Results Out of 1491 FSWs, BV data were available for 1367 among whom, BV and HIV prevalences were 47.6% (95% CI=45.0% to 50.3%) and 27.0% (95% CI=24.6% to 29.3%) respectively. In multivariable analysis (Abstract O1-S05.06 table 1), adjusting for site, age, years of education, occupation, current contraceptive method, oral sex, past history of STI, gonorrhoea, candidiasis and syphilis, BV was significantly associated to HIV (adjusted PR=1.20, 95% CI=1.01% to 1.42%, p=0.03). In addition, the PR was negatively modified by TV, whose prevalence was 6.7%: PR was 1.25 (1.05 to 1.48) and 0.76 (0.41 to 1.38) in the absence and the presence of TV respectively (p for interaction =0.12).
Conclusions Though its cross-sectional design precludes all directional interpretation of the findings, this study confirms the relationship between BV and HIV among FSWs and warrants prospective studies in this population. The negative modifying effect of TV on this association's measure needs further investigation.

Epidemiology oral session 6: Planning of HIV preventive interventions

O1-S06.01 IMPACT OF TARGETED INTERVENTIONS IN HIV EPIDEMICS AS PREDICTED BY MATHEMATICAL MODELS: A SYSTEMATIC REVIEW

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Background Mathematical modelling of sexually transmitted infections suggests that targeting intervention (TI) to high-risk heterosexual risk groups (HRG) who have disproportionately high exposure and potential for transmission within populations can be very effective. We reviewed HIV transmission modelling studies to better understand the potential impact of TIs or the contribution of HRG to overall HIV transmission across geographical regions and epidemic phases.
Methods We systematically searched PubMed with relevant key words to identify publications that used dynamical models of heterosexual HIV transmission, and then searched papers to identify studies that incorporated heterogeneity in risk, and provided estimates of the population attributable fraction of HIV infections due to HRGs (PAF), or fraction of infections prevented (PF) or change in prevalence due to TIs.
Results Of 917 titles, 283 were excluded on abstract review. Of 634 papers searched, 96 modelled heterogeneity, of which 26 were included. Six studies used non-regionalised models, 9 studied generalised epidemics (GE) in sub-Saharan Africa, nine studied concentrated epidemics (CE) in Asia, West Africa, Japan, and Europe, and two studied both epidemic types. The PAF of HRGs ranged from 13% to 17% in mature GEs with an HIV prevalence of 16%–22% across three studies. Five models explored TIs in GEs and predicted a PF of 12%–73% and a 0%–27% reduction in prevalence with >50% coverage of commercial partnerships. Ten studies modelled TIs in CEs, with overall HIV prevalence at the mature phase between 0.7% and 3.5%, and suggested that TIs could reduce prevalence by 14%–30%, with PFs of 25%–48% if >75% coverage of commercial partnerships. With <50% coverage of commercial partnerships, 1 study demonstrated a 14% reduction in prevalence at 10 years, and two studies predicted a PF between 13% and 20%. The PF of TIs implemented early in a CE with high coverage ranged between 27% and 97%. Two studies predicted that additional TIs (pre-exposure prophylaxis) associated with high levels of risk compensation in mature epidemic settings could reverse positive gains already made by increased condom use see Abstract O1-S06.01 table 1.
Conclusion Modelling studies suggest that TIs have the potential to reduce HIV in the overall population in generalised and concentrated epidemics. The relative impact of TIs depends on coverage, epidemic phase, differential risk between HRGs and remainder of the population, and the time-scale of outcome measurement.

Abstract O1-S06.01 Table 1 Summary of published modelling results on targeted intervention among heterosexual higher-risk groups

	Population attributable fraction, % (years)	Prevented fraction %, (years post-intervention)	Change in prevalence %, (years post-intervention)
Generalised epidemics			
Early	–	12 (4)	0 (1)
Mature	13 (4), 8–17 (20)	73 (1), 35 (10)	4–27 (10)
Concentrated epidemics			
Early	–	70 (1), 27(4), 85–97(10)	41–58 (10), 58–89 (30)
Mature	40 (1)	25–30 (1), 10–48 (10), 40 (11)	30 (5), 14 (10)

O1-S06.02 IMPACT OF PILL SHARING ON DRUG-RESISTANCE AND POPULATION-LEVEL EFFECTIVENESS OF A WIDE-SCALE ORAL PREP INTERVENTION IN RESOURCE-CONSTRAINED SETTINGS

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Background In 2010 two randomised trials suggested that pre-exposure prophylaxis (PrEP) products based on tenofovir, an antiretroviral drug either administered daily orally (oral PrEP) or applied topically (vaginal microbicides), significantly reduced HIV acquisition among adherent users. Behavioural studies also suggest that some PrEP users are compelled to share product with sex partners, family, or friends. Pill sharing (PS) decreases the adherence levels of the intended PrEP users and creates an uncontrolled environment for the development of drug-resistance. However PS effects on the expected population-level impact of PrEP interventions have never been assessed. Thus, we aim to evaluate the potential impact of PS on the PrEP effectiveness to prevent HIV transmission and the spread of drug-resistance in heterosexual populations in resource-constrained settings.
Methods A transmission dynamic model was used to assess the population-level impact of oral PrEP in a variety of intervention scenarios and high HIV prevalence settings. The cumulative fractions of new HIV infections prevented (CPF) and transmitted drug-resistance (TDR) are evaluated over fixed time periods under various epidemiological conditions. The influence of different factors (eg, acquisition rate, PrEP coverage, rates of resistance development) on CPF and TDR is studied through simulations, using parameter sets sampled from ranges representative of countries in Sub-Saharan Africa.
Results Without PS, a 70% effective oral PrEP intervention used by 60% of the population prevents about 52% (95% CI 49.6% to 53.8%) of all new HIV infections over 10 years (10 years CPF) if adherence is 100%. CPF increases by 7% in populations with 10% PS, assuming no efficacy reduction for those who share PrEP and reduces by 2% if the efficacy reduction for sharers (prescribers or untracked users) is 50%. However, the fraction of transmitted drug-resistance (TDR) increases 2- to 6-fold in all scenarios investigated. It depends on the success in preventing PrEP usage by HIV infected individuals.
Conclusions PS may increase the PrEP coverage level achieved in the population but it also affects the PrEP efficacy for the users who do not follow the prescribed dosing. It creates a pool of untracked users who do not receive counselling, remain hidden and unreached by the effort to avoid the PrEP usage by HIV infected individuals. This increases substantially the potential risk of drug-resistance development.