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Background STI prevalence or incidence data among HIV infected can help to distinguish populations with different levels of sexual HIV transmission risk. Herpes simplex virus type 2 (HSV-2) is considered useful because it is almost exclusively sexually transmitted, cannot be cured and leads to the production of lifelong antibodies. Unfortunately, few IDU studies include HSV-2 prevalence data.
Aim of the current work is to examine prevalence of and associations between HSV-2 infection, and HIV infection among injecting drug users (IDUs) in Kohtla-Järve, Estonia.
Methods Current IDU were recruited using chain referral methodology (RDS). Informed consent was obtained, a structured questionnaire including demographics, drug use history, and sexual risk behaviour was administered, and a blood sample was collected for HIV and HSV-2 antibody testing.
Results A total of 600 subjects were recruited in 2012. Subjects were primarily male (73%), with a mean age of 30 (SD 4.9) years. The prevalences of HIV and HSV-2 were 62%, and 32%, accordingly. Odds for being HSV-2 positive was higher among HIV infected IDUs (OR 1.9.95% CI 1.3–2.9). One third (27%) of the sexually active IDUs reported always using condoms (with in the last 4 weeks) prior the study.

Being HSV-2 positive was not associated with reported injection risk behaviour. HSV-2 seropositivity was associated with gender (higher among women; OR 2.7, 95% CI 1.8–4.0), and sexual behaviour: higher among those reporting IDU-sexual partners (OR 1.7, 95% CI 1.1–2.7), and those not always using condom (OR 2.0, 95% CI 1.2–3.4).
Conclusion HSV-2 seroprevalence can be used as a marker of (long-term) sexual risk. However, it might not capture more recent behaviour change in response to the HIV/AIDS among population groups studied.

High prevalence of HSV2 infection coupled with low reported condom use highlight the need of targeted sexual risk reduction interventions for IDU and their partners.

P3.226 PRE-EXPOSURE PROPHYLAXIS (PREP) IS ESTIMATED TO BE A COST-EFFECTIVE ADDITION TO ANTIRETROVIRAL THERAPY (ART) FOR HIV PREVENTION IN A GENERALISED EPIDEMIC SETTING

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Background In KwaZulu-Natal, South Africa, young women face an extraordinarily high risk for HIV acquisition, with annual incidence estimates of 6%. ART-based strategies for HIV prevention have the potential to significantly decrease HIV incidence, but the impact of PrEP in addition to ART scale-up is undefined. Modeling studies suggest that PrEP targeted to highest-risk groups could maximise benefits and contain costs.
Methods We developed a deterministic transmission model of HIV that stratifies the population by age, sexual activity, and includes HIV infection stage. The model was parameterized using data from community-based HIV counselling and testing studies in KwaZulu-Natal and validated using independent HIV prevalence and incidence estimates.

We estimated the effectiveness and cost-effectiveness of a 'test and treat' scenario, targeted PrEP by age and sexual activity, and general PrEP provision. Each scenario was in addition to anticipated baseline ART scale-up for CD4≤ 350 from 35% in 2013, as observed in KwaZulu-Natal, to 60% in 2018 (following national guidelines). We assumed PrEP efficacy of 70%.
Results 'Test and treat' (ART for 80% of all HIV-positive persons) reduced HIV incidence by 58% and averted 25% of cumulative infections by 2025, at an additional $39,900 per infection averted compared to baseline ART scale-up. PrEP targeted to 60% of 20–29-year-olds, in addition to baseline ART scale-up, reduced incidence by 42% and averted 22% of infections at an additional $22,500 per infection averted, whereas PrEP targeted to 80% of high-risk individuals reduced incidence by 33% and averted 13% of infections at an additional $7,400 per infection averted. PrEP coverage of 20% of the general population reduced incidence by 37% and incident infections by 18%, at an additional $26,900 per infection averted.
Conclusion In a generalised HIV epidemic setting PrEP is a cost-effective addition to ART, with targeted PrEP being more cost-effective than generalised PrEP distribution.

P3.227 A COMPARISON OF MICROSIMULATION AND DETERMINISTIC APPROACHES TO MODELLING OF SEXUALLY TRANSMITTED INFECTION DYNAMICS

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Background Deterministic models are widely used in simulating the potential effect of programmes for the prevention and treatment of HIV and other sexually transmitted infections (STIs). However, most deterministic models are frequency-dependent and do not model pair formation explicitly, which can lead to inaccuracies. We aim to quantify these inaccuracies by comparing a frequency-dependent deterministic model to a 'gold standard' microsimulation model of pair formation.
Methods An individual-based microsimulation model was created to represent as closely as possible the assumptions of a previously-developed deterministic model, which simulates heterosexual transmission of seven different STIs (HIV, genital herpes, syphilis, chancroid, gonorrhoea, chlamydia and trichomoniasis) as well as bacterial vaginosis and vaginal candidiasis, in the South African population. The microsimulation model was extended to simulate pair formation. For each STI, steady-state endemic prevalence levels were estimated using both models.
Results The ratio of the endemic STI prevalence in the microsimulation model to that in the deterministic model varied from 0.88 for HIV to 0.81 for genital herpes, 0.53 for chlamydia, 0.42 for trichomoniasis, 0.12 for gonorrhoea and 0.00 for both syphilis and chancroid. In contrast, the ratio was close to 1 for non-sexually transmitted infections (1.00 for vaginal candidiasis and 1.02 for bacterial vaginosis). The ratio was strongly negatively associated with the fraction of transmission occurring in the first 6 months of infection ($r = -0.98$).
Conclusion Frequency-dependent deterministic models of STIs tend to exaggerate the levels of transmission in the early stages of infection, because they ignore the period in which individuals remain in contact with the partner who infected them. This bias is particularly significant for non-viral STIs. Further work is required to assess whether microsimulation models of pair formation predict more accurately the effects of STI prevention and treatment programmes.

P3.228 HSV-2 SEROINCIDENCE AND ITS ASSOCIATION WITH MEDICAL MALE CIRCUMCISION, HIV, GENITAL ULCER DISEASE, AND PENILE EPITHELIAL TRAUMA

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Background We estimated the 72-month efficacy of medical male circumcision (MMC) against HSV-2 seroincidence among men in the randomised trial of MMC in Kisumu, Kenya.
Methods From 2002–2005, 2,784 men aged 18–24 were randomised 1:1 to immediate circumcision or control. At trial end in December 2006, control men were offered free circumcision. Follow-up continued through September 2010. Cox proportional hazards regression incorporating stabilised inverse probability of treatment and censoring weights generated through marginal structural modelling was used to account for potential time-varying confounding and censoring to estimate the efficacy of MMC on HSV-2 risk. Conventional Cox regression identified multivariable risks for HSV-2 acquisition.
Results Among 2,044 men who were HSV-2 seronegative at baseline, the cumulative 72-month HSV-2 seroincidence was 33.1%: 32.7% among circumcised men, 33.5% among uncircumcised men. In weight-adjusted Cox regression, the HR was 0.88 [95% CI: 0.77 – 1.10]. In conventional multivariable analyses, risks ($p < 0.05$) for HSV-2 included: HIV infection [aHR = 3.75], GUD [aHR = 4.75], penile epithelial trauma [aHR = 1.47], ≥ 2 recent sex partners [aHR = 1.54], and being married/cohabiting [aHR = 1.66]. Of men with seroincident HSV-2, 21% experienced GUD and 80% reported penile epithelial trauma. Conversely, 45% of men with GUD and 80% of men reporting penile epithelial trauma did not acquire HSV-2. GUD preceded HSV-2 in 59% of men with both conditions, with median time to HSV-2 of 12 months. Penile epithelial trauma preceded HSV-2 in 92% of men with both conditions, with median time to HSV-2 of 24 months.
Conclusion MMC had no effect on HSV-2 acquisition at 72 months. The temporal sequence and limited correlation between HSV-2, GUD, and penile epithelial trauma indicate these are distinct phenomena, rather than misclassification of HSV-2 symptoms. Determining the aetiology of non-STI GUD and penile epithelial trauma is necessary as both are risks for HIV acquisition, and are common in populations in sub-Saharan Africa.

P3.229 PREVALENCE AND CORRELATES OF *MYCOPLASMA GENITALIUM* IN HIV-POSITIVE AFRICAN WOMEN

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Background To assess the prevalence of *Mycoplasma genitalium* (MG) among HIV-positive African women and its associations with cervical infections and disease, other STI signs and CD4+ counts.
Methods The HARP study aims to evaluate cervical cancer screening tests among HIV-positive women aged 25–50 in Burkina Faso (BF) and South Africa (SA). In addition, real time PCR assays were used to detect *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), *Trichomonas vaginalis* (TV), and MG, using Sacace RT-PCRs in BF, and multiplex PCR followed by confirmatory APTIMA® assays for NG/CT and Sacace RT-PCR for TV/MG in SA. HPV genotyping was performed using Digene® HC2 assay.
Results 628 women were enrolled in BF and 624 in SA, two-thirds of whom were on antiretroviral therapy. The distribution of CD4+ count (cells/μL) was similar in both sites: 68% with CD4+ ≥ 350 and 10% with CD4+ < 200. Prevalence of MG was similar in both populations: 7.1% in BF (41/575) and 7.6% (47/622) in SA, and, overall, 6.7%, 8.2% and 10.1% among women with CD4+ ≥ 350, 200–349 and < 200, respectively (Table). MG was detected in 8.2% of high-risk (HR)-HPV-positive women vs. 3.9% of women without HR-HPV (P = 0.005), and in 7.7% of women with low-grade cervical intraepithelial lesions (LSIL), and 10.0% of women with high-grade lesions (HSIL+) and above vs. 6.2% in women without lesions (P-trend = 0.095). Co-infection with NG, CT, TV and BV was observed in 0%, 11.4%, 11.4% and 9.0% respectively. In multivariate analysis (Table), MG correlated negatively with age (P-trend = 0.003) and clinical PID (aOR = 0.29, P = 0.05), and positively with *T vaginalis* (aOR = 1.7, P = 0.06) but not with any other particular STI infection or syndrome; and tended to increase with decreasing CD4+ count (P = 0.13).
Conclusions MG prevalence is relatively high among these HIV-positive African women and is associated with younger age, trichomoniasis and marginally with CD4.

Table. Multivariate analysis showing factors originally associated in univariate analysis with *Mycoplasma genitalium* in Burkina Faso and South Africa

Abstract P3.229 Table 1

	Mycoplasma genitalium	
	n/N (%)	Adjusted OR (95% CI)
Age group (years)		P-trend = 0.003
25–29	22/243 (9.1%)	1
30–34	31/318 (9.8%)	0.98 (0.52–1.80)
35–39	19/285 (6.7%)	0.60 (0.30–1.20)
40–49	16/351 (4.6%)	0.35 (0.17–0.74)
CD4+ count (cells/μL)		P-trend = 0.13
< 200	12/119 (10.1%)	1
200–349	22/269 (8.2%)	0.62 (0.28–1.40)
>= 350	54/808 (6.7%)	0.54 (0.26–1.10)
T vaginalis		P = 0.06
Negative	59/924 (6.4%)	1
Positive	29/254 (11.4%)	1.70 (0.98–2.92)
Clinical PID		P = 0.05
Absent	73/923 (7.9%)	1
Present	3/116 (2.6%)	0.29 (0.87–0.99)

P3.230 USE OF THE EPI-REVIEW TOOL IN PREPARATION FOR MODES OF TRANSMISSION INCIDENCE MODELLING

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Guyana (one of the most heavily impacted countries by HIV in the Caribbean) embarked upon a Modes of Transmission Incidence Study (MOT) in 2010 with the support of the UN Joint Programme on HIV and AIDS (UNAIDS). The MOT was developed by UNAIDS to help resource constrained countries use pre-existing epidemiological data to estimate the distribution of new HIV infections for the following year by modes of transmission and better target prevention programming. The newly developed EPI- review tool was used to determine data availability and quality.

A technical working group (TWG) conducted an inventory of available data in preparation for the MOT Study. Data was collected