

anal high grade intraepithelial neoplasia (HSIL) was higher in HIV-positive than in the HIV-negative participants (46.9% vs 32.3%,  $p < 0.001$ ). Among those with HSIL at baseline, the clearance rate was similar between HIV-positive and -negative participants (38.4 vs 38.0 per 100PY,  $p = 0.636$ ).

**Conclusions** Gay men in SPANC reported multiple sexual partners across the adult age-range, and incident HPV16 continued to be detected in men up to their seventh decade of life. This suggests that HPV vaccination of adult gay men may prevent infection and have a role in cancer prevention. Anal HSIL is highly prevalent, particularly among HIV-positive men, but there are high rates of clearance without treatment. These data suggest that a screening test which can distinguish persistent from transient HSIL is required. The role of HPV biomarkers in identifying those HSIL lesions most likely to persist should be investigated.

## Oral Presentations

### 001 - Spread of antimicrobial-resistant gonorrhoea

#### 001.1 EVOLUTION AND SPREAD OF ANTIBIOTIC-RESISTANT GONORRHOEA

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**Introduction** *Neisseria gonorrhoeae* has developed resistance to all classes of antimicrobials that have been used to treat it and strains that are resistant to multiple classes of antimicrobials have evolved. Only one antimicrobial (ceftriaxone) can now be used for empirical treatment in many countries. Hence, it is important to understand the dynamics and drivers of resistance evolution.

**Methods** First, we estimated rates of resistance evolution from antimicrobial resistance surveillance data from the USA and from England and Wales for heterosexual men (HetM) and men who have sex with men (MSM). Second, we developed dynamic transmission models to reconstruct the observed dynamics of *N. gonorrhoeae* transmission and resistance evolution in both HetM and MSM.

**Results** We found that resistance to ciprofloxacin and cefixime initially spreads exponentially at rates between 0.2 and 2.4 per year. These rates suggest that the proportion of resistant strains doubles every 3 to 35 months. We found lower rates of spread in HetM (0.2 to 0.8) compared with MSM (0.9 to 2.4). The models show that the treatment rate is the driving force for the spread of resistance.

**Conclusion** There is a trade-off in optimising the treatment rate to provide individual patient care to all those who are infected and to keep the spread of resistance as low as possible. These findings have implications for developing antimicrobial treatment strategies and point-of-care tests to detect resistance.

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#### 001.2 AZITHROMYCIN-RESISTANT *NEISSERIA GONORRHOEA* IN MEN WHO HAVE SEX WITH MEN (MSM) IN SEATTLE, WASHINGTON: 2014–2015

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**Background** The emergence of azithromycin-resistant *Neisseria gonorrhoeae* threatens recommended first-line treatment regimens.

**Methods** We investigated cases of azithromycin-resistant gonorrhoea detected at Public Health – Seattle and King County STD Clinic between January 2014 and February 2015. In 2012–2013, zero of 237 MSM urethral isolates were azithromycin-resistant. The US Centres for Disease Control and Prevention (CDC) and Clinical and Laboratory Standards Institute (CLSI) do not define an azithromycin-resistance breakpoint. CDC uses  $\geq 2$  mcg/mL as an “Alert Value” minimal inhibitory concentration (MIC) (here called resistant). We used agar dilution to determine MICs.

**Results** Of 179 urethral, 83 pharyngeal and 87 rectal isolates from MSM, 11 (6.1%), 6 (7.2%) and 5 (5.7%) had azithromycin MIC  $\geq 2$  mcg/mL, respectively. We identified no cases of azithromycin-resistance among 56 heterosexuals. Overall, 19 (6.9%) of 276 MSM with culture-positive gonorrhoea had an azithromycin-resistant isolate. The median azithromycin MIC was 4.0 mcg/mL (range 2 to  $>256$  mcg/mL). Eight patients’ isolates also demonstrated tetracycline resistance (MIC  $\geq 2$  mcg/mL); one was ciprofloxacin-resistant (MIC 16.0 mcg/mL). None exhibited reduced susceptibility to cefixime or ceftriaxone. Clinicians treated thirteen (68%) cases with ceftriaxone and azithromycin, one (5.3%) with ceftriaxone and doxycycline, two (10.6%) with study drug, and three (15.8%) with 2g of azithromycin. Two of three men treated with azithromycin-monotherapy had a test of cure (TOC) and both had persistent infection; their isolates demonstrated azithromycin MICs of 32 mcg/mL and 4.0 mcg/mL. One rectal treatment-failure was cured with 360 mg of gentamicin intramuscularly; the other (urethra/pharynx positive), was treated with ceftriaxone and doxycycline. He did not undergo repeat TOC. The individual with high-level azithromycin-resistance (MIC  $>256$  mcg/mL) was an international traveller and not locatable for TOC.

**Conclusions** Clinically important azithromycin-resistant *Neisseria gonorrhoeae* now are found in  $>5\%$  of MSM with gonorrhoea in Seattle. These findings support new CDC recommendations to avoid treating gonorrhoea with azithromycin alone.

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#### 001.3 HIGH-LEVEL AZITHROMYCIN RESISTANCE IN *NEISSERIA GONORRHOEA* CLINICAL ISOLATES IN NANJING, CHINA, 2013–2014

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