

**Results:** HIV prevalence was 17.0% (95% Confidence Interval: 15.7–18.3%) among men and 30.1% (28.5–31.6%) among women. Overall, 59.1% (57.4–60.8%) of men and 79.5% (78.2–80.9%) of women reported having ever been tested for HIV. When controlling for age, circumcised men were more likely to ever have been tested (66.1% vs. 53.6%;  $p < 0.001$ ). Among HIV+ individuals, 21.0% (17.7–24.6%) of men and 30.5% (27.7–33.3%) of women tested positive for any ARV. The ratio of ARV+ people over those HIV– was 0.084. Using basic calculations, we found that if ART programs were actually treating all eligible patients since 2005, this ratio should have been 0.21–0.28, indicating an effectiveness of ART programs around 47–63%. Among ARV+ participants, 91.9% (88.7–94.3%) had viral suppression (VL < 400 cp/mL). The proportion of viral suppression among HIV+ was 27.0% (24.3–29.9%) among women and 17.5% (14.4–20.9%) among men. These proportions were lower among the highly-exposed age groups: 15.6% (12.1–19.7%) among women and 8.4% (5.0–13.1%) among men.

**Conclusions:** In Orange Farm, in the 2005–2012 period, ART programs were sub-optimal and, among HIV+, proportion of viral suppression was low, especially among the highly-exposed age groups. This suggests that, up to 2012, ART programs may not have substantially impacted HIV incidence. However, our study showed at community level that, when effectively taken, ARVs present a high effectiveness in suppressing VL.

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## MOAC0103

### A mathematical model to determine potential costs and benefits of increasing antiretroviral therapy coverage in female sex workers: the case of Panama

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**Introduction:** Panama adopted Treatment as Prevention (TasP) in February 2014 and is now seeking efficient and effective ways to expand antiretroviral therapy (ART) coverage in key populations. We

developed a mathematical model to determine the ART coverage and associated costs required to meet HIV incidence reduction targets for the female sex worker (FSW) population, which has a 1.6% HIV prevalence.

**Methods:** The Government of Panama, British Columbia Centre for Excellence in HIV/AIDS and Simon Fraser University are collaborating to develop mathematical models for informing Panama's TasP strategy. Quantitative and qualitative information was collected from national reports, key informant interviews and focus groups with civil society to inform a compartmental HIV transmission model incorporating disease progression and treatment. The model was calibrated and validated for 2013. Estimated FSW population size is 17,000 and according to the Global AIDS Response Progress report, current ART coverage for both FSW and the hard-to-reach client population is about 47%. Annual ART cost/individual is US\$625. Simulation scenarios for meeting 50, 70 or 90% reduction in HIV incidence in FSW in 15 years assumed ART expansion either for FSW and their clients (Scenario 1) or for FSW only (Scenario 2).

**Results:** ART expansion for FSW costs slightly more in Scenario 1 than 2. However, overall for both populations of FSW and clients, more infections are averted and treatment programme costs are lower for the strategy targeting FSW only (see Table 1). Furthermore, initial aggressive expansion of ART coverage leads to overall cost savings and a more effective means of averting new infections (see Figure 1). The result of no action compared to the 90% Scenario 2 strategy would be 170% more HIV infections and 50% more treatment costs over 15 years.

**Conclusions:** Rapid expansion of TasP for female sex workers in Panama would avert infections and treatment costs already within 15 years. Initial short-term investment to increase ART coverage would be offset by long-term savings. Since Panama adopted TasP, UNAIDS has announced the 90–90–90 targets for HIV diagnosis, treatment and suppression, which call for an even more rapid reduction in incidence. Ongoing analyses are evaluating costs and outcomes of reaching the new targets by 2020.

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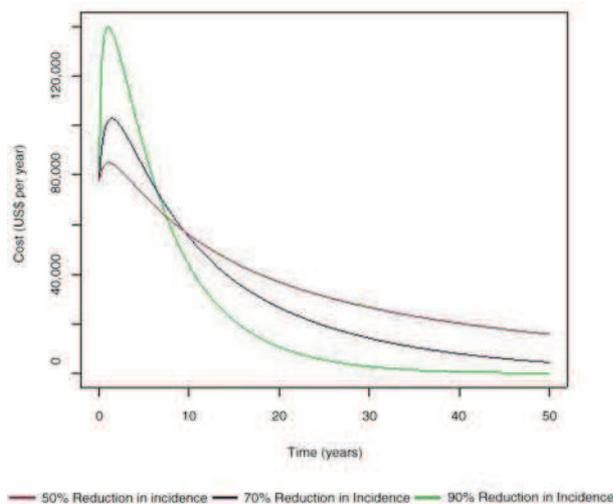
## MOAC0104

### Does a universal test and treat strategy impact ART adherence in rural South Africa? ANRS 12249 TasP cluster-randomized trial

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Abstract MOAC0103–Table 1. Outcomes and costs of TasP expansion scenarios

Population	Target incidence reduction in FSW in 15 years (%)	No ART expansion new cases in 15 years	No ART expansion US\$ costs in 15 years	TasP Scenario 1 new cases in 15 years	TasP Scenario 1 US\$ costs in 15 years	TasP Scenario 2 new cases in 15 years	TasP Scenario 2 US\$ costs in 15 years
FSW	50	2816	\$1,240,560	2003	\$911,016	2000	\$1,025,737
Clients	50	4096	\$3,841,072	2878	\$3,308,139	2847	\$3,139,332
Both	50	6912	\$5,061,632	4881	\$4,219,155	4847	\$4,165,069
FSW	70	2816	\$1,240,560	1620	\$863,324	1605	\$1,093,578
Clients	70	4096	\$3,841,072	2331	\$3,030,029	2259	\$2,782,224
Both	70	6912	\$5,061,632	3951	\$3,893,353	3864	\$3,875,802
FSW	90	2816	\$1,240,560	1118	\$777,438	1074	\$1,107,593
Clients	90	4096	\$3,841,072	1615	\$2,818,353	1480	\$2,260,854
Both	90	6912	\$5,061,632	2733	\$3,595,791	2554	\$3,368,447



**Abstract MOAC0103—Figure 1. Treatment cost for FSW population.**

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**Introduction:** HIV treatment guidelines are recommending ART at increasingly higher CD4 counts for maximizing individual and population benefits. However, the expansion of ART use may be at the expense of optimal adherence. We report on adherence and virological suppression when initiating ART at different CD4 thresholds within the Treatment as Prevention (ANRS 12249) trial of universal home-based testing and immediate ART initiation in rural KwaZulu-Natal.

**Methods:** Using data of a cluster-randomized trial of immediate ART versus initiation according to current national guidelines ( $CD4 \leq 350$  cells/mm<sup>3</sup>), we compared adherence levels ( $\geq 95\%$  vs.  $< 95\%$ ) measured using a visual analogue scale (VAS) and pill count (PC) and virological suppression at six months ( $< 400$  c/mL) according to CD4 count at ART initiation through logistic regression models, adjusting for possible confounders (age, sex, marital status, education and employment).

**Results:** During March 2012–May 2014, 601 participants who were not on ART entered care in trial clinics; 382 initiated ART; 254 have completed  $\geq 6$  months on ART, 227 of whom had six months HIV RNA data and were included in analyses. One hundred sixty-nine were women; median (IQR) age and CD4 at ART initiation were 35 years (28, 46) and 313 cells/mm<sup>3</sup> (206, 513). Adherence  $\geq 95\%$  at six months was high (88 and 83% by PC and VAS, respectively) with no evidence that this was associated with CD4 at initiation (aOR = 0.97 per 100 cells/mm<sup>3</sup> higher, 95% CI: 0.83–1.12,  $p = 0.65$  for VAS; aOR 1.13 per 100 cells/mm<sup>3</sup> higher, 0.98–1.31,  $p = 0.09$  for PC). Male sex was independently associated with  $< 95\%$  adherence (2.58, 1.24–5.35,  $p = 0.01$ ; ref. females). Eighty-three percent (183/227) of those who started ART achieved HIV suppression by six months with no association with CD4 at initiation (1.13 per 100 cells/mm<sup>3</sup> higher, 0.96–1.33,  $p = 0.40$ ). Compared to those with  $\geq 95\%$  adherence by

VAS, individuals with  $< 95\%$  adherence were somewhat less likely to suppress (0.44, 0.19–1.03,  $p = 0.06$ ).

**Conclusions:** We found no evidence that, among people newly entering HIV care, higher CD4 at ART initiation was associated with reduced adherence or poorer virological suppression, at least in the short-term. In this rural South African setting, motivation to adhere to ART may be independent of the presence of symptomatic HIV disease.

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## MOAC0105LB

### Community-based HIV testing and linkage effectively delivers combination HIV prevention: results from a multisite randomized trial

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**Introduction:** To have a population impact in generalized HIV epidemics in Africa, high coverage of combination HIV prevention strategies that reduce the susceptibility of uninfected persons and the infectiousness of infected persons is needed. Community-based HIV testing and counselling, with linkage to care and prevention, is a potential delivery platform for combination HIV prevention.

**Methods:** We conducted a multisite programme of community-based HIV testing and counselling, linkage to HIV care, and demand creation for voluntary medical male circumcision (VMMC) in rural communities in KwaZulu-Natal, South Africa and Sheema district, Uganda. HIV testing was done at home or through mobile units. HIV-positive persons were randomly allocated to linkage to care strategies: clinic facilitation by lay-counsellors at the initial clinic visit, lay-counsellor follow-up visits at home, or standard clinic referral. HIV-negative uncircumcised men were randomized to VMMC demand creation strategies: lay counsellor follow-up visits at home, SMS reminders, or standard VMMC promotion at the time of testing.

**Results:** Between June 2013 and February 2015, 15,332 persons received HIV testing and counselling. Among 1325 HIV-positive persons randomized to linkage strategies, the overall clinic linkage was high (93%). Compared to standard linkage, lay counsellor clinic facilitation increased linkage to care (RR = 1.09, 95% CI: 1.05–1.13), and home follow-up visits increased antiretroviral therapy (ART) initiation (RR = 1.23, 95% CI: 1.02–1.47). In all arms, ART initiation was limited by bottlenecks in service delivery at the clinics, although 67% of those eligible initiated ART by nine months. Overall, 82% of persons initiating ART achieved viral suppression without significant difference between study arms. Of 750 HIV-negative uncircumcised men randomized to VMMC promotion strategies, the uptake of circumcision was 41% by month 3. Compared to standard messages, VMMC uptake was significantly higher in the SMS promotion (RR = 1.72, 95% CI: 1.36–2.17) and lay counsellor follow-up arms (and RR = 1.67, 95% CI: 1.29–2.14).

**Conclusions:** Community-based HIV testing and linkage to care and prevention effectively deliver combination HIV prevention. Simple strategies, such as SMS reminders or lay-counsellor visits, increase linkage for ART initiation and male circumcision. Community-based strategies require integration with efficient clinical services, and