

However, significant associations were observed in MSM with anal HPV 16 (with coinfection—AOR, 10.94, 95% CI, 1.18 to 101.68; without—AOR, 4.96, 95% CI, 1.40 to 17.57).

Conclusion We found type-specific associations of HPV 6 and 16 seropositivity with prevalent anal HPV infection, but not with prevalent genital HPV infection alone. Anal HPV 6 infection was associated with seropositivity in both MSW and MSM, while anal HPV 16 infection was only associated with seropositivity in MSM. Our data suggest that, in men, anal HPV infection may be more efficient than genital HPV infection in inducing immune responses. This may have relevance for protective immunity or the lack thereof, conferred by natural infection.

Epidemiology poster session 1: STI trends: *Mycoplasma genitalium*

P1-S1.56 THE INCIDENCE OF MYCOPLASMA GENITALIUM IN A COHORT OF YOUNG AUSTRALIAN WOMEN

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Background *Mycoplasma genitalium* (Mg) is an emerging sexually transmitted infection that has been associated with serious upper genital tract infections in women such as cervicitis, pelvic inflammatory disease and endometritis. The burden of disease for Mg in Australia is unknown as there are no current population prevalence or incidence data.

Methods Women aged 16–25 years were recruited from sexual health clinics (SHC) and general practice clinics (GP) in South-Eastern Australia and consented to participate in a 12-month study providing vaginal swabs through the mail. Women were tested at 6-monthly intervals for chlamydia and Mg.

Results Overall, 1116 women were recruited from 29 clinics; with 79% of women retained at the conclusion of the study. The prevalence of Mg at recruitment was 2.4% (95% CI 1.5 to 3.3). Increased numbers of sexual partners was strongly associated with Mg (adjusted OR [AOR]=2.2; 95% CI 1.0 to 4.6), as was being recruited from SHC (AOR=3.4; 95% CI 1.5 to 5.3). Mg incidence was 1.2 per 100 women years (95% CI 0.7 to 2.1) and was associated with women recruited from SHC (HR=4.9; 95% CI 1.5 to 16.3) and having increased numbers of new sexual partners (HR=5.7; 95% CI 1.4 to 23.1). We found a median organism load of $1.4 \times 10^3/5 \mu\text{L}$, which was 100 times less than that found in chlamydia positive samples. We also found an azithromycin failure rate of 15% (95% CI 3.2 to 37.9).

Conclusion Mg is common in young Australian women, and consistent with international studies, Mg was less prevalent than chlamydia.

P1-S1.57 EPIDEMIOLOGY OF MYCOPLASMA GENITALIUM AND GENITAL HIV-1 RNA - A LONGITUDINAL STUDY AMONG HIV-INFECTED ZIMBABWEAN WOMEN

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Background *Mycoplasma genitalium* (MG) is an emerging STI associated with reproductive tract syndromes in men and women, and

with HIV in cross-sectional studies. MG is common in HIV-infected women, but there have been no longitudinal studies of MG and genital HIV RNA among HIV-infected women.

Methods The study is nested in a cohort of 131 HIV-infected, ART-naïve Zimbabwean women aged 19–37 years. Real-time PCR was used to test for presence and quantity of MG DNA in 420 stored cervical samples (1–4 visits per woman). Genital and plasma HIV viral load, CD4 count and presence of other STI and reproductive tract infections were collected at each visit, together with clinical and behavioural data. Logistic and linear random-effects models were used to analyse i) factors associated with detection of MG, and ii) the association of detection and quantity of MG with detection and quantity of genital HIV RNA.

Results MG was detected at 44/420 (10.5%) visits, with a median bacterial load of 1497 copies/ml (range <300–3 240 000 copies/ml). MG was twice as prevalent as *N gonorrhoeae* (5.0%) or *C trachomatis* (4.8%). Of the 33 women with MG detected at least once, six were infected at ≥ 2 consecutive visits, persisting for up to 43 weeks. In multivariable analyses, MG was independently associated with bacterial vaginosis (OR=2.24, 95% CI 1.03 to 4.85), HSV2 (OR=8.56, 95% CI 0.99 to 74.24) and younger age (OR=2.92, 95% CI 1.10 to 7.76). Cleaning inside the vagina was protective against MG infection (OR=0.33, 95% CI 0.15 to 0.71). Genital HIV RNA was detected at 237/397 (59.7%) visits, with a mean viral load of 5.14 log₁₀ copies/ml. MG was independently associated with detection of genital HIV RNA (OR=2.73, 95% CI to 1.02–7.33) after adjusting for confounders including plasma viral load, CD4 count, HSV2, and *N gonorrhoeae*. Higher MG bacterial load was weakly associated with detection of genital HIV RNA (OR=1.75, 95% CI 0.96 to 3.19) but there was little association with quantity of HIV RNA.

Conclusions This cohort study confirms previous cross-sectional results showing an association of genital HIV DNA detection with MG infection. Further research is needed to explore factors mediating this association, as MG was not associated with plasma viral load or measured markers of inflammation. The growing evidence for an association of MG with HIV genital shedding, and the high prevalence and persistence of MG infection, suggests that screening and treatment of MG may be warranted among HIV-positive women.

Epidemiology poster session 2 : Population: Commercial sex worker

P1-S2.01 PREVALENCE OF HIV AND SEXUALLY TRANSMITTED INFECTIONS AMONG CLIENTS OF FEMALE SEX WORKERS IN KARNATAKA, SOUTH INDIA

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Introduction Several studies have demonstrated the importance of commercial sex work in the transmission of HIV and other sexually transmitted infections (STIs) in India. Clients of female sex workers (FSWs) are thought to be an important bridging population for HIV and STIs. However, there is little information on basic characteristics of sex work clients. This study sought to describe the prevalence of HIV and other STIs, as well as examine the determinants of these pathogens, among a sample of clients in south India.

Methods Data were from a cross-sectional biological and behavioural survey of FSW clients from six districts in Karnataka State, India. The prevalence of HIV, syphilis, herpes simplex virus type 2 (HSV-2), chlamydia (CT) and gonorrhoea (GC) among clients was

examined. Multivariable logistic regression models were used to analyse the socio-demographic, sexual behaviour and sex-work related characteristics related to the prevalence of each pathogen. Sampling weights and appropriate survey methods were utilised in regression models to account for a complex sampling design.

Results The total sample size was 2745. The average age of clients was 30.4 years (SE=0.3). Across the total sample, the prevalences of HIV, HSV-2, syphilis and CT/GC were 5.6%, 28.4%, 3.6% and 2.2%, respectively. The prevalence of HIV/STIs varied substantially across districts, reaching statistical significance for HIV ($p<0.0001$) and CT/GC ($p=0.005$). In multivariable models, duration of paying for commercial sex was associated with increased risk for HIV and HSV-2 (both AORs=1.1; 95% CI 1.0 to 1.1, $p<0.0001$). Clients using brothels as a main FSW solicitation site were associated with increased risk of HIV (AOR=2.4; 95% CI 1.2 to 4.7, $p=0.001$), while those frequenting lodges were at increased risk for CT/GC (AOR=6.3; 95% CI 1.9 to 20.6, $p=0.03$). Clients with HSV-2 infection were at substantially higher risk of being HIV-positive (AOR=10.4; 95% CI 6.1 to 17.7, $p<0.0001$).

Conclusions This study fills in important gaps in knowledge regarding clients of FSWs in Southern India. FSW clients clearly constitute an important bridging population between FSWs and their other sexual partners in the population. It is important to design and implement effective prevention and care programs for this well-hidden population.

P1-S2.02 HIV PREVALENCE IN FEMALE SEX WORKERS IN A FOCUSED HIV PREVENTION PROJECT IN MUMBAI AND THANE DISTRICT, INDIA

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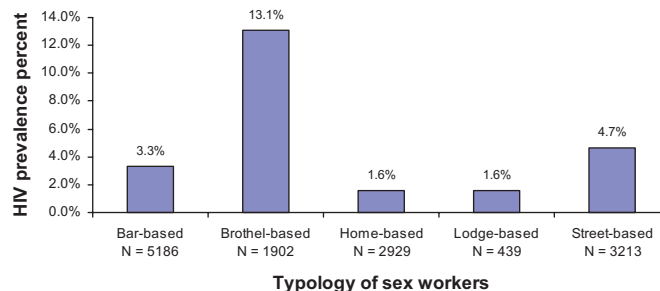
Background Since 2004, FHI has been implementing Aastha, a Bill & Melinda Gates Foundation supported HIV/STI prevention project for 24 000 sex workers (SWs) in Mumbai and Thane. It provides STI services to approximately 11 000 SWs monthly. HIV counselling and testing services were strengthened from March 2009 and by October 2010, 13 669 individuals had been tested for HIV. This abstract discusses the prevalence of HIV in female sex workers (FSWs) registered with the project by age and typology. When the project commenced its intervention in 2004, the HIV prevalence in brothel-based FSWs according to the HIV Sentinel Survey 2004 was 44.76%.

Methods From March 2009 to October 2010, 13 669 FSWs underwent voluntary counselling and testing for HIV. The results were analysed across age and typology. HIV tests were conducted and interpreted as per Indian national guidelines using three rapid tests.

Results Of the 13 669 tested, 623 individuals tested HIV-positive for HIV (4.6%). Among the 623 HIV-positive individuals, 177 individuals (28.4%) were aged 18–24 years; 404 individuals (64.8%) were aged 25–36 years and 42 individuals (6.7%) were aged 37 years or older. By FSW typology, HIV prevalence was as follows—13.1% brothel-based; 3.3% bar-based; 4.7% street-based; 1.6% home-based; and 1.6% lodge-based. The difference in HIV prevalence is statistically highly significant across different typologies ($p=0.0001$). All the sex workers who tested HIV-positive and were willing to disclose their status were linked to care, support and treatment services.

Conclusions In this study, overall HIV prevalence among sex workers was 4.6%. The highest HIV prevalence (13.1%) was observed in the brothel-based SWs. A change in the national policy for HIV testing for brothel-based sex workers from biannually to quarterly is recommended. Historically, in Maharashtra, it has been

observed that brothel-based sex workers have high incidence and this has been corroborated even after scaling up testing in this group. Given this scenario and considering the duration of the window period in any high-risk group, we can inform policy-makers to increase the frequency of HIV testing. This will provide an opportunity for early testing and inclusion of newly identified HIV-positives for referral for care and treatment.



Abstract P1-S2.02 Figure 1 HIV prevalence by SW typology.

P1-S2.03 DETERMINANTS OF CONDOM BREAKAGE AMONG FEMALE SEX WORKERS IN KARNATAKA, INDIA

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Background Condoms are effective in preventing the transmission of HIV and other sexually transmitted infections, when properly used. However, recent data from surveys of female sex workers (FSWs) in the state of Karnataka in South India, suggest that condom breakage rates may be quite high. It is important therefore to quantify condom breakage rates, and examine what factors might precipitate condom breakage, so that programmers can identify those at risk, and develop appropriate interventions.

Methods We explored determinants of reported condom breakage in the previous month among 1928 female sex workers in four districts of Karnataka using data from cross-sectional surveys undertaken from July 2008 to February 2009. Using stepwise multivariate logistic regression, we examined the possible determinants of condom breakage controlling for several independent variables including the district and client load.

Results Overall, 11.4% of FSWs reported at least one condom break in the previous month. FSWs were much more likely to report breakage if under 20 years of age (OR 3.43, $p=0.005$); if divorced/separated/widowed (OR 1.52, $p=0.012$); if they were regular alcohol users (OR 1.63, $p=0.005$); if they mostly entertained clients in lodges/rented rooms (OR 2.99, $p=0.029$) or brothels (OR 4.77, $p=0.003$), compared to street based sex workers; if they had ever had anal sex (OR 2.03, $p=0.006$); if the sex worker herself (as opposed to the client) applied the condom at last use (OR 1.90, $p<0.001$); if they were inconsistent condom users (OR 2.77, $p<0.001$); and if they had never seen a condom demonstration (OR 2.37, $p<0.001$).

Conclusions The reported incidence of condom breakage was high in this study, and this is a major concern for HIV/STI prevention programs, for which condom use is a key prevention tool. Younger and more marginalised female sex workers were most vulnerable to condom breakage. Special effort is therefore required to seek out such women and to provide information and skills on correct condom use. More research is also needed on what specific situational parameters might be important in predisposing to condom breakage.