

two cases in the placebo vaccine cohort, and 21 cases in the unvaccinated reference cohort suggesting that the vaccine efficacy translates into efficacy against cervical cancer. The passive follow-up continues and new cases emerging in future will be monitored by redoing linkage with the population-based cancer register at specific time intervals in the future, which will effectively add up person years to our follow-up study. In conclusion, valid comparisons between the vaccine and placebo recipients (excluding cross-vaccinated placebo vaccine recipients) and the reference cohort not exposed to intervention are feasible, and will be critical to define more definitively the long-term protection provided by HPV vaccination against the hard endpoints.

03-S2.03 THE SPECTRUM OF GENITAL HPV INFECTION AMONG MEN ATTENDING A SWEDISH STI CLINIC: HPV TYPING AND CLINICAL PRESENTATION

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Background Some Swedish studies on HPV typing in men exist. Most earlier studies have used less sensitive HPV typing techniques. The purpose of this study is to see if the HPV types in genital HPV associated lesions have changed since the 80ies, and to describe the lesions in detail.

Methods Between 2004 and 2007, male patients attending the STI clinic of Karolinska Hospital with genital HPV induced lesions planned for surgery, were asked to participate in the study. All men exhibited multiple lesions—men with solitary lesions were excluded. Two clinically identical lesions on the same genital site, were collected by punch biopsy or by scissor excision. One sample was put in formalin for histopathological routine preparation, and the other sample was frozen in -70°C for PCR analysis using a highly sensitive nested PCR technique, detecting 24 different HPV types. The macroscopic morphology of the lesions was classified in acuminate, papular, macular and seborrheic keratosis like. The colour of the lesions and the location were recorded. Data on previous therapy and how long time the patients had been afflicted with genital symptoms/and or warts was also noted.

Results Totally 303 men were included in the study. Of these, 47 men (16%) exhibited lesions of PIN and have been described previously. The remaining 256 men had benign lesions and are described here. Acuminate lesions dominated, occurring in 106 (41%) of the men, followed by papular lesions found in 88 (34%) men. The penile shaft, the pubic area and the foreskin were the most common locations for the HPV induced lesions, afflicted in 36%, 29% and 25% of the men, respectively. Pink and brown were the dominating colours of the lesions. HPV was detected in 233 (91%) lesions. Low risk HPV types only, were found in 75% of the lesions. On the other hand, 7% of the lesions contained only high risk HPV types, and 9% had a mix of low- and high risk HPV types. Multiple HPV types were found in 13%. HPV 6 was the most common HPV type (70% of the lesions were positive for HPV 6 only). Duration of genital symptoms and/or warts was mean 24 months and 211 of the men had previously been treated.

Conclusion Using a highly sensitive PCR technique, a high HPV detection rate of 91% was found. As in earlier studies, HPV 6 was most common, but also other HPV types including high-risk types were detected. As expected, most of the benign lesions were acuminate, but the morphology as well as the genital location varied.

03-S2.04 CERVICAL ECTOPY IS NOT ASSOCIATED WITH ACQUISITION OF HPV INFECTION

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Background HPV infection and cervical cancer are often found at the cervical transformation zone. High rates of HPV in adolescents have been attributed to their greater extent of "cervical ectopy", defined as areas of columnar and metaplastic epithelium visible on the ectocervix. The study aim was to examine associations between the extent of cervical ectopy and incident HPV infection in healthy adolescents.

Methods Sexually active young women were enrolled as part of a prospective HPV Natural History Study. Women were eligible if they were 13–21 years old, sexually active (5 years maximum), and had no history of cervical intraepithelial neoplasia, cervical procedures, or immunosuppression. At 4-month interval visits, we performed colposcopy to document the epithelium, HPV testing for 37 types by Roche Reverse Line Blot assay, and interviews to assess behaviours. This study selected women (N=147) who had negative HPV results at the first two consecutive visits. Epithelial areas of interest were measured in the digitised colposcopic photographs by using computerised planimetry to produce pixel counts. The extent of ectopy was measured as a percentage of the total cervical face. Cox proportional hazards models examined ectopy as a predictor for incident HPV, defined as the first positive HPV result following the initial two negative results, adjusted for the number of new sexual partners. Outcomes included incidence of any HPV type; α -9 HPV types (defined as 16, 31, 33, 35, 52, 58, 67); and α -3/15 HPV types (defined as 61, 71, 72, 81, 83, 84, 89).

Results The 147 women attended a total of 545 visits. The mean age at baseline was 17.2 years, mean age of menarche was 12.8 years, and mean age of first sex was 15.4 years. Self-reported race/ethnicity was 35 (24%) Asian, 14 (10%) African-American, 43 (29%) Caucasian, 52 (35%) Latina, and 3 (2%) Other. The median ectopy measurement from the 545 visits was 14% (interquartile range 6–32%) of the total cervical face. Incident HPV of any type was found in 42 (29%) women. The extent of ectopy was not significantly associated with incidence of any HPV type (HR 1.004, $p=0.63$); α -9 HPV types (HR 0.99, $p=0.43$); or α -3/15 HPV types (HR 1.02, $p=0.18$). Results were unchanged when adjusted for new sexual partners in the past 8 months (HR 1.9, $p<0.01$).

Conclusions When measured quantitatively, the extent of cervical ectopy is not a risk factor for the acquisition of HPV infection in healthy adolescent women.

03-S2.05 PREVALENCE OF TRICHOMONAS VAGINALIS AND CO-INFECTION WITH CHLAMYDIA TRACHOMATIS AND NEISSERIA GONORRHOEA IN THE USA AS DETERMINED BY THE APTIMA TRICHOMONAS VAGINALIS NUCLEIC ACID AMPLIFICATION ASSAY

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Background *Trichomonas vaginalis* (TV) is the most common curable sexually transmitted infection worldwide. True prevalence of TV infection is not well characterised as previous studies mainly used

methods with relatively poor sensitivity compared to nucleic acid amplification methods. Our aim was to determine TV prevalence using the APTIMA TV Assay (ATV, Gen-Probe Incorporated) and the frequency of co-infections with *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoea* (NG) in the USA among women being screened.

Methods Samples from 7593 women aged 18–89 years undergoing routine CT and NG screening at obstetrics/gynaecology, emergency room, hospital in-patient, family practice, family planning, internal medicine, jail, and STD clinic populations in 21 states were collected. Consecutive samples previously tested for CT and NG by the APTIMA COMBO 2 Assay (Gen-Probe Incorporated) were retrospectively tested with the ATV assay. Endocervical, urine, vaginal swab and PreservCyt liquid Pap samples (Hologic Inc.) diluted into APTIMA specimen transport buffer were tested.

Results Overall prevalences of TV, CT and NG in surveyed women were 8.7%, 6.7%, and 1.7%, respectively. TV prevalence ranged from 7.5 to 8.6% in women age 18 to 39 yr, and increased to 9.8% in women age 40–44 yr. Highest observed TV prevalences were in women ages 45–49 yr (13.4%) and over 50 yr (13.0%). CT and NG prevalences were less than 2% in the 40+ age group and highest in women less than 30 years of age ranging from 5.2% to 14.3% for CT and 1.3%–3.3% for NG. TV was the more prevalent STD than either CT or NG in all age groups, except the 18–19 yr group (CT: 14.3%; TV: 8.5%). TV prevalence differed by race/ethnicity (20.2% blacks; 5.7% whites; 5.0% Hispanics; 3.8% Asians). TV prevalence was 14.4% in the Southeast, 9.5% in the Southwest and Midwest, and 4.3% in the Northeast and ranged from 5.4% in Family Planning clinics to 22.3% in jails. Co-infections in most age groups were <1%, and were highest in the 18–19 yr group (TV/CT: 2.1%; TV/NG: 0.88%).

Conclusions TV prevalence was highest in women over 40 years of age, in contrast to CT and NG prevalences which were highest in women under 30 years of age. Co-infection of TV with CT or NG was relatively low. The high TV prevalence in all age groups suggests that all women being screened for CT/NG should also be screened for TV. Routine TV screening should also be considered for at-risk sexually active women of any age.

03-S2.06 THE EFFECT OF *TRICHOMONAS VAGINALIS* (TV) INFECTION ON THE VAGINAL MICROBIOME

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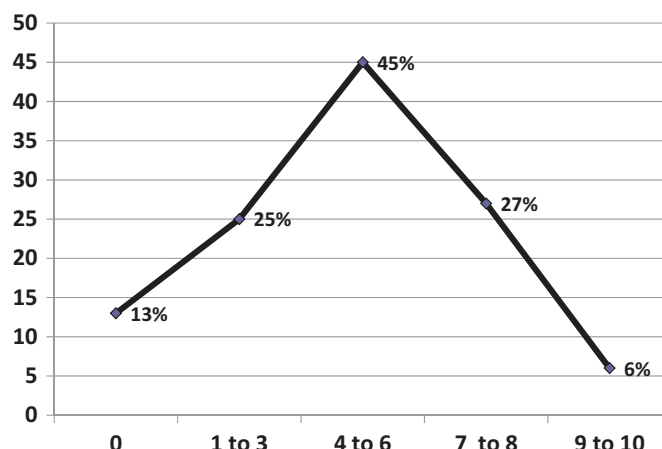
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Background Among pregnant women the prevalence of TV infection is highest in women who have intermediate Nugent scores (NS) compared to those with low and high scores reflective of normal and bacterial vaginosis (BV) types of vaginal flora. The goals of this study were to determine if this relationship held true for non pregnant women and to determine if TV infection was associated with changes in the vaginal microbiome.

Methods The study subjects were 394 women enrolled in a cross-sectional study of the aetiology of cervicitis in the New Orleans STD clinic. TV was diagnosed using the InPouch culture method. NS was determined using standard criteria. *C trachomatis* (CT), *N gonorrhoeae* (NG), and *M genitalium* (MG) were diagnosed using NAATs. DNA was extracted from a vaginal swab and stored. Associations between NS and STIs and NS and sexual behaviour were analysed for all 394 women. 454 pyrosequencing analyses were performed on vaginal DNA from 30 TV positive and 30 TV negative samples evenly divided between those with normal, intermediate, and BV flora as determined by NS.

Results 95% of enrolled women were African American and the mean age of the population was 25.6 years. The prevalence of TV

(y axis) by 5 NS categories (x axis) is shown in the Abstract O3-S2.06 figure 1. As opposed to TV, the prevalence rates for CT, GC, and MG were highest among women with NS of 7–10. Also there was no difference in high risk sexual behaviour between those with low and high NS. These data suggested that the striking decrease in TV prevalence observed among women with BV was the result of vaginal environmental factors, not decreased risk for STIs. A heat map based on pyrosequencing data showed that the vaginal flora of 18/30 of the women positive for TV had similar microbiomes which were distinctly different from those of the other 42 women. In the former group, *Mycoplasma spp.* and *Ureaplasma spp.* were more abundant than in the latter group while the reverse was true of *Megasphaera spp.* and *Gardnerella spp.*



Abstract O3-S2.06 Figure 1 *T. vaginalis* Prevalence by Nugent Score.

Conclusions Though published research shows that the incidence of TV is highest in women with BV, our data along with those from a previous study in pregnant women clearly establish that TV prevalence is highest in women with intermediate NS. These data in conjunction with our pyrosequencing results suggest that following infection TV modifies the vaginal microbiome by suppressing some of the BV associated organisms and enhancing the abundance of mycoplasmas.

Clinical sciences oral session 3—diagnostic testing: chlamydia & gonorrhoeae

03-S3.01 COMPARISON OF A NEW APTIMA SPECIMEN COLLECTION AND TRANSPORTATION KIT TO L-PAP FOR DETECTION OF *C TRACHOMATIS*, *N GONORRHOEA* AND *T VAGINALIS* IN CERVICAL AND VAGINAL SPECIMENS

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Background Control of sexually transmitted infections in women has focused on screening using cervical, vaginal or urine samples. The objective was to compare a new specimen collection and transportation (SCT) kit to PreservCyt (PC) and SurePath (SP) liquid-based Pap (L-Pap) for cervical sampling and self- and physician-collected vaginal samples.

Methods Women (n=562) attending a gynaecology clinic (GYC) (n=435) or a youth health clinic (YHC) (n=127) signed consent for a physician to collect two L-Pap samples with a Cervex broom, cervical (CSCT) and vaginal (VSCT) samples and a self-collected VSCT. All specimens were tested for *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) by APTIMA Combo 2 (AC2) and