes⁴, C. Fraser¹, PANGEA-HIV consortium and the HPTN 071 (PopART) study team
¹University of Oxford, Oxford, United Kingdom, ²Imperial College, London, United Kingdom, ³Zambart, Lusaka, Zambia, ⁴London School of Hygiene and Tropical Medicine, London, United Kingdom, ⁵Desmond Tutu TB Centre, Stellenbosch University, Cape Town, South Africa, ⁶Fred Hutchinson Cancer Research Center, Seattle, United States, ⁷Bloomberg School of Public Health, Johns Hopkins University, Baltimore, United States, ⁸African Health Research Institute, Durban, South Africa, ⁹Edinburgh University, Edinburgh, United Kingdom

BACKGROUND: Understanding the spread of HIV during HIV prevention trials has high potential to inform future intervention programming. Here, we provide a first characterisation of the residual age- and gender-specific transmission dynamics during the HPTN 071 (PopART) trial using orthogonal methods, and investigate the potential impact of suppressing transmissions from inferred source populations.

METHODS: First, epidemic predictions were made using an individual-based model (IBM) calibrated on trial data. Model parameters of the sexual network were derived from surveys on sexual behaviour. Second, model predictions were tested against phylogenetic estimates obtained with *phyloscanner* from viral short-read next-generation sequencing (NGS) data from three trial communities in Zambia.

RESULTS: Phylogenetic analysis identified 180 probable transmission pairs and the direction of transmission between them. 62% of these transmissions were from men to women, the same as was predicted by the IBM. The phylogenetic analysis predicted men to be 5.4 years than women in male-to-female transmission (IBM predicted 5.5 years), and 3.9 years older in female-to-male transmissions (the IBM predicted 2.9 years). The age distribution of transmitters agreed with modelling predictions, more closely after adjusting for sampling bias (figure 1). According to both the model and phylogenetics analysis, onwards transmissions peaked in 25-29 year old (y.o.) men and 20-24 y.o. women. Modelling the prevention of all transmissions from 25-29 y.o. men and 20-24 y.o. women reduced cumulative incidence over the trial period (mid-2014 to 2018) by 20% and 19% respectively.

CONCLUSIONS: Our results validate predictions of a mathematical model using phylogenetic data. These results support observations that there is a significant contribution of young people to HIV transmission in sub-Saharan Africa, especially 25 to 29 y.o. men. These results highlight that if universal testing-and-treatment (UTT) does not reach young people, and 25 to 29 y.o. men in particular, then the effect of UTT on reducing incidence may be limited.



[Figure 1]

Poster Exhibition

Track A

LBPEA01

HIV-1 pol gene diversity and molecular dating of HIV-1 C from Sri Lanka

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BACKGROUND: Sri Lanka is a member country of South-East Asia region (SEAR). Major HIV-1 subtypes documented in SEAR are subtype C and CRF01_AE. First case of HIV-1 in Sri Lanka was reported in 1987 and till date there is no data on HIV-1 genetic diversity from Sri Lanka. Our study for the first time reports the genetic diversity of HIV-1 pol gene and tMRCA for HIV-1 C from Sri Lanka.

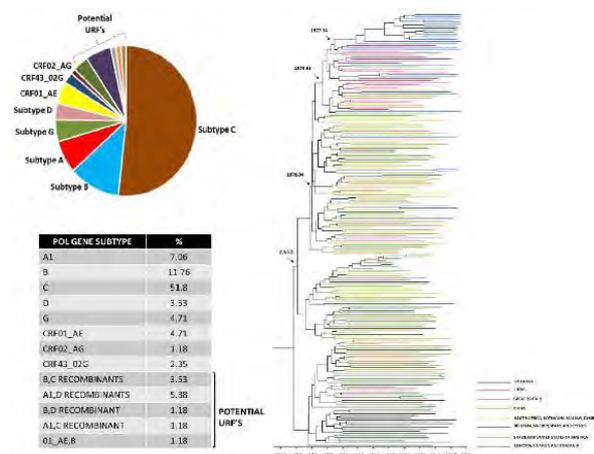
METHODS: Secondary analysis of sequence data obtained for HIV drug resistance analysis of dried blood spot specimens (N=85) collected from HIV infected individuals registered under national treatment program of Sri Lanka was done. Subtype analysis was done using REGA 3.0 while recombinants were characterized by Phylogenetic analysis and jPHMM tool. BEAST analysis was performed to estimate the time to most recent common ancestor (tMRCA) and demographic history for HIV-1 C in Sri Lanka.

RESULTS: Subtype C was predominant (44/85, 51.8%) followed by subtype B (10/85, 11.7%).

There were also sequences belonging to subtype A (7.06%), G (4.71%), D (3.53%), CRF01_AE (4.71%), CRF43_02G (2.35%) and CRF02_AG (1.18%). Additionally we observed unique recombinant forms (URF) which included recombinants like BC (3.53%), A1D (5.88%), BD (1.18%), A1C (1.18%) and O1_AE, B (1.18%). The tMRCA for HIV-1 C sequences was estimated to be around 1965 to 1970. Demographic history using Bayesian skyline plot revealed three phases of HIV-1 C epidemic in Sri Lanka: slow growth from mid-1960s to early 1970s followed by an exponential growth between 1970s to mid-1980s and after 1980s the trend was stationary.

CONCLUSIONS: This is the first study highlighting the genetic diversity of HIV-1 from Sri Lanka.

Major pol gene subtype was subtype C along with other pure subtypes, CRF's and potential URF's. BEAST analysis of HIV-1 C pol sequences indicate that subtype C was introduced in Sri Lanka around mid-1960's to early 1970's.



[HIV-1 pol gene diversity and tMRCA for HIV-1 C from Sri Lanka]

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LBPEA02

Identification and characterization of a CXCR4-tropic transmitted/founder HIV-1 in an acute CRF01_AE infectionH. Song^{1,2}, E. Sanders-Buell^{1,2}, B. Mann^{1,2}, E. Engeman^{1,2}, A. Nguyen^{1,2}, M. Bose^{1,2}, A.M. O'Sullivan^{1,2}, S. Giff^{1,2}, B. Barrows^{1,2}, L.A. Eller^{1,2}, J. Ananworanich^{1,2}, R. Gramzinski¹, N. Michael^{1,2}, R. Thomas^{1,2}, V. Polonis¹, M. Robb^{1,2}, S. Tovanabutra^{1,2}¹US Military HIV Research Program, Walter Reed Army Institute of Research, Silver Spring, United States, ²The Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda, United States**BACKGROUND:** Nearly all transmitted/founder (T/F) HIV-1 characterized to date are CCR5-tropic. While previous studies have suggested that CXCR4 (X4)-tropic HIV-1 are transmissible, detection was not at the earliest stages of acute HIV-1 infection. Here, we identified an X4-tropic T/F HIV-1 in participant 40700 among 18 phenotypically characterized CRF01_AE T/F envelopes (Envs) in the RV217 AH1 cohort.**METHODS:** Single genome amplification (SGA) was performed to retrieve the full-length viral genome in plasma from the first large volume blood draw. The *rev-vpu-env* cassette of the 40700 T/F sequence was cloned and co-transfected into the 293T cells with the NL4.3Δenv Luc+ backbone to generate pseudovirus with the luciferase reporter. Coreceptor tropism was determined by infecting the GHOST cell lines with pseudoviruses followed by measuring the intracellular luciferase activity. The X4-tropic strain MN and an R5 T/F Env identified from the same cohort were used as controls.**RESULTS:** Participant 40700 became infected around the time of entry. The first large volume blood draw was 15 days from the first RNA-positive test and 23 days from the last RNA-negative test. Analysis of SGA-derived sequences showed single T/F infection and a star-phylogeny. Coreceptor tropism prediction indicated a high likelihood of X4 phenotype for the 40700 T/F (Geno2pheno FPR 0.1%). Phenotypic characterization showed that 40700 T/F infected the GHOST.X4 cells efficiently while infected the GHOST.R5 cells poorly. Its low-level infectivity in GHOST.R5 cells can be completely blocked by 5 μM CXCR4 inhibitor AMD3100, whereas the CCR5 inhibitor Maraviroc showed minimal inhibition at the saturation dose, indicating that it entered the GHOST.R5 cells mainly through the endogenous CXCR4. Compared with other CRF01_AE infections established by R5 T/Fs, 40700 experienced a faster rate of CD4 decline and the CD4 count dropped from 707 to 130 cells/μL during the first 223 days of infection (1.6 cells/μL/day versus a median of 0.27 cells/μL/day for the R5 group).**CONCLUSIONS:** These data confirm that X4-tropic HIV-1 is transmissible and may cause rapid CD4 loss. Further studies on viral and host factors associated with the transmission of the highly virulent X4-tropic T/F are required to inform public health sectors for treatment and prevention.

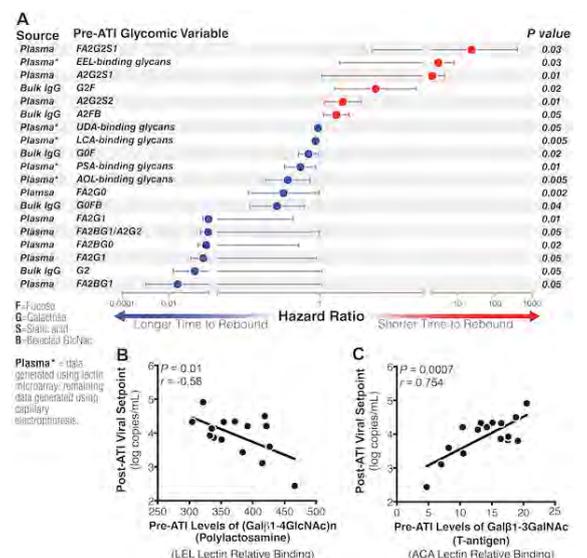
LBPEA03

Impact of alcohol on HIV infection in hepatocytesM. New-Aaron¹, M. Ganesan², E. Makarov³, N. Su³, L. Poluektova³, N. Osna²
¹University of Nebraska Medical Center, Toxicology, Omaha, United States,
²University of Nebraska Medical Center, Internal Medicine, Omaha, United States,
³University of Nebraska Medical Center, Pharmacology and Experimental Neuroscience, Omaha, United States**BACKGROUND:** Excessive alcohol use is frequently reported among HIV infected individuals to be associated with poor treatment outcomes and liver-related morbidities and mortalities among HIV infected individuals. HIV in the liver is known to be inert in patients using antiretroviral therapy, thereby making the liver a silent reservoir of HIV. However, it is unknown if alcohol metabolites affect HIV pathogenesis in hepatocytes.**Objectives:**

- To determine if alcohol metabolites induce HIV replication in liver cells
- To examine if alcohol exposure supports both early and late stages of HIV replication in liver cells

METHODS: We conducted an experimental study on Huh 7.5 cells over-expressing cytochrome P450 (designated as RLW cells). Since RLW cells do not have alcohol metabolizing enzymes, they were treated with acetal-dehyde generating system (AGS) to mimic alcohol metabolism in hepatocytes. Viral replication was measured by HIV RNA load, viral protein (P24) and HIV DNA. We run the experiments in the presence of pan-caspase inhibitor to preserve hepatocytes from apoptotic cell death induced by HIV. **RESULTS:** HIV RNA was upregulated by exposure of HIV-infected hepatocytes to AGS and this was attenuated by AZT treatment. Also, p24 and HIV DNA was upregulated in these cells when exposed to AGS. However, integrated DNA was not detected in the RLW cells regardless of treatment. **CONCLUSIONS:** The elevation of HIV RNA, p24 and HIV DNA in HIV infected RLW cells in the presence of alcohol metabolites (acetaldehyde) and suppressive effect of AZT on HIV RNA indicate that ethanol metabolites supports HIV replication in these cells. However, these replication is incomplete since there is no integration of HIV DNA into human genome and thus, can be interpreted as "abortive" or non-reproductive infection of hepatocytes

LBPEA04

Plasma and antibody glycomic biomarkers predict time to HIV rebound and viral setpointL. Bertoni Giron¹, E. Papisavvas¹, X. Yin¹, A. Anzurez¹, K. Mounzer², J. Kostman², H. Tateno³, Q. Liu¹, L.J. Montaner¹, M. Abdel-Mohsen¹
¹The Wistar Institute, Philadelphia, United States, ²Philadelphia FIGHT, Philadelphia, United States, ³National Institute of Advanced Industrial Science and Technology (AIST), Tokyo, Japan**BACKGROUND:** HIV cure research sorely needs to identify a set of pre-Analytic Treatment Interruption (ATI) biomarkers that predict time to viral-rebound and viral-setpoint. Such biomarkers will improve the safety of ATI and accelerate the development of curative strategies. We previously reported that galactosylated, bulk IgG glycans negatively correlate with cell-associated HIV DNA and RNA during antiretroviral therapy (ART). We hypothesized that this and other plasma glycomic traits can predict time to viral-rebound and viral setpoint upon ART-cessation.**METHODS:** Using capillary electrophoresis and a lectin microarray, we profiled the circulating glycomic signatures (plasma and bulk IgG) of 24 HIV-infected, ART-suppressed individuals who had participated in an ATI study without concurrent immunomodulatory agents. Signatures were obtained immediately before ATI, at viral-rebound, and at viral-setpoint. This cohort had a wide distribution of viral-rebound times (14 to 119 days; median=28) and viral-setpoints (median=13,675 HIV copies/ml). Cox proportional-hazards model, Mann-Whitney test, and linear regression were used for statistical analyses.**RESULTS:** Higher pre-ATI levels of the IgG galactosylated glycan, G2, predicted longer time to viral-rebound (hazard ratio (HR)=0.125, P=0.05). G2 glycan levels were significantly lower at viral-rebound (P=0.02) and viral set-point (P=0.009) compared to their pre-ATI levels. We also identified several predictive glycomic traits in plasma (see Figure):

[A] Plasma/IgG glycans predict time to viral-rebound. [B-C] Plasma glycans predict viral-setpoints.]

non-sialylated, core-fucosylated glycomic traits, e.g., FA2BG1 (HR=0.023, $P=0.05$), strongly predicted a longer time to viral-rebound; sialylated glycomic traits, e.g., FA2G2S1 (HR=24.1, $P=0.028$), strongly predicted a shorter time to viral-rebound. Additionally, pre-ATI plasma glycomic signatures predicted lower viral setpoint, e.g., Gal β 1-3GalNAc (T-antigen) ($r=0.75$, $P=0.0007$), or higher viral setpoint, e.g., poly-lactosamine ($r=-0.58$, $P=0.01$).

CONCLUSIONS: We identified novel, non-invasive, plasma and bulk IgG glycomic biomarkers that strongly predict time to viral-rebound and viral-setpoint upon ART-cessation. Our data warrant further validation and examination of potential functional significance. These pre-ATI biomarkers may revolutionize the conduct of ATI and accelerate the path to develop effective HIV curative strategies.

LBPEA05

Detection of inducible replication competent proviruses in adolescents following early initiation and 14 years of viral suppression in Botswana

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BACKGROUND: Little is known about the impact of early initiation and long-term antiretroviral therapy (ART) on the levels of inducible replication competent proviruses. To address this knowledge gap, we assessed the proviral reservoir in adolescents perinatally infected with HIV-1 receiving ART for > 10 years.

METHODS: Adolescents ($n=19$) with confirmed HIV-1 perinatal infection who initiated ART during the first year of life and on long term ART were studied. The viral load and CD4+ T cell counts were determined using standard methods. Inducible replication competent proviruses were quantified using a TZM-bl cell-based assay termed TZA.

RESULTS: The mean age, weight, height and current CD4+ T cells counts of study participants was 15.9 \pm 0.7 years, 45 \pm 6.4 kg, 157.5 \pm 4.4cm and 950 \pm 331 mm³ respectively. Seventeen of 19 participants had undetectable viral loads (< 400 HIV RNA copies/ml) while HIV-1 RNA load in two participants was 188,762 and 30,838 HIV RNA copies/mL. One of these unsuppressed cases resulted from termination of ART by routine clinical management outside of the study after 14 years of ART. A decision to terminate ART was based on undetectable viral load, negative HIV-1 DNA tests, undetectable antibodies to HIV-1 and high CD4+ T cell counts. However, we detected the inducible replication competent proviruses by the TZA assay with a mean of 24.4 \pm 3.3 Infectious Units per million cells (IU/PM).

CONCLUSIONS: This clinical case demonstrates that despite long standing viral suppression, ART termination resulted in viral rebound and inducible replication competent proviruses. These results suggest that early ART and long term ART (>14 years) does not eliminate HIV. The data presented have implications for public health management, as more people with early HIV infection initiate early ART in the context of 'Test and Treat all' recommendations. Expert advice should be sought in decision to terminate ART. Cautious decisions in clinical practice should be made on sensitive quantification of proviral reservoir; otherwise, negative diagnostic results may be misleading.

LBPEA06

CD57 expressing mature NK cells negatively correlate with the level of intact and hypermutated pro-viral DNA in HIV-1 infected ART-suppressed subjects

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BACKGROUND: By targeting HIV-1 infected cells expressing envelope, NK-mediated antibody-dependent Cellular Cytotoxicity (ADCC) can mediate the clearance of infected cells harboring potentially replication-competent virus. Previous studies in control donors indicate that the NK cells bearing the CD57 maturation marker are associated with enhanced ADCC function. Here, we explored the capacity of CD57 positive or negative NK cells from HIV-1 infected ART suppressed subjects (HIV-ART) to mediate NK poly-functionality against ADCC targets and investigated whether the NK cell CD57 phenotype correlates with any immunological parameters or virological measures of the HIV-1 reservoir.

METHODS: We assessed the phenotype (CD57, NKG2C, CD69, CD56, CD16) and poly-functionality (CD107a, IFN-gamma, TNF-alpha) of NK cells against gp120/antibody coated CEM ADCC targets and K562 tumor targets in fresh samples from ART suppressed HIV-1 infected subjects compared to uninfected donors. Using cryo-preserved samples from HIV-1 ART suppressed subjects, we tested whether the NK cell CD57 phenotype was correlated to CD4 count or the recently described Intact Pro-viral DNA Assay (IPDA) as measured by AcceleVir in circulating CD4+ T cells.

RESULTS: In HIV-ART individuals, the expression of CD57, but not NKG2C, on NK cells correlated positively with clinical CD4 count ($r=0.7409$, $p=0.0002$, $n=20$). Conversely, the IPDA assay revealed the frequency of CD57 positive NK cells was inversely correlated with intact pro-viral DNA content ($r=-0.5845$, $p=0.0505$, $n=12$) and the hypermutated and/or 3' deleted pro-viral DNA ($r=-0.6864$, $p=0.0164$, $n=12$) but not 5' deleted or total pro-viral DNA. *In vitro*, CD57 positive NK cells from HIV-ART individuals maintained strong ADCC-triggered degranulation and poly-functionality against gp120-coated targets, but exhibited lower recognition of traditional tumor targets when compared to uninfected donors ($p=0.007$, $n=9$). Within the NK cell population, CD57 expressing NK cells had faster response rate and higher magnitude of degranulation and cytokine production against ADCC targets when compared to less mature NK cells lacking CD57 ($p=0.002$, $n=9$).

CONCLUSIONS: Our results indicate that CD57 positive NK cells have an augmented ADCC innate effector response that can preferentially contribute to eliminate envelope expressing infected target cells. Our work supports monitoring the CD57 NK cell population as a potential determinant of ADCC cure-directed immunotherapy strategies targeting the replication-competent viral reservoir.

LBPEA07

Estradiol inhibits HIV-1_{BAL} infection and induces expression of CFL1 and LSP1 in endocervical mucosa and in peripheral blood mononuclear cells

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BACKGROUND: Inhibitory effect of estradiol (E2) during HIV acquisition was suggested by several studies. E2-containing implants and estradiol vaginal cream treatment protected against vaginal SIV acquisition in ovariectomized rhesus macaques. Administration of E2-containing vaginal cream in postmenopausal women blocked *ex vivo* ectocervical tissue infection. Our results demonstrated an inverse association between serum E2 concentrations and cervical tissue infection level.

However, the mechanism of E2 action against HIV infection is not fully understood. Our RNA sequencing (RNAseq) data of endocervix in the E2-dominating proliferative phase of the menstrual cycle (vs. secre-

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tory phase) identified increased gene expression of actin-binding proteins CFL1 and LSP1. Actin cytoskeleton has an integral role in establishing and spreading HIV infection. As both CFL1 and LSP1 regulate actin dynamics and cellular trafficking, this study was designed to explore effects of E2 on HIV infection, CFL1 and LSP1 expression *in vitro* to gain insight into the mechanism of HIV inhibition by E2.

METHODS: Human endocervical explants and PBMCs were incubated with E2 (100-10000 pg/ml) for 48h, then challenged with HIV-1_{BAL} (500 TCID₅₀ per explant and 1000 TCID₅₀ per 10⁶ of PBMCs), washed and cultured for 14 days in the presence of E2 (vs. Raloxifene or untreated controls). The infection was monitored by HIV *gag* one-step qRT-PCR. SOFT and CUM endpoint analyses were performed. p24 expression in PBMCs was analyzed by Immunofluorescence microscopy (IF). Expression of CFL1 and LSP1 was analyzed by qRT-PCR, IF and Western Blot.

RESULTS: E2 treatment dose-dependently inhibited HIV infection in both endocervix and PBMCs. This inhibitory effect was blocked by Raloxifene. Consistent with increased expression of CFL1 and LSP1 detected by RNA-seq in endocervix during E2-dominating proliferative phase of the cycle, *in vitro* E2 treatment induced increased expression of CFL1 and LSP1 at mRNA level and protein level in unchallenged and HIV-challenged tissues/PBMCs. Expression of active phosphorylated CFL1 was also increased.

CONCLUSIONS: These results support data pointing to protective effect of E2 against HIV acquisition and suggest novel potential mechanisms of E2 action through CFL1 and LSP1 effects on actin cytoskeleton.

LBPEA08

Efficacy of on-demand PrEP or PEP with single oral doses of combination tenofovir alafenamide, emtricitabine, elvitegravir, and cobicistat (TAF/FTC/EVG/c) in macaques

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BACKGROUND: Coitally timed antiretroviral dosing for HIV prevention ("on-demand" PrEP or PEP) may be preferred and cost-effective. Here, we investigated if single oral doses of combination TAF/FTC/EVG/c can prevent rectal SHIV infection in macaques. We also compared human and macaque rectal tissue pharmacokinetics, and assessed willingness to use on-demand PrEP or PEP among men who have sex with men (MSM).

METHODS: Efficacy of TAF/FTC/EVG/c was investigated in macaques exposed rectally to SHIV once a week for up to 8 weeks and treated at different times before or after exposure: -24h (n=6), -4h (n=6), +2h (n=5), +6h (n=6), and +24h (n=6). Infection outcome was compared to untreated controls. Drug levels in rectal tissues were compared between macaques and HIV-negative MSM (n=7) receiving a single fixed-dose combination TAF/FTC/EVG/c tablet. A national online HIV behavioral surveillance survey of MSM (N=1668) in the US assessed willingness to use on-demand PrEP or PEP. Participants were randomized to receive one of five questions: daily PrEP, PrEP (-24h or -2h) or PEP (+2h or +24h).

RESULTS: Efficacy of single dose TAF/FTC/EVG/c was 80% [10.8-95.5] in the -24h group, 91.7% [35.7-98.9] in the -4h, 100% in the +2h, 80.1% [13.9-95.4] in the +6h, and 64.6% [-19.4,89.5] in the +24h group. After a single dose, median TFV-DP levels in rectal tissues at 24h were similar in macaques and humans (p>0.5); FTC-TP was mostly undetectable. Tissue EVG, FTC, and TFV in macaques and humans were also similar (p>0.5 for all comparisons). Willingness to use on-demand PrEP/PEP was highest for PEP 24h after sex and lowest for PrEP 24h before sex among both current PrEP users (83.9% vs 52.2%, p< 0.0001) and non-PrEP users (83.3% vs 70.0%, p< 0.0001). Among PrEP non-users, willingness to use any form of on-demand PrEP or PEP (+2h or +24h) was higher than to use daily PrEP (77.6% vs 57.2%, p< 0.0001).

CONCLUSIONS: A single oral dose of TAF/FTC/EVG/c around the time of exposure protected macaques from rectal SHIV infection. The highest efficacy was seen when animals were dosed shortly before or after exposure. The high efficacy and willingness to use on-demand PrEP or PEP among MSM support the clinical development of this intervention.

LBPEA09

Viral and immune dynamics in orally SHIV-infected ART-treated infant rhesus macaques

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BACKGROUND: Currently available ART-based measures to prevent MTCT of HIV-1 do not address the scenario of new maternal infections during the peri- or post-partum periods, creating a risk for transmission to infants during breastfeeding. With lifelong drug exposure in HIV-infected children associated with accelerated non-AIDS complications and the risk of triple drug class virologic failure, there is a critical need for strategies to achieve viral remission. Expanding on a nonhuman primate model of pediatric infection recently published in our laboratory, here we aimed to characterize immune responses, the viral reservoir, and rebound kinetics in orally SHIV-infected ART-treated infant rhesus macaques.

METHODS: Sixteen 4-week-old Mamu B08/B17 rhesus macaques born in Summer 2018 were orally administered SHIV.CH505.375H.DCT in two inoculations 24 hrs apart and placed on ART (TDF+FTC+DTG) at 8 wpi.

RESULTS: Median viral loads at peak and immediately prior to ART were ~500,000 and 100,000 copies/mL, respectively. Males and females had comparable replication kinetics but there was a trend for lower pre-ART viral loads in Mamu A07 animals. Cell-associated viral DNA was detectable in blood and lymph node CD4+ T cells pre-ART and declined in both compartments by up to 2 logs after ART initiation. SHIV DNA was also readily detected in rectal biopsy CD4+ T cells at 16 wpi, where higher levels were associated with an increased frequency of CCR5+CD4+ T cells (p < 0.0001). Consistent with observations from HIV-infected children, SHIV-infected infant macaques showed little to no decline in peripheral CD4+ T cell frequencies during acute infection. Env-specific gp140, gp120, and gp41 binding antibodies were first detected at 3-4 wpi and displayed a gradual, significant decline after ART initiation.

CONCLUSIONS: In summary, we have begun to characterize viral and immune dynamics in a pre-clinical nonhuman primate model that displays key features of pediatric HIV infection and uses a SHIV expressing clade C HIV Env, a subtype highly relevant to the current epidemic and one that allows investigation of HIV envelope-targeting strategies. Ongoing work involves whole-body imaging to visualize anatomical sites of infection before and after ART interruption.

LBPEA10

Treatment with the IL-15 superagonist N-803 accelerates time-to-viremia in a novel *in vivo* humanized mouse model developed for rapid preclinical evaluation of latency reversing agent efficacy

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BACKGROUND: The elimination of cells latently infected with HIV is a major obstacle in developing HIV cure strategies. Current methods for screening latency reversing agents (LRAs) have largely utilized *in vitro* systems and current *in vivo* models require time-consuming methods and/or do not directly assess reactivation and depletion of latent reservoirs capable of producing infectious virus from HIV-infected individuals. To address this impediment, we developed a preclinical humanized mouse model using the onset of viremia as the metric for rapidly evaluating LRA efficacy in reactivating primary latently infected CD4+ T cells from ART-suppressed HIV-infected donors.

METHODS: Peripheral blood mononuclear cells (PBMCs) from HIV+ individuals on long-term cART suppression were intrasplenically coinjected with irradiated PBMCs from HIV-seronegative donors into highly immuno-

deficient NOD-Rag1^{nu/nu}L2ry^{nu/nu} (NSG) mice. The efficacy of LRAs, including the IL-15 superagonist N-803, to reactivate latently infected cells were determined by examining time-to-viremia and plasma viral loads relative to untreated mice. Human CD4 (hCD4) and human CD8 (hCD8) T cells were measured in peripheral blood and spleens by flow cytometry and immunohistochemistry. HIV env sequencing was performed on rebound plasma virus to characterize the diversity of the reactivated latently infected cell population.

RESULTS: hCD4 and hCD8 T cells were detectable in the peripheral blood throughout the 5-week course of screening and correlated with splenic populations. Viremia was detected in 60% (3/5) mice one week after intravenous injection of N-803 (mean=10,239 copies/mL) while no plasma virus was detected in untreated mice. Two weeks post-injection, 100% of treated mice (5/5) displayed pronounced plasma viremia (mean=1.99x10⁷ copies/mL) as compared to 80% (4/5) of untreated mice (mean=7.07x10⁵ copies/mL). Luminex cytokine measurements did not detect elevated levels of inflammatory cytokines relative to untreated mice. Sequence analysis is pending.

CONCLUSIONS: Administration of N-803 to mice accelerated time-to-viremia with almost 30-fold higher plasma viral loads relative to untreated mice, in line with previous data demonstrating *in vitro* LRA activity of N-803. The development of this model provides a new *in vivo* preclinical screening strategy for evaluating LRA efficacy and safety and may provide a highly valuable platform for testing personalized LRA therapeutic regimens and HIV cure strategies for individual patients.

Track B

LBPEB11

Development and validation of a point-of-care, urine assay to measure adherence to PrEP and ART

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BACKGROUND: High adherence to HIV prevention and treatment regimens is associated with reduced risk of HIV transmission and, in HIV-positive individuals, viral suppression. Currently, adherence is sub-optimal; available methods of assessing adherence are either inadequate or too expensive for widespread use. We developed an antibody specific to tenofovir (TFV), a metabolite of TDF and alafenamide (TAF), prodrugs of most ART and all PrEP regimens, for use in a lateral flow immunoassay (LFIA) format.

METHODS: We tested 160 urine samples for TFV concentrations above or below the 650 ng/mL cutoff using the POC LFIA and compared the results to a LC-MS/MS-based test. To ensure the integrity of the LFIA, we conducted storage and temperature stability tests to assess performance in disparate settings.

RESULTS: The sensitivity and specificity of the POC LFIA compared to the LC-MS/MS were 100% and 100%, respectively. We saw no changes in the performance of the LFIA with storage at room temperature, 45°C, and 55°C for up to 21 days.

CONCLUSIONS: We developed the first-ever urine TFV LFIA prototype that demonstrates high sensitivity (100%) and specificity (100%) using clinical samples. This novel POC LFIA can inexpensively facilitate real-time monitoring of adherence to TFV-based PrEP and ART, enabling providers to improve the allocation of adherence interventions to patients. Bolstered adherence support can prevent seroconversions and improve outcomes for PrEP and ART patients.

LBPEB12

Similar 12 & 24 month preliminary outcomes for TRU/DTG and TDF/FTC/EFV regimens in Botswana: The Botswana Epidemiological ART Treatment Cohort Study (The BEAT)

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BACKGROUND: Botswana became the first country in Africa to implement "Treat All" using Dolutegravir based regimens (DBRs) in June 2016. The BEAT Cohort Study, is an observational research cohort tracking clinical outcomes of PLHIVs starting DBRs in comparison to other ART regimens. We present preliminary 12 & 24 month outcomes for First Line patients initiated on either TRU/DTG or TDF/FTC/EFV in routine care settings.

METHODS: Retrospective data were extracted from electronic medical and laboratory databases, clinic and patient files from urban & semi-rural facilities, for patients initiating TRU/DTG from 1/1/16 and TDF/FTC/EFV from 1/1/08. Rates of adverse events (AEs) Grade ≥3 (DAIDS 2017 v.2.1), lost-to-follow-up (LTFU) and death were assessed at 8 facilities (n=3,791) and viral load (VL) suppression (HIV RNA load < 400 copies/mL) was assessed at 10 facilities (n=4,352).

RESULTS: A total of 4,352 First Line PLHIVs were included, 1,523 initiating TRU/DTG and 2,829 initiating TDF/FTC/EFV. Overall viral load suppression was high at both time points without significant differences (Tables 1 & 2).

	TRU/DTG (n = 1523) P (95% CI) Median Age: 36 Years 61% Female	TDF/FTC/EFV (n = 2829) P (95% CI) Median Age: 42 Years 67% Female	P Values
Sex	Baseline CD4 = 368 (193,545)	Baseline CD4 = 237 (129,308)	
Male	97.6 (95.7, 98.9)	97.1 (95.5, 98.3)	0.586
Female	98.3 (97.0, 99.1)	97.6 (96.6, 98.4)	0.307
District			
Gaborone	97.5 (95.6, 98.7)	97.2 (96.0, 98.1)	0.740
Mahalapye	97.9 (95.1, 99.3)	98.6 (96.8, 99.6)	0.495
Molepolole	98.0 (95.0, 99.5)	98.2 (96.4, 99.3)	0.845
Francistown	99.5 (97.4, 99.9)	98.2 (93.9, 99.8)	0.245
TOTAL	98.1 (97.1, 98.8)	97.3 (96.6, 98.1)	0.239

[Table 1: 12 Month Efficacy Outcomes for TRU/DTG & TDF/FTC/EFV Regimens]

	TRU/DTG (n = 750) P (95% CI)	TDF/FTC/EFV (n = 2829) P (95% CI)	P Values
Sex			
Male	98.5 (95.7, 99.7)	96.2 (94.4, 97.6)	0.113
Female	98.4 (96.5, 99.4)	98.4 (97.5, 99.0)	0.973
District			
Gaborone	98.0 (94.3, 99.6)	97.7 (96.5, 98.6)	0.802
Mahalapye	97.7 (94.1, 99.4)	98.9 (96.9, 99.8)	0.315
Molepolole	98.6 (94.9, 99.8)	96.9 (94.8, 98.3)	0.298
Francistown	100	96.4 (91.0, 99.0)	0.041
TOTAL	98.4 (97.0, 99.3)	97.3 (96.4, 98.0)	0.189

[Table 2: 24 Month Efficacy Outcomes for TRU/DTG & TDF/FTC/EFV Regimens]

Adverse Events Grade ≥3 occurred in < 1% of both DBRs (n=3) & TDF/FTC/EFV (n=18). Deaths occurred in < 2.5% of both DBRs (n=26) and TDF/FTC/EFV (n=53) at 24 months. No significant differences were found in LTFU on either regimen, both at < 1.5%, DBRs (n=19) and TDF/FTC/EFV (n=32).

CONCLUSIONS: Preliminary results from this observational cohort in a real-world setting in Botswana, demonstrate that First Line patients initiating TRU/DTG and TDF/FTC/EFV performed equally well with viral load, AEs, deaths and LTFU without significant differences at 12 and 24 months.

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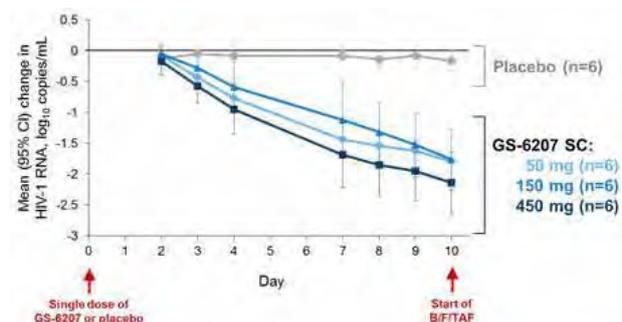
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LBPEB13

Safety and antiviral activity over 10 days following a single dose of subcutaneous GS-6207, a first-in-class, long-acting HIV capsid inhibitor in people living with HIVE.S. Daar¹, C. McDonald², G. Crofoot³, P. Ruane⁴, G. Sinclair⁵, H. Patel⁶, J. Sager⁶, Y.-P. Liu⁶, D.M. Brainard⁶, R.H. Hyland⁶, M. Rhee⁶¹Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, United States, ²Tarrant County Infectious Disease Associates, Fort Worth, United States, ³The Crofoot Research Center, Houston, United States, ⁴Ruane Clinical Research Group Inc, Los Angeles, United States, ⁵AIDS Arms Inc. DBA Prism Health North Texas, Dallas, United States, ⁶Gilead Sciences, Foster City, United States**BACKGROUND:** GS-6207 is a novel, long-acting inhibitor of HIV-1 capsid function. In a previous study in HIV-negative volunteers, a single dose of subcutaneous (SC) GS-6207 at 30, 100, 300, or 450 mg was well tolerated and maintained systemic exposure ≥ 24 weeks.**METHODS:** This ongoing, phase 1b, double-blinded, placebo-controlled, dose-ranging, randomized (3:1; n=8/group) people living with HIV who were capsid- and integrase-naïve and ART-naïve (or had not received ART 12 weeks before entry). Participants received a single SC dose of GS-6207 (20, 50, 150, 450, or 750 mg) or placebo. Primary endpoint was maximum reduction of plasma HIV-1 RNA through day 10. Safety was assessed using laboratory tests and adverse event (AE) reporting. On day 10, all participants initiated single-tablet regimen bicitgravir/emtricitabine/tenofovir alafenamide (B/F/TAF). Herein, we present efficacy (through day 10) and blinded safety (through at least day 16) data for the 50, 150, and 450 mg cohorts.**RESULTS:** Demographics and baseline characteristics were similar across groups. Significant reductions in plasma HIV-1 RNA by day 10 were observed for all groups, compared with placebo ($p < 0.0001$). Mean maximum decrease in HIV-1 RNA in each group ranged from 1.76 to 2.20 \log_{10} copies/mL (figure). No serious AEs, AEs leading to discontinuation, Grade 3 or 4 AEs, or clinically relevant Grade 3 or 4 laboratory abnormalities were reported. Most common AEs were mild or moderate injection site reactions (63%; 15 of 24). Available data from remaining cohorts will be presented.**CONCLUSIONS:** These preliminary data demonstrate the first proof-of-concept for in vivo antiviral activity of capsid inhibition. Following a single SC dose, potent antiviral activity was observed in all participants who received GS-6207 at 50, 150, or 450 mg through day 10. GS-6207 was generally safe and well tolerated. These results support further evaluation of GS-6207 as a long-acting antiretroviral agent in people living with HIV.[Mean (95% CI) Changes from Baseline in HIV-1 RNA (\log_{10} copies/mL)]

LBPEB14

Weight gain during pregnancy among women initiating dolutegravir in BotswanaE. Caniglia^{1,2}, R. Shapiro^{2,3}, M. Diseko³, B. Wylie⁴, C. Zera⁴, S. Davey³, A. Isaacson³, G. Mayondi³, J. Mabuta³, R. Lockett⁴, J. Makhema³, M. Mmalane³, S. Lockman^{3,5}, R. Zash^{3,4}, The Tsepamo Study
¹New York University School of Medicine, Population Health, New York, United States, ²Harvard T.H. Chan School of Public Health, Boston, United States, ³Botswana Harvard AIDS Institute Partnership, Gaborone, Botswana, ⁴Beth Israel Deaconess Medical Center, Boston, United States, ⁵Brigham and Women's Hospital, Boston, United States**BACKGROUND:** Recent data suggests clinically significant weight gain among non-pregnant HIV-infected adults after starting dolutegravir-based ART (DTG). Excess or inadequate weight gain in pregnancy could adversely impact maternal and fetal outcomes, but data for pregnant women receiving DTG has been limited to date.**METHODS:** The Tsepamo Study captured data at up to 18 large delivery sites in Botswana from August 2014-March 2019. Pre-pregnancy weight, weight measurements during antenatal care (ANC), HIV testing and HIV treatment information were abstracted at delivery from the maternity obstetric record. HIV-positive pregnant women who initiated DTG or EFV between conception and 17 weeks gestation and HIV-negative women with similar ages who presented for ANC care before 17 weeks gestation were included in this analysis. We evaluated weekly weight gain and total 18-week weight gain between 18 \pm 2 and 36 \pm 2 weeks gestation by exposure group. Linear regression models estimated mean differences, adjusting for demographic and clinical variables.**RESULTS:** Women initiating DTG and EFV had similar baseline characteristics, including pre-pregnancy weight and weight at ART initiation. Compared to EFV, the adjusted mean weekly weight gain was 0.05 (95% CI 0.03, 0.07) kg/week higher and the adjusted mean 18-week weight gain was 1.12 (95% CI 0.67, 1.57) kg higher for DTG. The weight gains in both ART groups were less than the weight gains in HIV-negative women (Table). Differences in weight gain by ART regimen were larger among women weighing >80kg and were attenuated among women weighing < 50kg before ART initiation.

	EFV (n=1,683)	DTG (n=1,464)	HIV-negative (n=21,917)
Age, mean	28.8	28.9	28.3
Pre-pregnancy weight, mean	62.60kg	62.80kg	63.01kg
Weight at ART initiation, mean	65.62kg	65.66kg	66.51kg (at first ANC)
Primigravid, percent	29.1%	26.6%	32.7%
Pre-ART CD4 cell count, mean	419 cells/ μ l	390 cells/ μ l	--
Weekly weight gain, mean	0.31kg/week	0.35kg/week	0.44kg/week
Adjusted mean difference (95% CI)	reference	0.05 (0.03, 0.07) kg/week	0.12 (0.10, 0.15) kg/week
18-week weight gain, mean	5.30kg	6.27kg	7.95kg
Adjusted mean difference (95% CI)	reference	1.12 (0.67, 1.57) kg	2.42 (1.92, 2.91) kg

[Baseline characteristics and weight gain during pregnancy by exposure group, The Tsepamo Study]

CONCLUSIONS: Women initiating DTG compared with EFV during pregnancy gained more weight between 18 and 36 weeks gestation, particularly among those with higher pre-ART pregnancy weight. However, neither group gained as much weight as HIV-negative women. Further research is needed to understand the impact of weight gain differences on maternal and infant outcomes.Tuesday
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LBPEB15

Low dose efavirenz (Efavirenz 400mg) combined with tenofovir 300mg and lamivudine 300mg shows excellent viral suppression among HIV pregnant women receiving routine HIV care in Zambia

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BACKGROUND: In an effort to promote the improved tolerability of combination antiretroviral therapy (ART) regimens for treatment of HIV, the Zambian Ministry of Health adopted the WHO recommendation of using low dose efavirenz (efavirenz 400mg or EFV400) as part of the alternative first line ARV regimens due to significantly fewer efavirenz-associated adverse events compared to the conventional efavirenz 600mg dose (EFV600). Following the dolutegravir (DTG) safety concerns in early pregnancy from the Botswana Tsepamo study and the favorable tolerability, virologic efficacy and *CYP2B6* pharmacogenetics of EFV400 in pregnant women living with HIV (WLWH) from Uganda and the United Kingdom, EFV400 combined with tenofovir disoproxil fumarate (300mg) and lamivudine (300mg) was recommended as the preferred regimen in pregnancy in Zambia.

METHODS: We evaluated maternal virologic suppression and infant HIV outcomes among WLWH on EFV based ART with documented maternal viral load at/near time of delivery and infant HIV status in twelve (12) high volume antenatal clinics within urban Lusaka. The primary outcomes were maternal virologic suppression (viral load < 1000 copies/mL) and vertical transmission rate based on infant HIV DNA PCRs.

RESULTS: Two hundred and eighty-seven (287) mother-infant pairs were analyzed with 271 (94%) women having initiated or transitioned to EFV400 during pregnancy with 16 (6%) remaining on EFV600 with a mean age of 30 years (95% CI:29.97, 31.57). Forty percent (40%) started ART during pregnancy with a median duration on EFV400 of 4.83 months (95%CI 4.28, 5.37). Maternal viral suppression at delivery was 92% (95% CI: 89,96) among those receiving EFV400 and 88% among those receiving EFV600. HIV DNA PCR was positive in 2 (0.7%) of the HIV exposed infants, with 3 (1.04%) non-viable outcomes and 0 fetal abnormalities.

CONCLUSIONS: Our findings show that the 400mg dose of EFV was associated with high levels of maternal viral suppression during pregnancy. This rate was higher than the previously reported suppression rates of 75% on EFV600 in the same Zambian population and this could be due to the improved tolerability of the lower EFV (400mg) dose. These findings support the routine use of EFV 400mg in pregnancy while providing a favorable alternative option to dolutegravir.

LBPEB16

Risk of sexually transmitted infections among women randomized to DMPA-IM, the copper IUD, and levonorgestrel implant in the Evidence for Contraceptive Options and HIV Outcomes (ECHO) trial

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BACKGROUND: Women and girls in need of contraception are at risk of both pregnancy and sexually transmitted infections (STI), yet minimal data are available regarding STI risk with modern contraceptive methods, and no data are available from randomized controlled trials.

METHODS: Women aged 16-35 years were randomized to injectable depot medroxyprogesterone acetate (DMPA-IM), copper intrauterine device (IUD), or levonorgestrel (LNG) implant and were followed for up to 18 months. Nucleic acid amplification testing for *Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT) was conducted at baseline, final visit and at interim visits per clinical indication; treatment was provided based on syndromes and laboratory results. We estimated pairwise NG and CT prevalence ratios (PR) at the final visit using intention-to-treat (ITT) and best achievable use (BAU, i.e., excluding women who did not initiate their randomized method at enrollment and censoring at time of randomized method discontinuation) analytic approaches. The ITT model included adjustment for site; confounders resulting in a ≥10% change in PR estimates were retained in BAC models.

RESULTS: NG and CT prevalence at baseline were 4.7% and 18.2% respectively, with comparable prevalence by randomized arm and higher prevalence among women ≤24 years of age vs. >24 years. Follow-up time (mean 15.7 months) and method continuation were high (81.3% used their assigned method throughout follow-up and completed the final visit) and comparable across randomized arms. STI prevalence at the final visit was high despite syndromic treatment during follow-up: NG 4.8% (95% CI 4.4, 5.4) and CT 15.4% (14.6, 16.2). Results of the ITT and BAU analyses were comparable:

	ITTa	ITTa	BAU	BAU
	NG PR (95% CI)	CT PR (95% CI)	NGb PR (95% CI)	CTc PR (95% CI)
DMPA-IM vs. copper IUD	0.7 (0.5, 0.9)*	0.9 (0.8, 1.0)	0.7 (0.5, 0.9)*	0.9 (0.7, 1.0)
DMPA-IM vs. LNG implant	0.8 (0.6, 1.0)	0.8 (0.7, 0.9)*	0.8 (0.6, 1.0)	0.8 (0.7, 0.9)*
Copper IUD vs. LNG implant	1.2 (0.9, 1.5)	0.9 (0.8, 1.0)	1.1 (0.9, 1.5)	0.9 (0.8, 1.0)

Prevalence ratio (PR); intention to treat (ITT); best achievable use (BAC) *significant at p≤0.05 level; aadjusted for study site; badjusted for study site, HIV status at final visit and pelvic exam number (total); cadjusted for study site, age group (≤24 vs. >24) and CT status at screening

[Relative risks of sexually transmitted infections by contraceptive methods]

CONCLUSIONS: The consistency of ITT and BAU analysis results suggest that DMPA-IM users may have a lower risk of NG compared to copper IUD users and of CT compared to LNG implant users. However, any true decreased risk must be evaluated along with all potential risks and benefits of the contraceptive method.

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LBPEB17

Early relative effects of intramuscular depot medroxyprogesterone acetate, a copper intrauterine device and the levonorgestrel implant on HIV disease progression: results from the ECHO Trial

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BACKGROUND: The immunosuppressive effects of intramuscular depot-medroxyprogesterone acetate (DMPA-IM) may promote HIV disease progression. Few data exist for other contraceptive methods. One randomized trial with important limitations found hormonal contraceptive (HC) use, including DMPA-IM, was associated with increased risk of disease progression compared to copper intrauterine device (Cu-IUD). However, cohort studies have consistently found no association between HC use and HIV disease progression.

METHODS: We included women 16-35 years randomized to either DMPA-IM, Cu-IUD, or levonorgestrel (LNG) implant who HIV seroconverted during the ECHO trial and who had not initiated ART (n=385). HIV viral loads (VL) and CD4 counts were assessed at HIV detection and quarterly thereafter. We analyzed outcomes among women according to their randomized group and a second 'continuous use' analysis which excluded women at time of randomized method discontinuation. We compared mean levels by contraceptive arm at baseline and 3 months (set point) using linear models adjusted for confounders. Time to CD4 count <350 cells/mm³ was compared by arm using Cox proportional hazards models.

RESULTS: At HIV detection DMPA-IM users had lower VL (mean differences: -0.28 [95% CI: -0.54, -0.02] log copies/ml vs. Cu-IUD, and -0.30 [CI: -0.57, -0.03] log copies/ml vs. LNG implant), and higher mean CD4 than Cu-IUD by 72 cells/mm³ (CI: 17, 127). Among women randomized to LNG implant, CD4 count was similar to DMPA users and modestly higher than Cu-IUD users (difference LNG vs IUD 46 [-11, 104]). Among women with a 3-month ART free visit (37.6%), no significant differences emerged in VL nor CD4 means at set point between groups but statistical power was limited. In time to CD4 <350 cells, hazard ratios were lower in DMPA and LNG than Cu-IUD: DMPA vs. IUD (HR = 0.7 [0.4, 1.1]) and LNG vs. IUD (HR = 0.6 [0.4, 1.1]). Results were similar in continuous use analysis: LNG vs. IUD, HR = 0.6 [0.3, 1.0], DMPA vs IUD HR = 0.6 [0.3, 1.1].

CONCLUSIONS: Although numbers are small, we found no evidence of more rapid disease progression among DMPA-IM users. Trends to more rapid progression among Cu-IUD users should be interpreted with caution.

LBPEB18

Pharmacokinetics (PK) and safety of zidovudine (ZDV), lamivudine (3TC) and lopinavir/ritonavir (LPV/r) in HIV-infected children with severe acute malnutrition (SAM) in sub-Saharan Africa: IMPAACT Protocol P1092

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BACKGROUND: SAM may alter PK and safety of antiretroviral therapy (ART) by affecting absorption. LPV/r and ZDV/3TC absorption is impacted by gastric pH in opposing directions, theoretically leading to decreased exposure for LPV/r and increased exposure for ZDV/3TC. The study P1092 compared PK, safety, and tolerability of ZDV, 3TC, and LPV/r in children with and without SAM.

METHODS: HIV-infected children aged 6 to < 36 months received WHO weight-band dosage of ZDV, 3TC, and LPV/r syrup for 48 weeks. SAM was defined by weight-for-height z-score (WHZ) < -3 or mid-upper arm circumference < 115 mm. WHZ > -2 defined non-SAM. Intensive PK sampling was performed at study week (SW) 1, 12, and 24. Plasma drug concentrations were measured using liquid chromatography tandem mass spectrometry, and steady-state mean area under the curve (AUC) and clearance (CL/F) for each drug were compared between groups. Grade ≥3 adverse events were compared. Tolerability was assessed by frequency of vomiting or diarrhea and study treatment discontinuation. Statistical significance: p < 0.05.

RESULTS: 52 children enrolled (44% female): 25 SAM with median WHZ -3.4 (IQR -4.0, -3.0) and 27 non-SAM WHZ -1.0 (-1.8, -0.1). Baseline median HIV-RNA and CD4% 4.8 log₁₀ copies/mL vs. 5.6, and 15% vs. 23%. No AUC or CL/F significant differences were observed between groups (p ≥ 0.11) except for lower SW12 3TC AUC (mean 4,365.5 vs. 7,233.0 ng*hr/mL; p=0.047) and higher SW24 ZDV AUC [2,449.7 vs. 1,609.3 ng*hr/mL; p=0.003] and lower SW24 ZDV CL/F [40.8 vs. 64.0 L/hr; p=0.003] in SAM. Across time, SAM vs. non SAM showed consistent but non-significant lower mean LPV/r (p=0.17) and higher mean ZDV AUC (p=0.08). Treatment-related grade ≥3 toxicity through SW24 did not differ significantly (24.0% vs. 25.9%). Treatment discontinuations through SW24 were comparable: Five (20%) SAM (3 fatalities unrelated to study treatment [2 gastroenteritis, 1 probable pneumonia]) vs 3 (11%) non-SAM. SAM children experienced more vomiting (28%) and diarrhea (36%) compared to non-SAM (18.5% and 11.1%).

CONCLUSIONS: WHO weight-band dosing of ZDV, 3TC, and LPV/r syrup appeared safe and drug exposures were generally similar between the groups, but SAM AUC exposure tended to be lower for LPV/r and higher for ZDV.

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LBPEB19

Emergence of clonal invasive nontypeable *Haemophilus influenzae* in HIV-positive Black men who have sex with men in Metropolitan Atlanta, 2017-2018

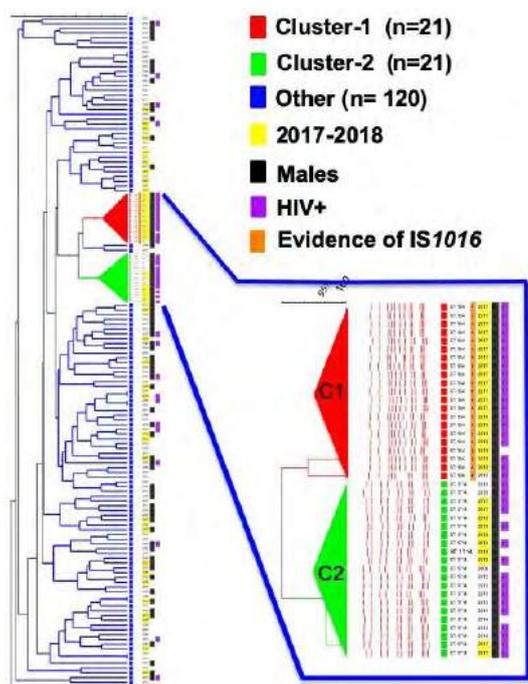
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BACKGROUND: Adult invasive nontypeable *Haemophilus influenzae* (iNTHi) is typically associated with bacteremic pneumonia. NTHi is genetically diverse; clusters of infection are uncommon. We investigated an apparent increase in iNTHi in HIV-positive men who have sex with men (MSM) in Atlanta in 2017-2018.

METHODS: Using population-based surveillance, we identified iNTHi in adults 18-55yrs from 1/1/2008-6/30/2018 in Atlanta. We compared cases in persons living with HIV (PLWH) to those in presumed HIV-negative adults by time period (HIV+ 2008-16, HIV+ 2017-18, HIV- 2008-18). We determined genetic-relatedness of available NTHi isolates by pulsed-field gel electrophoresis (PFGE) and whole genome sequencing (WGS).

RESULTS: Fifty-two of 168 iNTHi cases occurred in PLWH: 24 in 2008-2016, 28 in 2017-2018 ($p < 0.001$). Compared with HIV-negative adults with iNTHi in 2008-2018, PLWH with iNTHi in 2017-2018 were more likely to be male (93% vs 48%), black (100% vs 52%), have septic arthritis (39% vs < 1%) ($p < 0.001$ for all), and less likely to have pneumonia (21% vs 39%, $p=0.09$). Most (120/162) NTHi isolates had heterogeneous PFGE patterns, but two distinct clonal groups were identified: C1 ($n=21$), C2 ($n=21$) (Figure). PLWH in 2017-2018 were more likely to have C1/C2 iNTHi (93%) compared with PLWH 2008-2016 (43%, $p < 0.001$) and HIV-negative adults 2008-2018 (5%, $p < 0.001$). Patient characteristics in C1/C2: median age 33y/36y, 100%/100% male, 100%/95% black, 95%/76% PLWH [95%/80% MSM]. Of PLWH with C1/C2 strains, 63% had HIV viral suppression, 71% had prior sexually transmitted infections, and 83% lived in two urban counties. WGS confirmed two genetically-distinct clonal lineages of NTHi. All C1 isolates, but no C2 isolates, carried IS1016, an insertion sequence associated with Hi capsule genes.



[PFGE cluster analysis of invasive nontypeable *H. influenzae* in adults 18-55yrs (Atlanta, 2008-2018).]

CONCLUSIONS: We document emergence of clonal iNTHi with frequent septic arthritis in young, black MSM with well-controlled HIV, living in geographic proximity. This suggests potential spread of NTHi within social networks and possible sexual transmission.

Track C

LBPEC20

HIV epidemics to the rise and concentrating in young men in Latin America

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BACKGROUND: For the last 5 years UNAIDS reports no reduction in new HIV infections in Latin America (LA) remarking an insufficient advance to the aim to significantly reduce HIV transmission by 2020. Nevertheless, the report shows marked disparities among countries and in many cases lack of data. The objective of our study was to monitor the trends of HIV epidemics in LA by independent data collection of number and demographic characteristics of new cases admitted to care from 2013 to 2017. **METHODS:** We collected data from 42 public and private HIV centers from capital cities and provinces in 42 HIV Care Centers from 11 countries in LA. All selected centers reported complete data from 2013 to 2017. Gender, age and CD4 at admission among other baseline characteristics were registered. Transfers in from other centers were excluded of the analysis. Ponderation was made by type of center; RT, OR and heterogeneity by MCMC and GLMER

RESULTS: 48,179 new cases were admitted in 5 years increasing from 7,271 in 2013 to 11,945 in 2017. Women represented 21.7% of new cases in 2013 decreasing to a 16.9% in 2017. Distribution by age in new cases in women remained stable along time but presentation to care at younger ages steadily increased among men during in the 5 years reported. In 2013 34.5% of new cases in men were younger than 29 years old. By 2017 this group of age represented 46.7% of new cases as shown in Graph 1.

CONCLUSIONS: Our data in a representative sample of 11 LA countries show a significant increase in HIV transmission among young men in LA and should be taken as an alert to urgently intensify prevention strategies in this principal key population in LA. Unprotected sexual practices in young men should be focused as a priority for prevention strategies.

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Multi-country evaluation of survival and HIV-free survival among children under 3 years of age of women living with HIV in eight sub-Saharan African countries: Results from population-based HIV impact assessments

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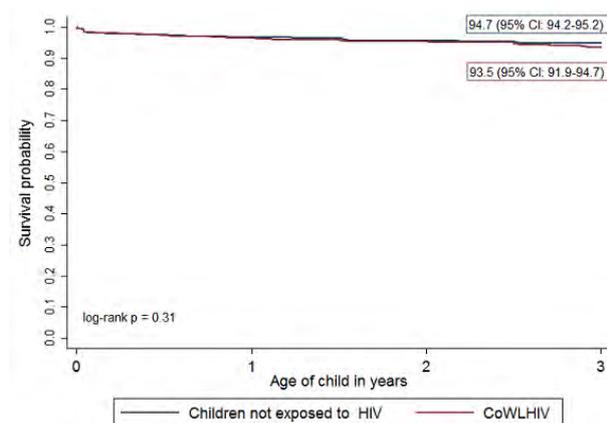
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BACKGROUND: We used population-based household survey data to estimate survival and HIV-free survival through age 3 years in children of women living with HIV (CoWLHIV), accounting for maternal antiretroviral treatment (ART) status, in Eswatini, Lesotho, Malawi, Namibia, Tanzania, Uganda, Zambia, and Zimbabwe.

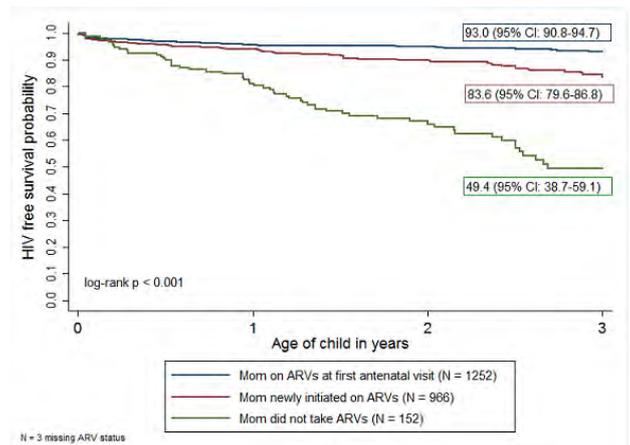
METHODS: Maternal HIV status and ART use during last pregnancy in the past 3 years, HIV status of their children, current age of living children, and age of death of deceased children were determined through maternal interviews. A sub-sample of children underwent HIV testing using rapid test and Geenius™ HIV-1/2 confirmatory assay (≥18 months) and virologic testing (< 18 months). We performed Kaplan-Meier analyses to estimate probability of survival and HIV-free survival at 3 years. Children were censored at HIV diagnosis, death or 3 years of age.

RESULTS: Of the 16,006 children, 2,373 were CoWLHIV. Among CoWLHIV, 2138 were HIV-uninfected, 127 were HIV-infected, and 108 had died before 3 years. Survival probability at 3 years was similar among CoWLHIV and children of HIV-uninfected women (Figure 1). HIV-free survival at 3 years was 85% (CI: 83%-87%) among CoWLHIV and highest among children of mothers who were on ART at first antenatal visit compared to children of mothers who had initiated or who did not take ART during pregnancy (Figure 2).

CONCLUSIONS: The findings demonstrate the impact of maternal ART in improving survival among CoWLHIV in Africa, particularly with ART initiation before pregnancy. Elimination of MTCT requires programs to close the gap in maternal HIV diagnosis and ART coverage.



[Figure 1. Child survival Up to 3 years of Age by HIV Status of Mothers (n = 16,006)]



[Figure 2. HIV-Free Survival among CoWLHIV, by Maternal ARV Use during Pregnancy (n = 2,370)]

LBPEC22

Persistently high HIV incidence among trans women, San Francisco

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BACKGROUND: Trans women bear the highest burden of HIV of any population worldwide. For example, HIV prevalence is >30% in surveys of trans women in San Francisco. Unfortunately, the high burden is not matched by the availability of data to guide the HIV response. HIV-related data for trans women usually derive from studies that incorrectly aggregate them with men who have sex with men (MSM), include too few trans women to make inference to the population, or are severely biased by convenience sampling at clinics, service sites, or high-risk venues. Moreover, gender identity is not uniformly collected in national censuses and household surveys. To date, no study has directly measured the rate of HIV seroconversion among trans women in a population-based sample.

METHODS: We established a longitudinal cohort study of trans women in the San Francisco Bay Area to measure HIV incidence from 2016-present. Participants were recruited through respondent-driven sampling (RDS) to gather a representative sample. HIV-negative trans women were followed every six months for 18 months with repeated HIV testing. Rates of seroconversion were calculated using the incidence density method assuming a Poisson distribution.

RESULTS: A total of 429 HIV uninfected trans women were enrolled in the cohort; 412 had at least one follow-up visit and were included in analysis (96% retention). HIV incidence was 1.4 per 100 person-years (PY) (95% CI: 0.60-2.76). The majority of seroconversions (5/8) were among Latinas (incidence 2.76 per 100 PY). Preliminarily, incidence was very high among younger trans women ages 18-24 years (3.88 per 100 PY).

CONCLUSIONS: In San Francisco, a city heading toward zero HIV infections in other groups, our study witnessed a persistently high rate of seroconversion among trans women. This substantial transmission continues despite unparalleled access to gender-affirming medical procedures and social services. We will not reverse the course of the epidemic among trans women without addressing structural barriers and the low inclusion of trans women in research to design and test new biomedical HIV prevention interventions. Our cohort study provides much needed benchmark estimates to plan rigorous prevention trials with HIV incidence endpoints for trans women.

LBPEC23

High HIV incidence among young women in South Africa: data from the ECHO trial

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BACKGROUND: Scale-up of HIV testing, antiretroviral therapy and PrEP access in South Africa has prompted anticipation of a national decrease in HIV incidence. The 2017 South African National household-based HIV Prevalence, Incidence, Behaviour and Communication Survey reported decreased national HIV incidence, including among women aged 15-49 years (estimate 0.93 per 100 woman-years from 2.28 in 2015). We conducted a prospective clinical trial among women in South Africa between 2015 and 2018 and measured HIV incidence.

METHODS: ECHO included sexually active, HIV-negative women aged 16-35 years, seeking effective contraceptives and willing to be randomised to intramuscular depot medroxyprogesterone acetate, copper intrauterine device, or levonorgestrel implant. Women were followed for 12-18 months across 9 sites in South Africa, plus three in Kenya, the Kingdom of Eswatini and Zambia. HIV incidence based on prospectively observed HIV seroconversions and exact 95% CIs based on a Poisson distributions assumption were assessed. Cox proportional hazards regression models were used to define cofactors related to incident HIV.

RESULTS: Of 7829 women enrolled, 5768 women aged 18-35 were enrolled in South Africa and contributed 7647 woman-years of follow-up. The median age was 23 and 62.5% were ≤ 24 years. A total of 345 incident HIV infections occurred, for an incidence of 4.51 per 100 woman-years of follow-up [95%CI 4.05-5.01]. Incidence was >3.30 per 100 woman-years at all South African sites, the largest being 6.80 per 100 woman-years (Table). In multivariable models, age ≤ 24 years, baseline infection with sexually transmitted infections (HSV-2, gonorrhoea or chlamydia), BMI ≤ 30 , and having new or multiple partners were all strongly associated with HIV incidence.

CONCLUSIONS: HIV incidence was high among young South African women enrolled in a prospective study between 2015 and 2018. Provision of diverse prevention options are needed to mitigate ongoing risks of HIV acquisition for this population.

Site	Enrolled (n)	HIV seroconversions (n)	Woman-years of follow-up	HIV incidence per 100 woman-years	Lower bound	Upper bound
Brits	407	18	544.83	3.30	1.96	5.22
Cape Town	560	31	703.82	4.40	2.99	6.25
Durban	861	52	1172.24	4.44	3.31	5.82
East London	614	44	819.45	5.37	3.90	7.21
Edendale	611	40	825.71	4.84	3.46	6.60
Johannesburg	697	28	923.62	3.03	2.01	4.38
Klerksdorp	555	39	759.10	5.14	3.65	7.02
Ladysmith	653	56	823.13	6.80	5.14	8.84
Soshanguve	810	37	1074.90	3.44	2.42	4.75

[Table 1: HIV Seroconversion in South African Sites]

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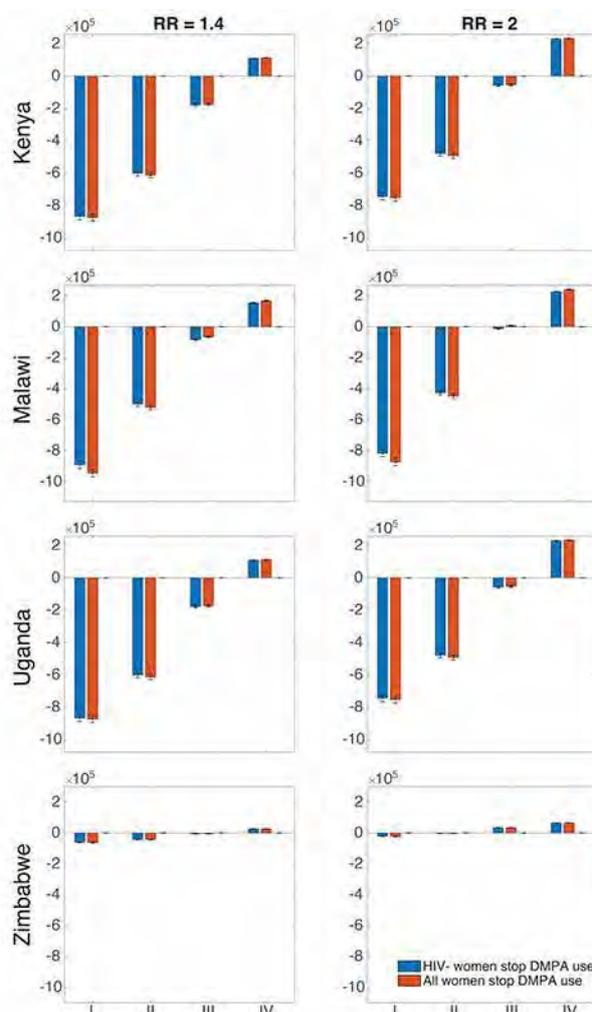
Modelling progestin-based contraceptive use in high DMPA use and high HIV incidence settings

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BACKGROUND: Progestin-based injectable contraceptives, particularly depot medroxyprogesterone acetate (DMPA), are a popular option for women of reproductive age in many sub-Saharan Africa countries. However, some studies have associated them with an increased HIV acquisition risk. The ECHO trial will provide new evidence about the degree of risk, if any. Depending on results, countries may consider advising some women against using DMPA to reduce their HIV risk but such a policy must be weighed against the substantial benefits of using DMPA for contraception.

METHODS: We used a deterministic mathematical model, parameterized separately for four sub-Saharan African countries—Kenya, Malawi, Uganda, and Zimbabwe—to estimate potential HIV and reproductive health outcomes of different scenarios of reduced DMPA usage and contraceptive replacement for women (summarised as disability-adjusted life-years [DALYs]). We considered scenarios in which DMPA is stopped for HIV-negative or all women, and the proportion of women on DMPA switching to another contraceptive method in 2019 is 0% (I), 20% (II), 60% (III), or 100% (IV). We assumed the relative risk of HIV acquisition for women using DMPA could be 1.4 or 2.

RESULTS: Figure 1 shows net DALYs averted over twenty years. In the four countries modelled, reduced use of DMPA led to an overall greater number of DALYs unless there is a very high level (>80%) of contraceptive replacement. Immediately after ECHO results are released, the models will be updated and presented based on the trial findings of relative risk.



[Net DALYs averted over 20 years for Kenya, Malawi, Uganda, and Zimbabwe]

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CONCLUSIONS: If there is a relative risk associated with DMPA, it will be critical to ensure that women wishing to not use DMPA have the ability to transition to another method. If women using DMPA do not use a replacement method, it is likely that this would adversely affect expectations of health for a woman and her children, even if the risk associated with DMPA is high.

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LBPEC25

Integrating oral PrEP delivery into a large HIV endpoint-driven clinical trial in Eastern and Southern Africa: the ECHO trial experience

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BACKGROUND: Oral pre-exposure prophylaxis (PrEP) is a component of comprehensive HIV prevention. Clinical trials with incident HIV as a principal study outcome have an ethical imperative to offer state-of-the-art HIV prevention options.

METHODS: ECHO, an open-label clinical trial of HIV incidence compared across women randomized to three effective contraceptive methods (DMPA-IM, copper IUD, and LNG implant), followed 7829 HIV-negative sexually active women aged 16-35 years from 12 sites in 4 African countries (Kenya, Eswatini, South Africa, and Zambia) for up to 18 months from December 2015 through October 2018. The trial protocol permitted PrEP use. During ECHO, national policies and guidelines evolved to recommend PrEP for persons with HIV risk, and access to PrEP was prioritized by the trial team, either off-site via referral or on-site via trained trial staff.

RESULTS: PrEP access in ECHO began in Kenya in May 2017 and was available at all sites by June 2018. Of the 3626 (46.3% of trial total) women in follow-up when PrEP became available, 622 (17.2%) initiated PrEP. PrEP initiation did not differ across study arms ($p=0.7$). Women initiating PrEP were slightly older, more likely to be unmarried, not living with their partner, having multiple partners, not earning their own income, not receiving financial support from partners, and have higher rates of *Chlamydia trachomatis* (all p -values < 0.05 by chi-square tests). The median duration of use was 85 days (IQR 39-96) prior to study exit; two-thirds received a 3-month PrEP refill at study exit. Among women with access to PrEP during the trial, there were 37 HIV seroconversions among women who did not initiate PrEP and 2 among women who initiated PrEP (HIV incidence 2.4 versus 1.0 per 100 person-years, IRR 0.35, 95% CI 0.04-1.38). Of these two women, one who became HIV infected had discontinued PrEP two months prior to HIV seroconversion.

CONCLUSIONS: PrEP as a component of a comprehensive HIV prevention package provided to women in a large clinical trial was feasible. PrEP was taken up by 17.2% of participants and included those with characteristics suggesting higher HIV risk.

LBPEC26

Virologic assessment of seroconverters in a phase III dapivirine vaginal ring trial

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BACKGROUND: The Ring Study/IPM 027, a 2:1 randomized, double-blind, placebo-controlled Phase III trial, showed that the Dapivirine Vaginal Ring led to a 30.7% HIV-1 infection risk reduction compared to placebo ring. HIV-1 resistance in participants who seroconverted was assessed.

METHODS: Population-based genotyping of reverse transcriptase was performed on HIV-1 RNA positive plasma samples obtained before, during, and after HIV seroconversion. Variants across all of RT and known NNRTI resistance mutations to EFV, NVP, ETR and RPV were assessed (Stanford HIVdb version 8.4). Phenotypic susceptibility of viruses with NNRTI mutations was determined for dapivirine; for those with E138A mutations, susceptibility to EFV, NVP, ETR and RPV was determined.

RESULTS: Population genotype was successful in 82/84 (98%) and 57/58 (98%) participants at HIV seroconversion in the dapivirine and placebo groups, respectively. Most viruses were subtype C (92%) and wildtype (85% at NNRTI resistance codons). NNRTI mutations were similar between the two groups, except for a higher frequency of E138A in the dapivirine group. No or modest reductions in susceptibility to dapivirine was observed in the dapivirine group. Viruses with E138A showed no or only modest FC to the other NNRTIs (FC range dapivirine group: 0.6 - 2.9). Paired genotypes for 52 viruses from the dapivirine group, between first HIV-1 RNA detection and seroconversion, separated by an average of 35 days, did not detect any additional NNRTI mutations, although 2 of 63 viruses had emergent G190G/A or K103K/N and V106V/M after stopping product.

CONCLUSIONS: Dapivirine Vaginal Ring use was not associated with selection of resistance mutations in reverse transcriptase. Known NNRTI resistance mutations were observed at low prevalence and distributed equally between the two treatment groups, except for E138A (a common subtype C polymorphism) that was more frequent in the Dapivirine Vaginal Ring group, but conferred no or only modest changes in dapivirine susceptibility.

NNRTI Resistance Associated Mutations	Population-Based Genotyping		Dapivirine Susceptibility Fold Change Geometric Mean (SD)	
	Dapivirine (N = 82)	Placebo (N = 57)	Dapivirine (N = 11)	Placebo (N = 7)
Any	13 (15.9%)	8 (14.0%)	3.1 (1.6) [Range 1.3-5.1]	5.8 (5.3) [Range 0.9-120]
A98G	2 (2.4%)	1 (1.8%)	4.1 (n=1)	2.5
K101E	0	1 (1.8%)	-	4.2
K103N	2 (2.4%)	1 (1.8%)	2.0 (n=1)	3.5
E138A	8 (9.8%)	2 (3.5%)	2.9 (1.6) [Range 1.3-5.0]	0.9 (n=1)
K101E, E138A	1 (1.2%)	0	5.1	-
E138Q	0	1 (1.8%)	-	2.2
V108I, Y181C, H221Y	0	1 (1.8%)	-	120

[NNRTI Resistance associated Mutations and Dapivirine Susceptibility]

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LBPEC27

High self-reporting of HIV self-test results through an interactive voice response telephone line in inner city Johannesburg

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BACKGROUND: The World Health Organisation recommends HIV Self-Testing (HIVST) as a supplementary approach for HIV testing. HIVST can provide under-tested populations with the option to privately screen themselves for HIV but presents challenges in collecting data on test usage and linkage to care. Using behavioural economic principles, we assessed whether short message service (SMS) reminders and interactive voice response hotline aided reporting of HIVST use and linkage to care.

METHODS: In a large-scale implementation science study, over 10500 HIVSTs were distributed between October 2018 and February 2019 in inner-city Johannesburg, South Africa. Participants were encouraged to contact a hotline or access a website to report HIVST results, and received two SMS messages, three days and five days after receiving a test, encouraging them to do so. On the seventh day after receiving a kit, all participants who had not reported HIVST use received an automated phone call with a recorded survey. In addition to their test result, participants were asked about linkage into care and their willingness to pay (WTP).

RESULTS: 9,504 unique phone numbers were registered by participants, of whom 5,056 were male (53%). 59% of respondents had taken an HIV test in the previous 3 months, 86% in the last year. In total, 1,933 (20.3%) respondents reported their test result, substantively higher than other HIVST programs not using a hotline. 313 (16%) reported a positive HIVST. Men were slightly more likely than women to have made an inbound call (10.2% vs 9.1%, $p=0.01$). Of those reporting a positive result, 204 (65%) reported that they had or intended to link to care. There was weak evidence that HIV prevalence was high among females ($p=0.2$) and among those who called into the system compared to those called by the system ($p=0.2$). Median WTP was ZAR50 (\$3.47).

CONCLUSIONS: Self-reporting HIVST results through an automated hotline system is a promising option for implementation programs, and yielded higher response rates than comparable reporting systems. Recorded hotlines are low-cost and could be easily integrated into larger implementation programmes. This modality was successful in reaching men and young people and should be explored further.

LBPEC28

"It's fast and convenient": HIVST is highly acceptable to people who inject drugs and their intimate partners in rural and urban settings in Vietnam

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BACKGROUND: Men who inject drugs (M-PWID) and their female intimate partners (IP) account for the majority of new HIV infections in Vietnam. Annually, 30% of M-PWID test for HIV. Cited reasons for low testing uptake include concerns regarding confidentiality of test results, travel costs and wait time. Offering a choice of HIV testing options among M-PWID and IP may translate into improved case finding.

METHODS: We conducted a cross-sectional study to measure M-PWID and IP acceptability and use of HIV self-testing (HIVST) compared to facility-based testing (FBT), and linkage to treatment among M-PWID and IP in one rural (Thai Nguyen-TN) and one urban (Ho Chi Minh City-HCMC) province. Peer outreach workers (OW) were trained to offer M-PWID and IP clients a choice of FBT or assisted oral-fluid HIVST. Participants screening HIV-reactive with HIVST or through FBT received referral for confirmatory testing and treatment. We recruited a minimum sample of 202 per population, per location ($n=808$).

RESULTS: Among the 501 PWID and 439 IP enrolled, 74% (297/401) of M-PWID and 88.6% (256/289) of IP selected HIVST over FBT in HCMC; while 100% of both populations selected HIVST in TN. Being the first to know the result, confidentiality and rapid results were the primary reasons for HIVST selection across both populations and locations. Among M-PWID who selected HIVST, 3.7% (11/297) in HCMC and 2.4% (7/289) in TN were newly HIV-diagnosed. For IPs using HIVST, 2.4% (7/289) in HCMC and 1% (2/209) in TN were newly diagnosed. For M-PWID and IP in HCMC selecting FBT, 4.1% (4/97) and 6.3% (2/32) were newly diagnosed, respectively. All but two (92%) newly diagnosed individuals were enrolled in treatment. Multivariable analysis of the HCMC sample identified that M-PWID who were first-time HIV-testers [AOR 2.7 (1.4-5.2)], and IPs who were < 35 years old [4.2 (1.8-10.0)] had higher odds of opting for HIVST.

CONCLUSIONS: HIVST was preferred to FBT among M-PWID and IP in one rural and one urban location in Vietnam and helped to identify additional HIV cases. HIVST provides an efficient and acceptable new option to diagnose more HIV cases in high-risk groups in Vietnam.

LBPEC29

Performance of syndromic screening for bacterial STIs among men who have sex with men (MSM) in Dar es Salaam, Tanzania

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BACKGROUND: Sexually transmitted infections (STIs) among men who have sex with men (MSM) are associated with high morbidity and are major co-factor of HIV transmission. We investigated the performance of syndromic screening of STIs among MSM receiving periodic presumptive treatment (PPT) for bacterial STIs.

METHODS: We analyzed data collected under Sauti, a PEPFAR/USAID funded project offering community-based HIV combination prevention services in 11 regions of Tanzania. Between May and July 2018, MSM accessing biomedical services in Dar es Salaam were interviewed and physically examined for symptoms/signs of bacterial STIs, including *Neisseria gonorrhoeae* (NG) and *Chlamydia Trachomatis* (CT). Biospecimens of blood were collected in addition to rectal/urethral swabs. HIV and syphilis rapid testing were provided while NG and CT were tested by PCR. All participants received PPT with support from Elton John Foundation. The study was approved by local and Johns Hopkins University IRBs.

RESULTS: A total of 520 MSM were included in this analysis (median age: 26 years (IQR 23-33)). Participants reported a median of 4 (IQR 2-7) sexual partners within the last six months. 141/520 (27%) reported condomless anal sex during their last three sex acts. Among all participants, 57 (11%) were living with HIV, 43 (8%) were newly diagnosed HIV positive, and 10 (2%) tested positive for syphilis. A total of 121 (23%) were laboratory confirmed for NG (rectal: 102/121 (84%); urethral: 15/121 (12%); both 4/121 (3%)). 81 (16%) were positive for CT (rectal: 68/81 (84%); urethral: 11/81 (14%); both: 2/81 (2%)). Just 42 (8%) were dually infected. Among the 160 MSM with laboratory diagnosed NG or CT, 31 (19%) were symptomatic at baseline.

CONCLUSIONS: These data reinforce the challenges with relying on syndromic management of STIs given that less than one in five MSM infected with CT/NG reported symptoms. While there has been a trend of recommending PPT, increasing levels of antibiotic resistance suggest that there may be utility on assessment of culture and sensitivity. Irrespective of symptoms, STIs mediate local inflammatory responses that potentiate HIV risks, highlighting the need for revision of the approach to address STIs for MSM across Tanzania and likely across Sub-Saharan Africa.

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LBPEC30

In utero mother-to-child transmission (MTCT) in Botswana does not differ between efavirenz/tenofovir/emtricitabine (EFV/TDF/FTC) and dolutegravir/tenofovir/emtricitabine (DTG/TDF/FTC)

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BACKGROUND: Botswana was the first African country to change from EFV/TDF/FTC to DTG/TDF/FTC first-line antiretroviral treatment (ART), allowing the first evaluation of MTCT with DTG-based ART.

METHODS: From April 2015–July 2018, the Early Infant Treatment Study (EIT) tested HIV-exposed infants for HIV DNA at < 96 hrs of life. Maternal ART regimen and start date were available for screened infants who could be linked to the separate Tsepamo surveillance study database. After May 2016 most adults, including pregnant women, initiated DTG-based ART; those already on ART continued prior regimens. Comparisons were by Fisher's exact and t-test; exact logistic regression calculated odds ratio (OR) for MTCT differences.

RESULTS: Of 10,622 HIV-exposed infants screened for HIV in the EIT study, 40 (0.38%) were HIV-positive: 12/2849 (0.42%) prior to the DTG era, and 28/7773 (0.36%) after DTG was rolled out for new ART initiations. In total, 5,064 (47.8%) screened infants could be linked to the Tsepamo database. Linked and unlinked infants had similar demographics and MTCT risks. Among linked infants, 1235 (24.4%) were exposed to DTG/TDF/FTC, 2411 (47.6%) to EFV/TDF/FTC, and 1418 (28.0%) to other or no ART. No difference in MTCT was observed between DTG-based ART (0.65%) and EFV-based ART (0.37%) overall (OR 1.74, 95% CI 0.58, 5.08), or among those starting DTG-based ART (0.80%) or EFV-based ART (0.91%) in pregnancy (OR 0.88, 95% CI 0.29, 2.71)(Table). Most MTCT events (4 of 8 with DTG, 6 of 9 with EFV) occurred when ART started < 90 days before delivery. MTCT occurred in 4/17 (23.5%) born to women with undetectable VL (< 40 copies/mL) at delivery (all 4 on DTG).

CONCLUSIONS: *In utero* MTCT in Botswana remains rare in the DTG era. No significant MTCT differences were observed between DTG/TDF/FTC and EFV/TDF/FTC. Risk was highest for both groups when ART was started in the 3rd trimester.

	Total (N=1,882)	DTG/TDF/FTC (N=998)	EFV/TDF/FTC (N=883)
ART initiated during pregnancy (n = 1,882)	16 / 1,882 (0.85%)	8 / 999 (0.80%)	8 / 883 (0.91%)
ART initiated >180 days before delivery (n = 370)	2 / 370 (0.54%)	1 / 223 (0.45%)	1 / 136 (0.74%)
ART initiated 90-179 days before delivery (n = 1,128)	4 / 1,128 (0.35%)	3 / 568 (0.53%)	1 / 537 (0.19%)
ART initiated 30-89 days before delivery (n = 351)	5 / 351 (1.42%)	1 / 170 (0.59%)	4 / 168 (2.38%)
ART initiated <30 days before delivery (n = 82)	5 / 82 (6.10%)	3 / 38 (7.89%)	2 / 42 (4.76%)
ART initiation date missing (n = 55)	0 / 55 (0.0%)	0 / 23 (0.0%)	0 / 31 (0.0%)

[*In utero* MTCT for DTG or EFV started in pregnancy, for EIT and Tsepamo linked infants in Botswana]

LBPEC31

Results from an impact evaluation of a school-based sexuality and HIV revention education activity in South Africa

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BACKGROUND: In South Africa, adolescents and young adults are at high risk of HIV, sexually transmitted infections, and unintended pregnancies. Recently, the Department of Basic Education (DBE) revised its sexuality and HIV prevention content and teaching strategies (using scripted lessons plans) to strengthen the overall sexuality education content of the life orientation curriculum delivered in schools.

This paper presents impact evaluation results of the novel sexuality education program implemented since 2016 by Educational Development Center with support from the United States Agency for International Development.

METHODS: A cluster randomized longitudinal evaluation was implemented in two districts in Mpumalanga and three districts in KwaZulu-Natal. The primary outcome of the evaluation was incidence of HSV-2 or pregnancy; and secondary outcomes included HIV prevalence, HIV testing, sexual experience, and knowledge and attitudes around HIV. One-hundred six schools were randomly assigned to either the intervention group, where scripted lesson plans of the revised sexuality lessons were taught to learners; or the control group, where previously developed life orientation materials were taught in schools. In total 3,145 grade-8 female learners were interviewed and had dried blood spots taken at baseline. Two-years later, 2,802 of the baseline sample of girls were found and interviewed again (78% response rate).

RESULTS: Overall incidence of HSV-2 in the two-year follow-up was 7% while HIV prevalence in grade 10 was 6.5%; this demonstrates important HIV prevention needs in this population. Multivariate results demonstrated that incidence of HSV-2 was not statistically different between the intervention and control groups. However, compared to girls in the control group, those in the intervention group were significantly more likely to report being pregnant at endline ($p < 0.05$); and were more likely to have had an HIV test in the past 12 months ($p < 0.10$).

CONCLUSIONS: While the sexuality education program did not impact the incidence of HSV-2 among female learners, the curriculum holds promise given that it positively affected learners' recent HIV testing behaviors. The lack of impact on biomarkers may be a result of weak implementation of the revised curriculum in the intervention group.

Track D

LBPED32

Effective public-private partnerships for sustainable antiretroviral therapy: Outcomes of the Right to Care Health Services GP down-referral program

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BACKGROUND: The recently increased access to antiretroviral therapy (ART) in South Africa has placed additional strain on human and infrastructure resources of the public health sector. Capacity from private-sector General Practitioners (GPs) could be leveraged to ease the current burden on the public health sector.

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METHODS: We conducted a retrospective record review of routine electronic medical record data on a systematic sample of HIV-infected adults (≥ 18 years old) initiated on ART at a tertiary hospital outpatient HIV clinic in Johannesburg, South Africa and down-referred to private GPs for continued care after stabilization on ART. We compared these patients ("GP down-referred") to a control-cohort who remained at the referring site ("Clinic A") and patients from a regional hospital outpatient HIV clinic not offering down-referral to GPs ("Clinic B"). Study outcomes assessed are viral load suppression (VL < 50 copies/ml) and attrition from care (all-cause mortality or > 90 days late for a last scheduled visit) by 12 months of follow-up following down-referral or eligibility.

RESULTS: A total of 3685 patients, comprising 373 (10.1%) GP down-referred, 2599 (70.5%) Clinic A patients, and 713 (19.4%) Clinic B patients were included in the analysis. Overall, 1535 patients (53.3%) had a suppressed viral load. A higher portion of GP down-referred patients had a suppressed viral load compared to Clinic A and B patients (65.7% vs 49.1% vs 58.9%). We found no difference in viral load suppression between GP down-referred and control patients [adjusted relative risk [aRR] for Clinic A vs. GP down-referred 1.0; 95% CI: 0.9-1.1], [aRR for Clinic B vs. GP down-referred 1.0; 95% CI: 0.9-1.0].

Clinic B patients experienced the highest attrition compared to GP down-referred and Clinic A patients (33.2% vs 11.3% vs 5.9%) and had a higher risk of attrition compared to GP down-referred patients [adjusted hazard ratio [aHR] 4.3; 95% CI: 2.8-6.5], whereas Clinic B patients had a lower risk of attrition [aHR 0.5; 95% CI: 0.3-0.7].

CONCLUSIONS: Our results show that adequately monitored HIV care by private GPs leads to similar virologic outcomes to patients managed in the public sectors but remains challenged by poorer retention in care.

LBPED33

State licensure laws' relationship to PrEP prescribing by nurse practitioners and physician assistants in the United States, 2017

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BACKGROUND: By 2016, less than 10% of United State residents who could benefit from PrEP ($n = 78,360$) had filled a prescription. To bridge the gap, barriers that may prevent access to PrEP must be addressed. We examined if licensure restrictions on Nurse Practitioners (NP) and Physician Assistants (PA) prescribing authority was such a barrier.

METHODS: We conducted descriptive and regression analyses to assess the relationship between licensure laws and PrEP prescribing in all 50 U.S. states and the District of Columbia. To calculate the number of PrEP prescriptions by licensure and state, we used 2017 data from the IQVIA national longitudinal pharmacy database with linked medical claims. To categorize NP licensure laws, we used the 2017 American Association of Nurse Practitioners' classifications; for PA licensure laws, we used the 2017 National Conference of State Legislatures and Association of State and Territorial Health Officials' classifications. We conducted two separate Poisson regression models of percentage of state-level PrEP prescriptions written by NPs and by PAs, and adjusted for age, gender, poverty, insured rate, and racial and ethnic composition.

RESULTS: Regarding NP licensure laws, 12 states required supervision by a physician for an NP to prescribe PrEP. Sixteen states required a period of physician supervision prior to an NP transitioning to full prescribing practice, and 23 states allowed an NP to prescribe PrEP based on their own professional determination. Regarding PA licensure laws, all 51 jurisdictions required ongoing physician supervision, but seven states allowed the Board of Medicine to determine practice guidelines for PAs, while 44 laws left those decisions to the practice-level. Controlling for other factors, states that grant NPs full or transitional practice, and states that allowed the medical board to determine PA practice, had significantly more proportionate PrEP prescriptions written by NPs [adjusted prevalence ratio [PR] = 1.39; 95% CI: 1.21, 1.60; p -value = < 0.0001] and PAs (adjusted PR = 2.94; 95% CI: 1.71, 5.07; p -value = 0.0001).

CONCLUSIONS: These data suggest that the laws governing NP and PA practice present a barrier to PrEP prescribing. Addressing practice restrictions may help increase access to PrEP among patients served by NP and PA

LBPED34

Oral self-testing for individuals absent or refusing testing during home-based HIV testing - a cluster-randomized trial in Lesotho (HOSENG trial)

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BACKGROUND: In sub-Saharan Africa, home-based HIV testing is validated and accepted, but coverage remains low due to absent household members (HM). The cluster-randomized trial, HOSENG (Home-based Self-testing), measured the effect of secondary distribution of oral HIV self-tests (HIVST) on coverage during home-based testing.

METHODS: Clusters were defined as villages in the catchment area of 20 health facilities in Lesotho and were randomized to intervention or control. In intervention clusters, HIVST were left for HM who were absent or declined testing. The primary outcome was HIV testing coverage among HM (age ≥ 12) within 120 days after home-based testing, defined as a confirmed HIV test result, known HIV+, or recent HIV- result. Secondary outcomes included assessment of effect modification by sex and age (adults/adolescents). Analyses were by intention-to-treat. Intervention effects were estimated with adjusted random effects logistic regression models. Trial registration: NCT03598686.

RESULTS: 3110 consenting households with 7,846 HM aged ≥ 12 were enrolled (intervention: 57 clusters, 1628 households, 4192 HM; control: 49, 1478, 3654). 2413 (58%) intervention and 2070 (57%) control HM were present. Of those with unconfirmed status, 1278/1382 (92%) HM of intervention and 1118/1224 (91%) of control accepted testing. Coverage after home-visit was 63% in the intervention and 60% control arm ($p=0.17$). In intervention arm, 1889 HM were absent (94%) or refused testing (6%). An HIVST was left for 1463 (77%), and 824 (56%) were returned within 120 days. In control arm, 1695 HM were absent (93%) or refused testing (7%); 12 (0.7%) were tested at the facility within 120 days.

HIV testing coverage was 3372/4188 (81%) in the intervention versus 2187/3654 (60%) in the control arm (odds ratio 2.9 [95% confidence interval 2.5-3.5]; $p < 0.001$). The intervention effect was greater in males (74% vs 44%; 4.2 [3.3-5.2]) than females (86% vs 73%; 2.4 [1.9-3.0], p interaction < 0.001) and in adolescents (75% vs 38%; 5.6 [4.4-7.1]) than adults (84% vs 71%; 2.2 [1.8-2.7], p interaction < 0.001). Positivity rate was 3% during visits and 0.4% with HIVST.

CONCLUSIONS: In the HOSENG trial, secondary distribution of HIVST achieved an increased HIV testing coverage of >20%. The intervention was particularly successful among males and adolescents.

LBPED35

Temporal relationship between heavy drinking, drug use and antiretroviral medication nonadherence

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BACKGROUND: Previous studies have established a link between substance use and nonadherence to antiretroviral medication (ART). However, very few previous studies have examined this association on a daily basis, particularly using electronic pillbox data as an objective measure of nonadherence.

METHODS: We recruited 53 persons living with HIV (PLWH) into a study aimed at testing the preliminary efficacy of an intervention to improve ART adherence. Prior to randomization to treatment condition, ART adherence was monitored for 14 days with electronic pillboxes. Alcohol and drug use on those 14 days were assessed using a Timeline Followback Interview (TLFB).

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RESULTS: Over the course of the 14 days, there was a mean adherence rate of 78.67%. We used Hierarchical Linear Modeling to examine the association between same day substance use and ART nonadherence. While any alcohol use on a given day did not have a significant association with ART nonadherence for that day (OR=.94, 95% CI=.565-1.57, $p=.819$), heavy drinking (≥ 5 drinks for males and ≥ 4 drinks for females) was associated with a nearly 5 times greater likelihood of same day ART nonadherence (OR=4.90, 95% CI=1.79-13.36, $p=.002$). Further, drug use was associated with a nearly two times greater likelihood of ART nonadherence on the same day (OR=1.80, 95% CI=1.14-2.85, $p=0.12$).

CONCLUSIONS: These results reinforce and extend previous research examining the impact of substance use on ART nonadherence, examining this association on a daily basis and employing an objective measure of daily ART adherence. The results are consistent with previous research that has found heavy drinking to convey risk for multiple problematic behaviors and support the differentiation between any alcohol use and heavy drinking days as a meaningful distinction. While drug use was significantly associated with ART nonadherence, the magnitude of the association was not as significant as that found for heavy drinking. This may be due to inclusion of marijuana use and a relatively low prevalence of other drug use in this sample. These results highlight the importance of continuing to pursue interventions to effectively address heavy drinking and drug use among PLWH in order to improve ART adherence.

LBPED36

Twelve-month retention and viral load outcomes from a non-inferiority cluster randomized trial extending adherence club ART refill dispensing intervals to 6-monthly

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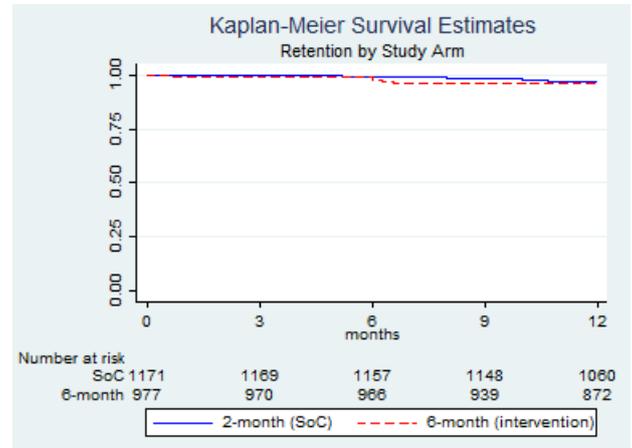
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BACKGROUND: The antiretroviral therapy (ART) adherence club (AC) model has supported clinically stable patients' retention with group ART refills and psychosocial support. Patients and health systems could benefit from reduced visit frequency by increasing ART refills. We conducted a non-inferiority cluster randomized trial comparing standard of care (SoC) ACs and 6-month refill intervention ACs in a primary care facility in Khayelitsha, South Africa.

METHODS: Existing ACs were randomized to either SoC or intervention. SoC ACs met 5 times annually, receiving 2-month refills with a 4-month refill over year-end. Blood was drawn at one AC visit with a clinical assessment at the next. Intervention ACs met twice annually receiving 6-month refills, with a third individual blood collection anytime three-30 days before the annual clinical assessment AC visit. The database closed on 15/2/2019. Retention was defined any visit within 3-months of the 12-month scheduled appointment and was described using Kaplan-Meier methods. Viral load (VL) completion and suppression (< 400 copies/mL) proportions within first 12 months of follow-up are presented by group. We conducted a Cox proportional hazards regression analysis to compare retention using robust standard errors to account for clustering.

RESULTS: A total of 2,148 patients were included in the analysis; 977 in 40 intervention ACs (22% male) and 1171 in 48 SoC ACs (24% male). Twelve-month retention was high in both arms; 96.9%[95%CI:95.7-97.8%] in intervention ACs and 96.2%[95% CI:94.8-97.3%] in SoC, with no significant difference between groups (Hazard Ratio 1.24, 95%CI: 0.71-2.16)[see figure]. VL completion [944/977; 98.1% [CI:97.0-98.9%] vs. 1093/1171;94.9%[CI:93.4-96.1%]] and suppression [922/944; 97.9%[95%CI:96.8-98.8%] vs. 1053/1093; 96.5%[95%CI:95.3-97.6%]] was higher in the intervention ACs.

CONCLUSIONS: Comparable 12-month retention and favourable VL outcomes in the intervention ACs compared to SoC ACs highlight that clinically stable patients can achieve good outcomes with fewer ART visits and 6-monthly refills.



[Kaplan-Meier estimates of retention in care by study arm]

LBPED37

HIV self-testing acceptability, feasibility and motivations among young people in South Africa: A demonstration community-based study

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BACKGROUND: HIV self-testing can facilitate meeting the UN 90-90-90 HIV testing goal. However, it must first be acceptable to the target population before roll out. We therefore assessed acceptability and feasibility of HIV self-testing, choice of and motivation for self-testing by kit type (blood-based or oral-swab) among young people.

METHODS: We conducted a household demonstration study among young HIV-negative people (18-24y). We offered participants two screening kits and asked them to choose one and conduct an HIV self-test with or without counsellor supervision. Demographic information, test results and screening experience data were collected and descriptively analysed by test kit type in Stata.

RESULTS: A total of 440 participants were recruited, 98.6% accepted to conduct HIV self-testing while 1.4% opted for the standard of care testing by a counsellor. Two-percent tested positive. Reasons for self-testing were trying a new method (36.7%), knowing HIV status (34.7%), preference for privacy and wanting to know results first (11% each). More than four in five (81%) reported never seeing an HIV self-test kit before. The blood-based kit (51.7%) was more preferred than the oral test kit (48.3%).

More blood-based kit users than oral-based kit users reported difficulties in reading instructions (11.6% vs 4.6% $p=0.015$), following instructions (10.6% vs 4.6%; $p=0.03$) and interpreting results (8.7% vs 2.9%; $p=0.02$) but not actual screening ($p=0.37$). Choice of test kit did not differ by gender, age, education, class and marital status ($p < 0.10$).

No differences were found by transactional sex, ($p=0.402$), multiple sexual partnership ($p=0.274$), STI history ($p=0.946$), HIV screening ($p=0.169$) nor self-screening history ($p=0.859$). Choice of test kit did not differ by whether a participant tested with supervision (63.3%), without supervision (24.6%) or with partial supervision (12.1%) ($p=0.988$).

Although 93.8% would recommend the kit to others, no differences were observed by test kit ($p=0.171$). Common self-testing concerns were unavailability of counsellors to guide (24.8%), counsel (29.1%) and interpret results (14.8%).

CONCLUSIONS: HIV self-testing was highly acceptable. Socio-demographic characteristics and sexual behaviours did not appear to determine choice of self-test kit but the blood based kit appeared more difficult to use. We recommend rolling out HIV self-testing among young people.

LBPED38

Strengthening capacity toward the sustainable transition of HIV and TB services to Kenya prisons service

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BACKGROUND: Kenya Prisons Service (KPS) AIDS Control Unit (ACU), through Health Strat's (HS) 5-year Centers for Disease Control and Prevention-funded Transforming TB & HIV Prevention Care and Treatment in Prisons (TACT) project, provides HIV and tuberculosis (TB) prevention, care, and treatment services to prisoners, prison staff, and their families and surrounding communities.

A key objective of the grant is to enable KPS sustain quality HIV programming through direct funding. We evaluated the progress of this transition and its effect on HIV care in prisons.

METHODS: At the start of the project in 2014, a mixed-methods study was conducted to identify gaps in the management and delivery of HIV/TB services in KPS. Key gaps identified included lack of integration between the ACU and Prisons Directorate of Health Services, limited human resource capacity, and weak internal program monitoring. A framework for health system strengthening was developed, implemented, and monitored. In April 2019 we analyzed data from this 2014 study and current program data to evaluate the extent to which direct funding has been transitioned.

RESULTS: An ACU oversight committee comprising KPS top leadership and a project management unit with twinning between KPS and HS were created to monitor project implementation. 75% of the capacity and staffing gaps at the ACU and supported facilities identified in the 2014 report had been addressed. ACU staff were trained in financial and grants management to strengthen internal program monitoring. The first tranche of funds was transferred from HS to KPS in September 2016. By March 2019, the annual direct funding to KPS increased from 49% to 81% of the total project's activity funds. During 2014-2019, TACT interventions increased HIV service coverage from 24 to 42 facilities, increased the number of patients on ART from 3008 to 8206, and improved viral suppression among prisoners from 65% to 91%.

CONCLUSIONS: Strengthening capacity of KPS through the TACT project expanded the HIV program and transitioned HIV/TB services and funding to direct management by KPS. This project models strategies for achieving sustainable HIV programming through direct partnership, capacity strengthening, and direct funding of government institutions.

LBPED39

Prioritizing continuity of HIV services in Mozambique post cyclone Idai

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BACKGROUND: Cyclone Idai made landfall over Mozambique on March 14, 2019 and is now considered the worst natural disaster in Southern Africa in nearly two decades. Nearly 1.9 million people were affected, including an estimated 200,000 people living with HIV (PLHIV).

METHODS: In collaboration with the Ministry of Health's HIV Programme, the United States Agency for International Development and FHI 360 jointly performed facility assessments immediately following the storm

to document its effects on HIV service provision and prepare sites for continuity of HIV services. Cyclone impact was measured through weekly monitoring data from the electronic medical records system of ten high volume sites to assess changes in antiretroviral drug (ARV) pick-ups pre- and post-storm. The week of the storm was excluded from the analysis due to service and reporting disruptions.

RESULTS: Of 44 health centers assessed in the most affected province of Sofala, 38 (86%) suffered structural damage, 20 (45%) reported destroyed patient records, and 16 (36%) experienced interruptions of HIV treatment services. Building on observations and recommendations made during these assessment visits, nearly all health facilities were able to provide HIV services, including ARV dispensing, the week following the cyclone.

Key steps taken included: repurposing undamaged space for consultation rooms and interim pharmacies; on-site training on administration of non-cold-chain dependent ARV regimens; and providing mechanisms for ARV dispensing for patients with lost health cards. Among ten affected health facilities in Sofala with complete data, the number of ARV pick-ups per week was, on average, 25% lower in the five weeks after the cyclone compared to the five weeks before the storm (Figure 1). ARV pick-ups have steadily increased since the cyclone.

CONCLUSIONS: Despite widespread infrastructure damage from the cyclone, immediate site assessments accompanied by direct technical assistance were instrumental in minimizing the disruption of services and ensuring continuity of care for PLHIV.



[Figure 1. # of ARV Pick-Ups at Ten Affected Health Facilities Before and After Cyclone Idai]

LBPED40

Gaps in the PrEP continuum of care in a large cohort of insured transgender patients

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BACKGROUND: The HIV PrEP continuum of care is a framework for evaluating gaps in the delivery of PrEP. Key components include linkage to PrEP care, PrEP initiation, and PrEP persistence during periods of risk. However, little is known about the PrEP continuum among transgender persons, a population disproportionately affected by HIV.

METHODS: We evaluated the PrEP continuum among transgender patients in the Kaiser Permanente Northern California (KPNC) healthcare system between July 2012 and March 2019. Transgender status was previously identified and validated by diagnosis codes, pharmacy records, and manual chart review. We extracted other data from the electronic health record, including PrEP referrals and encounters, pharmacy fills, and positive tests for bacterial sexually transmitted infections (STI; syphilis, gonorrhea, chlamydia). PrEP linkage, initiation, and discontinuation were defined as a PrEP referral or encounter, a pharmacy fill, and as ≥ 120 days

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without PrEP in possession, respectively. HIV seroconversions were identified using the KPNC HIV registry. Differences by gender were compared using chi-square tests.

RESULTS: Of 2606 transgender patients, median age was 34 (IQR 25-49); 62% were White; 13% Latinx; and 52% transfeminine. Approximately 5% (132/2606) of patients were linked to PrEP care and 3% (84/2606) initiated PrEP. Of 61 patients with sufficient follow-up, 53% discontinued. Linkage to PrEP (5% vs. 6%, $p=0.32$), PrEP initiation (3% vs. 4%, $p=0.30$), and discontinuation (58% vs. 49%, $p=0.46$) were not statistically different between transfeminine and transmasculine patients. Among 102 patients diagnosed with an STI, 44% (45/102) were linked to PrEP care and 27% (28/102) initiated PrEP. Of the 25 with sufficient follow-up, 40% discontinued PrEP. Nineteen patients became HIV-infected during the study period, most (79%) of whom were transfeminine. Of those who became HIV-infected, 15 had no evidence of being linked to PrEP care, three were linked but never started, and one was diagnosed after discontinuing PrEP.

CONCLUSIONS: We found substantial gaps at each step of the PrEP continuum among transgender patients with access to care. Even among those diagnosed with an STI, less than half were linked to PrEP care. Efforts are needed to improve PrEP linkage, uptake, and persistence among transgender people, particularly those who are transfeminine.

LBPED41

Longitudinal cascades more accurately assess health systems performance than cross-sectional cascades such as UNAIDS 90-90-90 targets: A simulation-based demonstration

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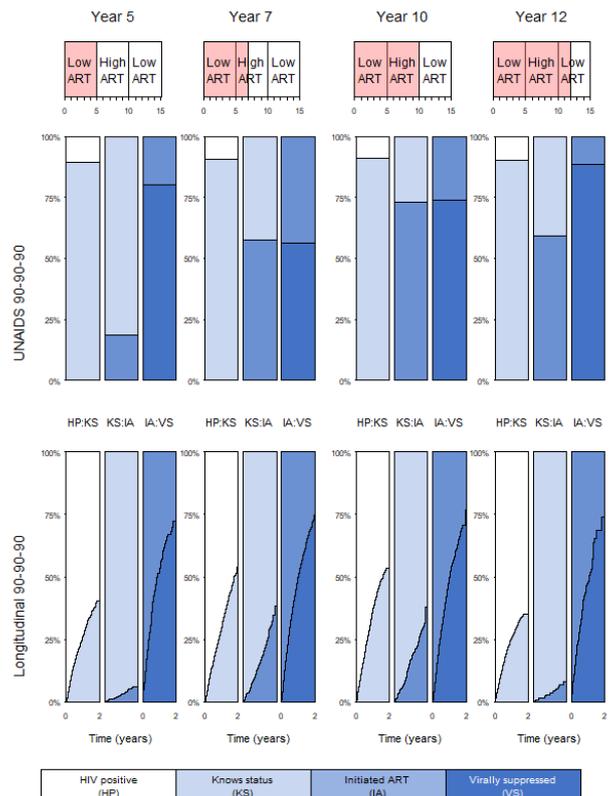
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BACKGROUND: HIV cascades are used to monitor, evaluate, and set goals for health systems. However, UNAIDS 90-90-90 targets and other cascades based on cross-sectional achievement of stages may misrepresent health systems performance compared with longitudinal formulations. We compare how the UNAIDS 90-90-90 and its longitudinal equivalent identify systems performance in a simulation.

METHODS: Two cascades were compared: a UNAIDS 90-90-90-based cascade, and a comparable longitudinal cascade based on Kaplan-Meier estimated cumulative incidence from the prior stage to the next, within two years from the calendar date. We simulated 100,000 people over 15 years with daily probabilities of transition from HIV acquisition to knowing status, becoming linked to care, initiating ART, viral suppression, and death. Transition probabilities were fixed for all periods except for probability of ART initiation, which was set low for 5 years, then normal for 5 years (representing public ART rollout), and finally low again (representing a policy reversal or supply stoppage).

RESULTS: In the pre-rollout period, both cascades show a bottleneck at ART initiation. However, increasing ART coverage perversely causes the proportion of people who are virally suppressed out of those who have initiated ART to decrease from 80% to 56% two years later, due simply to an influx of ART initiators having not had time to transition to viral suppression. Response to both transition probability changes in the cross-sectional cascade lags behind the longitudinal cascade, due to the cross-

sectional cascade having accumulated people into those states over long periods of time, whereas the longitudinal cascade considers only more recent transitions.



[Figure. Comparison of cascades at selected times during the simulation]

CONCLUSIONS: UNAIDS 90-90-90 and other cross-sectional cascades yield less responsive and misleading assessments of HIV health systems performance, which in turn leads to resource misallocation and excess HIV transmission, morbidity, and mortality. We recommend reforming international goal setting and evaluation to be based on longitudinal flow between stages wherever possible.

LBPED42

Randomized controlled trial of a positive affect intervention to reduce HIV viral load among methamphetamine-using sexual minority men

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BACKGROUND: Randomized controlled trials (RCTs) with HIV+ persons who use substances support the short-term effectiveness of contingency management (CM) for reducing HIV viral load. Positive affect interventions that sensitize individuals to natural sources of reward as well as provide skills for managing withdrawal could boost the effectiveness of CM for stimulant abstinence.

METHODS: From 2013-2017, 110 HIV+ sexual minority men with biologically confirmed, recent methamphetamine use were enrolled. Participants were randomized to: 1) a five session, individually delivered positive affect intervention ($n = 55$) - Affect Regulation Intervention to Enhance Methamphetamine Intervention Success (ARTEMIS); or 2) an attention-matched control condition ($n = 55$). ARTEMIS and attention-control sessions were

delivered over a three-month period where all participants were receiving thrice-weekly CM for stimulant abstinence. We examined intent-to-treat effects on log₁₀ HIV viral load as the primary outcome. Secondary outcomes included any unsuppressed HIV viral load over 15 months (≥ 200 copies/mL) and positive affect.

RESULTS: The majority of participants were racial/ethnic minorities (57%), middle-aged (mean = 43.2 years; SD = 8.9), and had a median CD4+ T-cell count of 646 cells/mm³ (Interquartile Range = 428-816). At baseline, 14% had an unsuppressed viral load. We observed a significant group x time interaction for the primary outcome, log₁₀ HIV viral load ($p = 0.049$). In planned comparisons, men in the ARTEMIS intervention displayed significantly lower log₁₀ HIV viral load at six (Cohen's $d = 0.89$), 12 (Cohen's $d = 0.43$), and 15 (Cohen's $d = 0.50$) months compared to attention-control participants. Men in the ARTEMIS intervention also had significantly lower risk of at least one unsuppressed HIV RNA over 15 months (Risk Ratio = 0.33; 95% CI = 0.15 - 0.69; $p < 0.001$). Finally, there was a significant group x time interaction for positive affect ($p = 0.044$) such that men in the ARTEMIS intervention reported significantly higher positive affect at six (Cohen's $d = 0.53$) and 12 (Cohen's $d = 0.41$) months compared to attention-control participants.

CONCLUSIONS: Delivering a positive affect intervention with CM for stimulant abstinence achieved durable virologic suppression in methamphetamine-using sexual minority men.

LBPED43

The impact of memory and substance use on HIV clinic visits

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BACKGROUND: Memory impairment is common among people living with HIV/AIDS (PLWHA) and it might have an impact on their daily activities, including HIV clinic visits. Memory impairment may also exacerbate the effects of substance use on HIV clinic visits.

This study investigated the effects of memory impairment and its joint effect with drug use on HIV clinic visits.

METHODS: HIV-positive patients were recruited from local health departments and clinics in Florida from 2014 to 2018. Demographics, self-report substance use, memory and missed HIV clinic visits were collected through survey methods. Memory impairment was measured using the abbreviated Cognitive Difficulties Scale (CDS). Participants were categorized into two groups with median CDS score of 5 with scores >5 implying more memory impairment.

Participants were coded as drug users if they reported having drug injection or forms of drug use in the past 12 months, including the use of cocaine, heroin, stimulants, pain medication, sedatives, ecstasy or others, but not including marijuana.

Multivariate analyses were conducted to assess the associations between CDS scores, drug use and the interaction of the two with HIV clinic visits. We calculated Adjusted Odds Ratios (AOR) and 95% Confidence Intervals (CI).

RESULTS: A total of 221 (24%) out of 919 participants reported missed HIV clinic visits in the past 6 months. A younger age, unstable housing or homeless, and walking or riding a bike to clinics were associated with missed clinic visits in bivariate analyses. Past-year drug use (AOR 1.68, CI 1.19-2.37) and CDS score greater than median (AOR 1.69, CI 1.19-2.39) were associated with missed HIV clinic visits, respectively, after controlling for demographics, housing and transportation. Relative to participants with no drug use and CDS score within 1-5, the estimated AOR was 2.89 (1.81, 4.62) for participants with CDS score >5 and used drugs.

CONCLUSIONS: In addition to a direct association, memory impairment can exacerbate the association between substance use and missed HIV clinic visits. Additional research with longitudinal data are needed to verify the findings from this study to improve care for PLWHA.

LBPED44

Mortality after receipt of short-term incentives for HIV care among adults initiating ART in Tanzania: Follow-up of a randomized trial

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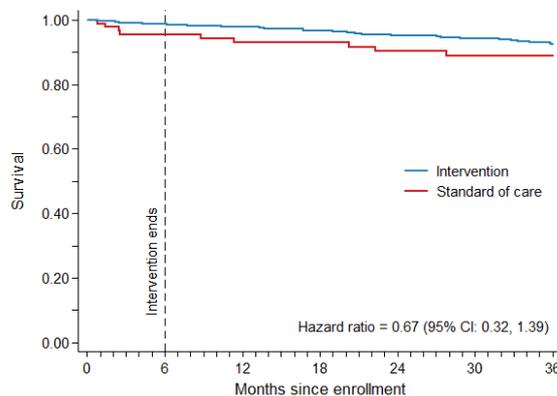
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BACKGROUND: Mounting evidence demonstrates the effectiveness of economic incentives for improving antiretroviral therapy (ART) adherence. However, the long-term effects of short-term incentives remain unknown, including whether such interventions reduce mortality.

METHODS: We traced former participants in a randomized trial of short-term incentives for HIV care in Shinyanga, Tanzania. The original study (2013-2015) randomized 800 food insecure adults who recently initiated ART (≤ 90 days) in a 1:3:3 ratio to receive the standard of care alone or together with monthly cash or food assistance (valued at ~\$11/mo) for ≤ 6 consecutive months, conditional on visit attendance. We traced participants ≥ 36 months after enrollment using records and interviews at original or transfer clinics, phone calls, and community health workers. We analyzed the effect of receiving any incentives on mortality using Cox proportional hazards and logistic regression models adjusted for age, sex, clinic, and baseline imbalances.

RESULTS: Of 800 former participants, we determined 36-month survival for 641 participants (80%) of whom 51 were deceased (7.9%, including 21 undocumented deaths); 159 could not be located (20%; unconfirmed transfers or lost to follow-up) and were censored at their last known visit date. Compared to the standard of care, the incentive group had a non-significant 33% lower mortality rate overall (Figure), corresponding to a 42% lower 24-month mortality risk (5.2% vs. 8.3%; OR=0.58, 95% CI: 0.24, 1.39) and a 20% lower 36-month mortality risk (7.8% vs. 9.4%; OR=0.80, 95% CI: 0.36, 1.77).

CONCLUSIONS: We used gold-standard tracing procedures in the first study of whether short-term incentives at ART initiation have long-term benefit. Up to 3 years after the 6-month incentive program, we found somewhat lower mortality among incentive recipients compared to the standard of care. Although preliminary, these findings indicate that interventions to support ART adherence at the time of treatment initiation may have durable, spillover effects on other outcomes including survival.



[Kaplan-Meier survival plot of time to all-cause mortality among adult ART initiates in Tanzania]

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LBPED45

Is having healthcare coverage enough to increase viral suppression among men who have sex with men in the United States?: Results from HPTN 078

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BACKGROUND: Men who have sex with men (MSM) continue to account for the majority of HIV infections in the United States (U.S.). Access and adherence to HIV treatment among those infected are key to stopping transmission. As having health insurance can facilitate access to treatment, we analyzed the association between reported health coverage and viral suppression among MSM living with HIV screened for HPTN 078.

METHODS: We used cross-sectional data from 1,305 MSM screened for the HPTN 078 trial, of whom 902 were HIV-infected. Participants were recruited through both direct and respondent driven sampling methods from clinics across four U.S. cities, including two located in states with Medicaid expansion. Sexual health and sociodemographic characteristics were collected. Participants answered "Yes" or "No" to whether or not they had health coverage (regardless of type). We assessed the association between reported health coverage and viral suppression (< 1000 copies/mL) at screening using multivariable logistic regression adjusting for age, race, employment, household income, education, and recruitment method into the study. We then assessed factors associated with having health coverage using multivariable logistic regression.

RESULTS: Among the 902 participants with HIV, 864 had available viral load measurements at screening. Among these 864, the median age was 46, 79% were Black (n=684), 87% had health coverage (n=754), and 82% were virally suppressed (n=710). After covariate adjustment, having health coverage was significantly associated with higher odds of being virally suppressed [OR: 1.67, 95% CI: 1.02, 2.71, p=0.04]. Older participants (>35 years) had significantly higher odds of being insured [OR: 3.88, 95% CI: 2.56, 5.89, p= < 0.001], while those with low household income (< \$20,000 per year) had marginally lower odds of being insured [OR: 0.57, 95% CI: 0.33, 1.00, p=0.05].

CONCLUSIONS: In this analysis, participants with HIV who had healthcare coverage had a higher odds of viral suppression. The association between healthcare coverage and viral suppression has important implications as the Trump Administration has made a commitment to end the HIV/AIDS epidemic. These results suggest that programs such as the Ryan White Care Act and Medicaid expansion can positively contribute to viral suppression rates among MSM in the U.S.

LBPED46

Tolerability, safety and efficacy of MK-8591 at doses of 0.25 to 2.25 mg QD, in combination with doravirine and lamivudine through 24 weeks in treatment-naïve adults with HIV-1 infection

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BACKGROUND: MK-8591 is a novel nucleoside reverse transcriptase translocation inhibitor (NRTTI) in development for the treatment and prevention of HIV-1 infection. Doravirine (DOR) is a recently approved, non-nucleoside reverse transcriptase inhibitor (NNRTI). We present the tolerability, safety, and efficacy data for MK-8591 in combination with DOR and lamivudine (3TC) through 24 weeks, for treatment of HIV-1 infection.

METHODS: Phase 2B, randomized, double-blind, active comparator-controlled, dose-ranging trial designed to evaluate safety, tolerability and efficacy of MK-8591 given in combination with DOR and 3TC. Eligible participants were HIV-1 infected treatment-naïve adults with pre-treatment HIV-1 RNA \geq 1,000 copies/mL and CD4⁺ T-cell count >200 cells/mm³. Participants were randomized (1:1:1:1) to one of four once-daily treatments groups, receiving one of three doses for MK-8591 (0.25, 0.75, or 2.25mg) plus DOR (100mg) with 3TC (300mg) added for at least the first 24 weeks, or DOR/3TC/TDF, with appropriate placebo. Safety was assessed by adverse event (AE) reporting. Efficacy endpoint of interest at week 24 was HIV-1 RNA < 50 copies/mL. At week 24, participants taking MK-8591 with HIV-1 RNA < 50 copies/mL could switch to a two-drug regimen of MK-8591 and DOR.

RESULTS: 121 participants received drug and were included in analyses (mean age 31yr, 92.6% male, 76.0% white, 22% HIV-1 RNA >100,000 copies/mL) with 29, 30, 31, and 31 participants in the 0.25mg, 0.75mg, 2.25mg dose of MK-8591, or DOR/3TC/TDF groups respectively. There were no deaths, serious drug-related AEs or discontinuations due to AEs in any treatment group. Lower rates of drug-related non-serious AEs were reported for MK-8591 groups [0.0% (0/29), 6.7% (2/30) and 6.5% (2/31) for 0.25mg, 0.75mg and 2.25mg dose respectively] compared with DOR/3TC/TDF (19.4%, 6/31). At week 24, 89.7% (26/29), 100% (30/30), 87.1% (27/31), of participants achieved HIV-1 RNA < 50 copies/mL in the 0.25mg, 0.75mg, 2.25mg dose of MK-8591 respectively, compared to 87.1% (27/31) who received DOR/3TC/TDF. No virologic failure was observed by week 24. Efficacy was consistent regardless of baseline HIV-1 RNA level.

CONCLUSIONS: MK-8591 was well tolerated regardless of dose. Similar proportion of participants achieved HIV-1 RNA < 50 copies/ml at week 24 in all treatment groups.

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PUB001

National trends in TB/HIV comorbidity in Ukraine, 2008-2017

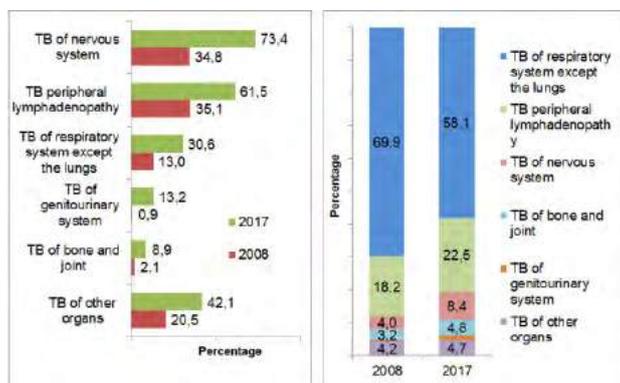
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BACKGROUND: Tuberculosis remains the most common opportunistic disease in HIV patients in Ukraine and is the main cause of AIDS morbidity and mortality. In accordance with data of the Ukrainian Public Health Center, TB was detected in 50.5% new AIDS cases, and 30.1% of AIDS patients died due to TB/HIV co-infection in 2017. HIV infection not only promotes the spread of TB, but changes TB clinic, which depends on the stage of HIV infection and degree of immunodeficiency.

METHODS: Our study was based on national reporting forms "Report on active tuberculosis disease" (annual) over the period of 2008-2017 years.

RESULTS: Against the background of 36.5% decrease in the incidence of active TB without HIV from 71.6 per 100,000 (2008) to 45.5 (2017), the incidence of TB/HIV co-infection increased by 89.4% - from 6.1 per 100,000 (2008) to 11.6 (2017). As a result, from 2008 to 2017 TB/HIV comorbidity rates among patients with pulmonary TB (PTB) increased from 3.9% (2217) to 18.4% (3601), extrapulmonary TB (EPTB) from 11.6% (402) to 31.3% (688) and miliary TB from 28.0% (49) to 71.6% (169). Among EPTB cases TB/HIV comorbidity rates increased in all clinical forms. Over the past 10 years the proportion of TB of respiratory system except the lungs among new EPTB cases with HIV decreased to 58.1% (400), so increased the proportion of TB peripheral lymphadenopathy to 22.5% (155), TB of nervous system to 8.4% (58), TB of bone and joint to 4.8% (33) TB of genitourinary system to 1.5% (10), other form of TB to 4.7% (32).



[TB/HIV comorbidity rates of clinical forms of EPTB and structure of the incidence of EPTB with HIV]

Conclusions: HIV-associated TB in Ukraine has different clinical presentations, which is a difficult task for its early diagnosis. Represented data testify to the necessity of introduction of more sensitive methods of diagnostics of tuberculosis in HIV-infected, especially at later stages with low level of CD4.

PUB002

Scaling up peer driven intervention plus: An innovative approach to reach hidden MSM and TG in Cambodia

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BACKGROUND: A pilot program under the Flagship Project utilized a Peer Driven Intervention Plus (PDI+) method to recruit men who have sex with men (MSM) and transgender (TG) to receive HIV rapid testing in 2017 in one province of Cambodia. Results suggested that the PDI+ method was successfully engaged hard-to-reach MSM and TG. As the result, KHANA scaled up the program to target MSM and transgender (TG) women in seven provinces in the southern zone of Cambodia in Mid-2018

METHODS: The PDI+ method utilized a peer network model: Seeds (identified by the PDI+ staff) and Recruiters (participants who agree to recruit additional participants) persuaded their peers (participants) to engage with the PDI+ staff to screen for PDI+ eligibility and HIV risk using a tablet device. Eligible participants with moderate to high HIV risk were encouraged to receive confidential HIV/Syphilis testing and offered a \$2.50 USD incentive. Moreover, participants were offered a \$2.50 USD incentive for each additional participant they recruited. Low HIV risk individuals were not eligible for the PDI+ program, but were encouraged to receive HIV testing by traditional outreach intervention without an offered incentive. Five coupons were provided to each seed/recruiter to recruit five participants, one coupon per recruiter. Each coupon was valid for up to two weeks.

RESULTS: In total, seeds/recruiters recruited 675 participants (both MSM and TG women) to be screened for PDI+ program eligibility and HIV risk. All screened participants were eligible to enroll in the PDI+ program and all were tested for HIV. Of the 675 participants, 45 (6.67%) tested positive for HIV, of which 37 out of 589 (6.81%) were MSM and eight out of 86 (9.40%) were TG women.

CONCLUSIONS: This intervention program supports that peer driven network intervention is a potential method for detecting HIV cases. A PDI+ method has also proven superior to traditional intervention methods as it allows greater access to and recruitment of hard-to-reach MSM and TG women.

PUB003

Use of WhatsApp technology as a platform for improving Timeliness of data reporting in a hard-to-reach Rural Riverine Health facilities in South-South Nigeria

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BACKGROUND: Excellence Community Education Welfare Scheme (ECEWS) supports 55 health facilities in Bayelsa State, South-South Nigeria to provide HIV Prevention, care and treatment intervention with funding from the Global Fund (GF). Of the 55 health facilities, 17 are located in a hard to reach/riverine community. One of the core monitoring and evaluation (M&E) deliverable of the project is "To ensure timeliness in validated data reporting on a monthly basis."

Adopting effectively the National Guideline on HIV for collection of routine M&E data through the local government area (LGA) M&E officials from the facility has been adversely affected by difficulty in accessing the riverine areas. This has continuously caused delay in complete submission of monthly program data.

METHODS: ECEWS built capacity of 28 Data Entry Clerks (DECs)/Adhoc Staff supporting M&E activities at the 14 GF HIV treatment sites through a 3day on site orientation on the use of WhatsApp technology in collation

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and reporting data and cluster the other facilities including the riverine facilities to ensure timeliness of data reporting. The team created a group where all stakeholders relevant in sharing and validating these data can interact better. On monthly basis, each DEC will snap and upload data summaries alongside their key source documentations from Hub and spoke facilities for validation by different staff. With this system in place, the long process of moving across the supported facilities including the riverine areas to get hard copies of data from facilities is effectively bypassed while ensuring timeliness and data quality issues are resolved real time.

RESULTS: Retrospective analysis of the M&E monthly data reporting shows that from April 2017 - May, 2018, the ECEWS team struggled with inconsistency in data quality and timeliness; with the reporting rate stagnated at 55-65% as against the set timeliness target of 90%. The output of this innovation has significantly improved reporting rate from 72% in June 2018, 76% in July and 100% in August 2018.

Conclusions: Building capacity of DECs at GF supported HIV treatment sites on the use of WhatsApp platform to in the areas of data collection reporting and validation has helped to improve timeliness of monthly data.

PUB004

Potential impact of implementing index partner notification to reach undiagnosed people living with HIV in Rwanda

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BACKGROUND: Rwanda is on track to achieve the first target of the UNAIDS 90-90-90 as more than 80% of people living with HIV (PLHIV) are aware of their status. However, reaching the last PLHIV will be even more challenging. In response, Rwanda launched the HIV partner notification program - active tracing of sexual partners of newly HIV diagnosed individuals to improve identification of people with undiagnosed HIV infection and facilitate their linkage to care. We report results from implementation of the pilot of this strategy in Rwanda.

METHODS: The pilot phase started in 23 sites Kigali city from October-December 2017. Newly HIV diagnosed men and women identified in Antiretroviral Treatment (ART) and Prevention Mother to Child Transmission (PMTCT) services were enrolled as index clients. They were offered the choice of referring their sexual partners themselves or having a health provider contact their partners for HIV testing. Sexual partners presenting to the facility were offered HIV testing and those found HIV positive were linked to care and treatment services. Prior to implementation, a training of healthcare providers on HIV partner notification was conducted and the HIV National Guidelines were updated to include the new strategy. An awareness campaign through different media was conducted at the national level to sensitize the public.

RESULTS: In total, 542 Index clients were newly diagnosed in the pilot sites and they reported a combined total of 670 sexual partners. Of them, 76% (509/670) were successfully contacted and 89% (451/509) presented to the sites for HIV testing. Among those who presented, 12% (53/451) already knew their HIV status and were on ART. In the 398 sexual partners with unknown HIV status or previously HIV negative, 51 (13%) were found to HIV positive and 78% (40/51) of them were linked to care.

CONCLUSIONS: These results indicate that HIV partner notification may be effective in reaching undiagnosed people living with HIV in Rwanda. Additionally, this strategy can be effective in linking people to care evidenced by the high proportion newly diagnosed partners linked to care in the pilot phase. HIV partner notification, coupled with other already existing interventions may help Rwanda move closer to the 90-90-90 target.

PUB005

Provider-initiated HIV testing finds the majority of HIV positive persons in Kenya

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BACKGROUND: HIV testing is the gateway to epidemic control. The "first 90" of the UNAIDS 90:90:90 strategy aims to identify 90% of persons living with HIV (PLHIV). Understanding the balance and trade-offs of proportional yield v. absolute PLHIV identified is critical to guiding programs' desire to diagnose and treat all PLHIV. We reviewed PEPFAR-funded HIV testing services (HTS) in Kenya to assess outcomes of different HIV testing modalities.

METHODS: We reviewed PEPFAR HTS data for the period October 1, 2017 - September 30, 2018. "Yield" was defined as the proportion of HIV-positive tests among all tests performed through each modality. We examined total HIV tests performed, numbers of positive tests, yield by modality, and the proportional distribution of HIV-positives by modality.

RESULTS: HTS were provided to 13,193,085 persons; 183,885 were HIV-positive (yield 1.4%; Table). Provider-initiated testing and counseling (PITC) accounted for 10,333,826 (78.3%) tests performed with 123,938 people newly diagnosed (yield 1.2%). After testing at TB clinics (4,656/53,755; 8.7% yield), the highest yield was from index testing, and included testing of index clients' family members as well as testing of sexual contacts through partner notification services (PNS): 341,282 people tested (2.6% of all tested), 25,357 newly diagnosed (yield of 7.4%). PITC contributed the most new diagnoses -123,938 (67.4%) - followed by facility VCT with 29,441 (16.0%) and index testing (including PNS) 25,357 (13.8%).

CONCLUSIONS: PITC contributed the majority of new HIV diagnoses in Kenya, followed by VCT. Index testing had a relatively high yield, mainly driven by PNS. Achieving "the first 90" requires reaching the large numbers of remaining undiagnosed PLHIV. PITC should remain a current priority, even while continually scaling high yield strategies such as family and sexual contact testing (PNS), especially as PITC is also the source of most index clients for PNS.

Modality	N Tested (% All Tests)	Yield	(% HIV+)	% of all HIV+ Tests
All PITC	10,333,826 (78.3%)	123,938	1.2%	67.4%
Facility VCT	1,669,259 (12.7%)	29,441	1.8%	16.0%
Pediatrics	190,878 (1.4%)	1,370	0.7%	0.7%
Other Community	520,835 (3.9%)	3,616	0.7%	2.0%
Index (including PNS)	341,282 (2.6%)	25,357	7.4%	13.8%
VMMC	137,005 (1.0%)	163	0.1%	0.1%
TOTAL	13,193,085 (100.0%)	183,885	1.4%	100.0%

[PEPFAR Kenya HIV Tests Performed, HIV Yield, and Proportional Distribution of HIV-Positives by Testing Modality, October 2017 - September 2018.]

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