urethritis (NGU) cases with no identified aetiology. Cultivation-independent methods have identified novel bacteria associated with female reproductive tract disease, particularly bacterial vaginosis (BV). We evaluated the association of NGU and 5 newly described BV-associated bacteria (BVAB).

Methods English-speaking, heterosexual men aged 16 years attending the STD clinic in Seattle, WA between May 2007 and July 2011 were eligible if PCR tests for *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis, Mycoplasma genitalium*, and *Ureaplasma urealyticum*-biovar2 were negative. Cases were men with visible urethral discharge or 5 PMNs/HPF in urethral exudates. Controls were men with no visible urethral discharge and < 5 PMNs/HPF. Urine was tested for *Atopobium*, BVAB-2, BVAB-3, *Megasphaera spp.*, and *Leptotrichia/Sneathia spp.* using quantitative taxon-directed PCR.

Results Cases (n = 157) and controls (n = 191) were similar with respect to age, education, and income. Mean age was 34.7 (SD ±9.9) and most were white. *Leptotrichia/Sneathia* was significantly associated with NGU (25/157 (15.3%) vs. 6/102 (5.9%), p = 0.03) and BVAB-2 was detected more often in cases than controls (7/157 (4.5%) vs. 1/102 (1.0%), p = 0.15). BVAB-3 (n = 2) and *Megasphaera* (n = 1) were uncommon, but only detected in men with NGU. In contrast, *Atopobium* was not associated with NGU (8.3% vs. 7.8%, p = 1.0). Quantity of bacteria did not differ between cases and controls for any of the 5 candidate pathogens. Among treated cases, doxycycline was somewhat more effective than azithromycin for clinical cure of men with *Leptotrichia/Sneathia* (9/10 (90%) vs. 7/12 (58%), p = 0.16), and BVAB-2 (3/3 (100%) vs. 0/3 (0%), p = 0.10).

Conclusion *Leptotrichia/Sneathia* was significantly associated with NGU. BVAB-2, BVAB-3, and *Megasphaera* were less commonly detected, but most often identified in men with NGU and rarely or never in men without NGU. Doxycycline may be more effective against these newly identified bacteria than azithromycin.

014.2 PREDICTORS AND PATHOGENS AMONG 4,326 CASES OF ACUTE NON-GONOCCOCAL URETHRITIS

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Background This large series examines the behavioural, demographic and laboratory characteristics and pathogens among males with first presentation of acute NGU.

Methods Retrospective review using the electronic-medical record database of Melbourne Sexual Health Centre, Australia, from January 2006 to December 2011. Cases were men with their first presentation with symptoms of acute NGU, in this period. First-stream urine was routinely tested for *C.trachomatis* and *M.genitalium* by PCR, and selectively tested, for trichomoniasis by culture, and HSV-1/2, and adenoviruses by PCR. We examined characteristics of cases, stratifying by pathogen, pathogen-clusters and sexual preference.

Results Of 5452 cases of acute NGU during the study period, 4326 (79%) first presentations were included. 799(18.5%) had *C.trachomatis,* and 264(6.0%) *M.genitalium* detected. Of cases tested selectively on clinical grounds: 28/70 had adenovirus, 31/85 HSV-1/2 and 2/50 trichomoniasis. The majority (74.5%) had no pathogen-detected. Cases with bacterial-STIs were more likely than cases with viruses to have ≥ 5 PMNL/HPF on urethral Gram-stain (62.6% vs 31.5%),p < 0.001. Cases with viruses or no pathogen detected, were more likely to report unprotected oro-genital sex as their only exposure (10.3% & 10%,respectively) compared to cases with bacterial-STIs (5.2%),p < 0.001. Compared to heterosexuals, men who have sex with men (MSM) were less likely to have a bacterial-STI (OR = 0.5; 95% CI: 0.4–0.6, p < 0.001), more likely to have no pathogen-detected (OR = 1.9; 95% CI: 0.1.6–2.3, p < 0.001), and to report 100% condom-use (OR = 4.1; 95% CI: 3.5–4.9, p < 0.001).

Conclusion Compared to heterosexual men, MSM were less likely to have *C.trachomatis* and *M.genitalium* and more likely to have no pathogen detected in acute NGU. Cases with viral agents and pathogen-negative cases were significantly more likely to report unprotected oral sex as the only exposure, raising the possibility that other oropharyngeal pathogens may have an aetiologic role in acute NGU. The urethral Gram stain cut off ≥ 5 PMNL/HPF fails to detect a significant proportion of cases with bacterial and viral pathogens.

014.3 LONG-TERM EFFICACY OF HUMAN PAPILLOMAVIRUS VACCINATION AGAINST CERVICAL CANCER

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Human papillomavirus (HPV) vaccination trials have shown high efficacy (VE) against high grade cervical intraepithelial neoplasia (CIN2/3). CIN2/3 is a surrogate marker of invasive cervical cancer (ICC). These lesions may spontaneously regress. Therefore, long-term follow-up is needed to determine the overall VE against ICC. Between September 2002 and March 2003, 1,749 16- to 17-year old women from Finland were enrolled in the randomised FUTURE trial of the quadrivalent HPV vaccine (Gardasil) with active follow-up for 4 years. Passive follow-up using the population-based Cancer Registry started 6 months after the active follow-up ended in 2007. A cluster randomised, population-based reference cohort of 15,744 unvaccinated, 18–19 year old women was established. We linked these cohorts to compare the incidence rates of CIN3 and ICC. Passive follow-up after 4 years resulted in 3,464, 3,444 and 62,876 person years of follow-up for the HPV vaccinated cohort, the placebo vaccinated cohort and the reference cohort, respectively. The number of endpoints with CIN3 or ICC identified were 0 and 0, 3 and 0, and 59 and 3 for the three cohorts, respectively. The corresponding incidence rates were 0 (95% confidence interval 0.0–106.5), 87.1 (95% CI 17.9–254.5) and 93.8 (95% CI 71.4–121), respectively. Our study shows that evaluation of the long-term efficacy post vaccination for the most stringent endpoints is feasible using cancer registries.

014.4 MICROBIOLOGIC AETIOLOGY OF PROCTITIS DIAGNOSED IN AN URBAN STD CLINIC

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Background Sexually transmitted proctitis occurs among persons who participate in receptive anal intercourse and is a risk factor for HIV acquisition. *N. gonorrhoeae*, *C. trachomatis* (including LGV), *T. pallidum*, and Herpes Simplex Virus (HSV) are the most common pathogens identified. The distribution of microbiologic aetiology of proctitis has implications for empiric treatment guidelines. Methods: We describe the microbiologic aetiology of clinical proctitis among men who have sex with men seen at the municipal STD clinic in San Francisco. *N. gonorrhoeae* and *C. trachomatis* were tested using a nucleic acid amplification assay, HSV was tested using polymerase chain reaction, and *T. pallidum* was tested using a non-treponemal antibody test, with *T. pallidum* particle agglutination confirmation. Results: Between January 1, 2004 and December 31, 2012, there were 1271 men diagnosed with clinical proctitis at the clinic. The number of cases of proctitis diagnosed annually did not increase over this interval, despite

increasing rates of rectal gonorrhoea and Chlamydia. Overall, 820 (65%) of the cases had no microbiologic aetiology identified and nearly half were among HIV-infected men. Two-hundred sixty-three (21%) had gonorrhoea, 205 (16%) had Chlamydia, 53 (4.2%) had both gonorrhoea and Chlamydia, 28 (2.2%) had syphilis and 105 (8.3%) had herpes. Cases in which no microbiologic aetiology was identified were not more likely to have a repeat clinic visit within 14 days of diagnosis compared with those with Gonorrhea or Chlamydia (6.3% vs. 6.8%).

Conclusion STD clinics can be sentinel sites to assess proctitis trends. No microbiologic diagnosis was identified in almost half of proctitis cases evaluated during the study interval and these cases were not more likely to experience treatment failure, suggesting that current empiric treatment guidelines are effective. Future studies should use advanced molecular techniques to evaluate the role of novel and emerging pathogens in the aetiology of proctitis.

014.5 OCCURRENCE OF VACCINE AND NON-VACCINE HUMAN PAPILLOMAVIRUS (HPV) TYPES IN THE FEMALE POPULATION BEFORE AND AFTER THE HPV VACCINATION

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Understanding type replacement following HPV vaccination is important.

We studied the occurrence of specific HPV types in a large cohort of young women from Finland who participated in a population-based HPV vaccination trial. A total of 4,808 16- to 17-year-old women were enrolled in the randomised PATRICIA efficacy trial of HPV16/18 vaccine (Cervarix) compared to hepatitis A virus (HAV) vaccine. HPV infection was assessed from cervical samples obtained every 6 months for 4 years post-vaccination and tested for 14 high-risk HPV types and 2 low-risk HPV types. HPV16/18 vaccination coverage varied from 1% to 22% by participating community. HPV incidence rate ratios (IRRs) in baseline positive women vs. baseline negative women were calculated. In the control arm, baseline HPV18-positive women showed an increased risk of acquiring other clade A7 HPV types (39/45/59/68) (IRR 1.8, 95% confidence interval = 1.01–3.1). No excess risk of non-vaccine HPV types was observed in the baseline HPV DNA-negative HPV16/18-vaccinated women compared to the baseline HPV DNA-negative control women. Similarly, no excess risk was observed in the baseline HPV-16/18-positive HPV16/18-vaccinated women compared to the baseline HPV16/18-negative women. In conclusion, we found no increased rates of non-vaccine HPV types suggestive of type-replacement up to 4 years post-vaccination among HPV16/18-vaccinated young women. However, surveillance of clinical trial cohorts and other populations in countries with HPV vaccination programmes implemented with focus on vaccination coverage rates are warranted.

014.6 AETIOLOGY OF INFECTIOUS PROCTITIS DIFFERS BY HIV STATUS

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Background Sexually acquired rectal infections are common among men who have sex with men (MSM) and increase the risk of HIV acquisition. We aimed to compare the spectrum of pathogens responsible for infectious proctitis between HIV positive and HIV negative MSM.

Methods We undertook a study of MSM who presented to Melbourne Sexual Health Centre with symptomatic proctitis between March 2003 and December 2011. Men with proctitis were tested for gonorrhoea by culture, chlamydia by strand displacement assay, and herpes simplex virus (HSV) by PCR. Chlamydia positive specimens were genotyped for lymphogranuloma venereum (LGV).

Results Among the 279 men in the study, 141 were HIV positive and 138 were HIV negative. The median CD4 count among HIV positive men was 423 (range 189–1026). The prevalence of infections among HIV positive and HIV negative men respectively was: chlamydia (23.4% versus 21.7%, p = 0.7); gonorrhoea (13.4% versus 10.8%, p = 0.5); HSV-1 (14.2% versus 6.5%, p = 0.04); HSV-2 (22% versus 12.3%, p = 0.03); and LGV (7.8% versus 0.7%, p = 0.004). HIV positive men were more likely to have multiple infections (17.7% versus 8.6%, p = 0.017). Only 32% of men with HSV associated proctitis had visible anal ulceration.

Conclusion Among MSM presenting with proctitis, HSV, LGV and multiple infections are more common among HIV positive men than among HIV negative men. MSM presenting with proctitis require comprehensive testing and treatment for possible pathogens including herpes in the absence of anal ulceration.

O.15 - For lab rats and other mice and men

015.1 SUB-OPTIMAL CD4 T-CELL RECOVERY IN HIV-1 SUBTYPE C PATIENTS ON ANTIRETROVIRAL THERAPY: A SEARCH FOR PREDICTIVE BIOMARKERS AND BASELINE CHARACTERISTICS

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Background Despite receipt of combination antiretroviral therapy (cART) and subsequent viral suppression some 15–30% of treated HIV infected patients fail to achieve optimal CD4 T-cell reconstitution. Sub-optimal CD4 recovery has been associated with unfavourable outcomes for patients on cART. We assessed markers of immune activation, microbial translocation and patient baseline characteristics for associations with sub-optimal CD4 T-cell recovery post cART initiation.

Methods This was a retrospective case control analysis of CD4 T-cell recovery from a completed (2002–2007) clinical trial, the Adult Antiretroviral Treatment and Drug Resistance ("Tshepo") Trial, in Gaborone, Botswana. Cases (sub-optimal CD4 response) were defined as CD4 ≤ 200 cells/μl at 12 months post ART initiation, with virologic suppression achieved within 6 months. Microbial translocation (sCD14) and immune activation (interferon-gamma) markers were quantified using Enzyme Linked Immuno-Sorbent Assays on a subset of 30 cases and 30 controls gender matched baseline and 12 month plasma samples. Univariate and logistic regression analysis were used to assess predictors of sub-optimal CD4 T-cell recovery.

Results Fifty-one cases (21%) from 249 virologically suppressed patients had sub-optimal CD4 recovery. The median age was 33.39 years and 69.9% were female. Baseline CD4 count < 100cells, haemoglobin and aspartate transaminase were associated with sub-optimal CD4 recovery (adjusted OR (aOR) = 3.03 95% CI [1.65, 5.57], p < 0.001; aOR = 0.81 [0.67, 0.99], p = 0.038 and aOR = 1.03 [1.00, 1.05], respectively). sCD14 levels were significantly different between cases and controls, p = 0.0011, at 12 months. Baseline Tuberculosis infection, body-mass-index, interferon-gamma, alanine transaminase and age were not associated with poor CD4 T-cell response.