p16 gene is increasingly accompanying the severity of lesions, but without statistical relevance.

P3.209 AGE DIFFERENCES BETWEEN HETEROSEXUAL PARTNERS: IMPLICATIONS FOR THE SPREAD OF *CHLAMYDIA TRACHOMATIS*

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Introduction The consequences of mixing between sexual partners of different ages on the transmission and prevalence of sexually transmitted infections (STI) are still not well understood. Using sexual behaviour data, we obtained a detailed quantitative description of sexual mixing by age. We then investigated the impact of age mixing on the age- and sex-specific prevalence and incidence of *Chlamydia trachomatis* (*Ct*) using a dynamic transmission model.

Methods First, we used age- and sex-specific data about the proportion of individuals who are sexually active, sexual partner change rates, and the ages of the three most recent partners at first episode of sexual intercourse from the second and third British National Surveys of Sexual Attitudes and Lifestyles (Natsal-2 and Natsal-3). We used a parametric description of the partner ages using skew-normal distributions and combined the data to reconstruct age mixing between heterosexual partners. Second, we incorporated the mixing patterns into a compartmental transmission model to investigate the age groups amongst which *Ct* is most likely to be transmitted and in which direction.

Results On average, males reported sex with younger female partners (median age difference −5.3; IQR [−1.6,–8.9] years) and females reported having male partners of similar age (median age difference −0.4; IQR [−2.7, 1.9] years). The median and the skewness of partner age distributions depend heavily on the age of the respondent. *Ct*-transmitting partnerships are typically between an older male and a younger female partner. In 60% of *Ct*-transmitting partnerships, at least one partner was >25 years old.

Conclusion Our study illustrates the importance of sexual mixing patterns on *Ct* spread and indicates that a majority of transmitted infections are in age groups outside of those included in typical *Ct* screening programs. Our method for the incorporating sexual behaviour data into dynamic transmission models can be used to study the transmission of any STI and to understand the potential impact of control strategies that target specific age groups.

P3.210 ESTIMATING THE ANTIBODY PREVALENCE OF HERPES SIMPLEX VIRUS TYPE 2 AMONG SELECT MIDDLE EAST AND NORTH AFRICA POPULATIONS

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Introduction There are very limited data on herpes simplex virus type 2 (HSV-2) infection in the Middle East and North Africa (MENA). We examined the overall and age-specific HSV-2 antibody prevalence among select MENA populations currently residing in Qatar.

Methods Sera were collected from blood donors attending Hamad Medical Corporation June 2013–2015. Specimens were screened for HSV-2 antibodies using HerpeSelect 2 ELISA IgG kits. All positive and equivocal specimens detecting presence of HSV-2 antibodies were retested for final HSV-2 status using Euroline Westernblot assays. Demographic information included nationality, age, and sex. Age was grouped into 8 bands:≤24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, and ≥55. Age-specific trend of HSV-2 infection among Egyptian, Fertile Crescent (Iraq, Jordan, Lebanon, Palestine, and Syria) and Qatari nationals was described and assessed using the Cochran–Armitage test.

Results Sera from 2165 blood donors were tested for HSV-2. Among 132 retested specimens, 66 were confirmed positive. Country-specific HSV-2 prevalence was measured at 5.5% (95% confidence interval (CI) 3.7%–8.2%) for Qataris, 4.5% (95%CI 1.9%–10.0%) for Iranians, 4.2% (95%CI 1.8%–9.5%) for Lebanese, 3.1% (95%CI 1.2%–7.7%) for Sudanese, 3.0% (95%CI 1.4%–6.4%) for Palestinians, 2.2% (95%CI 1.1%–4.3%) for Egyptians, 2.0% (95%CI 1.0%–5.0%) for Syrians, 1.0% (95%CI 0.3%–3.6%) for Jordanians, 0.7% (95%CI 0.1%–3.7%) for Yemenis, and 0.5% (95%CI 0.1%–2.8%) for Pakistanis. Age-specific HSV-2 prevalence was estimated for Egyptians, nationals of the Fertile Crescent, and Qataris. Overall, HSV-2 prevalence increased with age, but the trend was not always statistically significant in these populations. HSV-2 prevalence was significantly higher for females at 9.1% (95% CI 4.7%–16.9%) than males at 2.8% (95%CI 2.2%–3.6%) (χ^2p-value<0.01).

Conclusion HSV-2 prevalence among MENA nationals was found to be lower than that commonly found in other regions. However, these observed prevalence levels suggest unmet needs for sexual health and control of sexually transmitted infections (STIs) transmission. Programs need to be established to tackle STIs and their disease burden in this region.

P3.211 PROFILE OF MEN WITH HIV+ INFECTION DIAGNOSIS: A COMPARATIVE STUDY ON A PUBLIC HEALTH SERVICE BETWEEN THE YEARS 2003 AND 2013

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Introduction To describe and compare the profile of men who had a positive diagnosis to the infection by the Human Immunodeficiency Virus (HIV) at a health service in the municipality of Nova Iguaçu in Baixada Fluminense, Rio de Janeiro, in the years 2003 and 2013.

Methods Comparative and retrospective study in which the patient's medical records were utilised in the referred diagnostic service.

Results In 2003, 772 men were attended, and 116 (15.02%) were diagnosed with HIV, among them, 41 (35.3%) had 1 to 3 years of complete school education, 26 (22.4%) had 4 to 7 years of school education and 26 (22.4%) had from 8 to 11 years. 20 (17.2%) individuals had STDs in the past year. 33 (28.4%) individuals made regular use of condoms and 52 men

(44.8%) described that they had never used condoms. In 2013, 838 men were attended, 84 (10.02%) were diagnosed with HIV. 5 patients (5.9%) reported having between 1 and 3 years of complete school education, 32 (38%) had between 4 and 7 years of school education, and 36 (42.8%) between 8 and 11 years. 45 (53.6%) described having experienced previous STDs. 7 patients (8.3%) reported effective condom use, but 33 men (39.3%) have never used condoms.

Conclusion It has been analysed that, after 10 years, an infection growth has taken place among individuals with a higher educational level, an increase of concomitant or past STDs in the previous year before the test, corroborating with the reduction in condom use. This study shows the need of the health professional assistance regarding, not only the pre-and post-test counselling, but also the educational activities within the communities in order to carry out awareness-raising strategies and guidelines aimed at STD/HIV prevention among male individuals.

P3.212 ANTIBIOTIC RESISTANCE DETECTION IS ESSENTIAL FOR GONORRHOEA POINT-OF-CARE TESTING: A MATHEMATICAL MODELLING STUDY

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Introduction Antibiotic resistance threatens to make *Neisseria gonorrhoeae* untreatable. Point-of-care tests (POC) that detect antimicrobial resistance (AMR) would allow individually tailored treatment. But rapid access to test results might lead to more treatment overall, resulting in higher resistance levels. We investigated the impact of different clinical pathways for gonorrhoea diagnosis on the spread of AMR gonorrhoea.

Methods We used data about the prevalence and incidence of gonorrhoea in men who have sex with men (MSM) and heterosexual men and women (HMW) to calibrate a mathematical model that describes the transmission of *N. gonorrhoeae*. With this model, we simulated four clinical pathways for the diagnosis and treatment of gonorrhoea: POC test for *N. gonorrhoeae* with AMR detection (POC+R), POC without AMR detection (POC-R), culture with antimicrobial susceptibility testing (culture), and laboratory-based nucleic acid amplification tests without AMR detection (NAAT). We calculated the proportion of resistant infections, the cases averted after 5 years, and compared how fast resistant infections spread in the populations.

Results After 30 years, the proportion of resistant *N. gonorrhoeae* infections is lowest for POC+R (median MSM: 0.18%, HMW: 0.12%), and increases for culture, NAAT, and POC-R. After 5 years, NAAT leads to a total of 36 366 (median MSM) and 1228 (median HMW) observed cases per 1 00 000 persons. POC+R results in the largest number of cases averted after 5 years (median MSM: 3,353, HMW: 118 per 1 00 000 persons) compared with NAAT. POC tests with intermediate sensitivity for the detection of AMR slow the spread of resistance more than NAAT. POC tests require very high sensitivity to detect AMR to reduce the spread of AMR more than culture.

Conclusion POC tests with high sensitivity to detect AMR can keep gonorrhoea treatable for longer than either culture or NAAT. POC tests that do not detect AMR reliably should not be introduced because they result in higher levels of empirical treatment for gonorrhoea and accelerate the spread of AMR.

P3.213 A TOOL FOR EVALUATING THE IMPACT OF THE NATIONAL CHLAMYDIA SCREENING PROGRAMME IN ENGLAND: *C. TRACHOMATIS* ANTIBODY PREVALENCE IN YOUNG WOMEN IN ENGLAND (2007–2015)

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Introduction Genital infection with *Chlamydia trachomatis* (CT) is the most commonly-diagnosed bacterial sexually transmitted infection in England. The National Chlamydia Screening Programme (NCSP) was implemented nationwide in 2008, offering opportunistic CT testing to people under 25. Not all chlamydia infections result in a lasting antibody response, however, monitoring age-specific seroprevalence of antibodies against CT over time may offer insights into the impact of this intervention. We explored trends in seroprevalence from 2007 up to 2015.

Methods Samples were obtained from the PHE Seroepidemiology Unit, which collects unlinked, anonymous, residual sera submitted to laboratories in England for routine investigations. Samples known to come from GUM clinics were excluded. Sera from 2007–2015 from women aged 15–30 (n=9,798) were tested using an indirect IgG ELISA for chlamydia Pgp3 antibody. Women in 2007 had limited exposure to the NCSP, increasing over time. Age-standardised seroprevalence was calculated for 17–24 year-olds using 2015 population data. Samples were classified by the number of years individuals were eligible for the screening programme, based on year of birth.

Results Age-standardised seroprevalence among 17–24 year-olds varied, being highest at 20.3% (95% CI 17.2–23.4) in 2007 and lowest at 15.5% (95% CI 10.0–20.9) in 2015, although no clear trend was seen. Although incomplete data were available for those with 'limited' and 'high' exposure to the NCSP, age-specific seroprevalence did not vary by exposure to NCSP.

Conclusion There was no evidence that age-specific seroprevalence varied by exposure to the NSCP. Interpretation of this is complicated by the potential effects of antibody prevalence waning over time, and being affected by factors such as treatment and re-infection. Other limitations include a high number (86.2%) of specimens from 'unknown' source which could have been from GUM clinics. Multi-parameter evidence synthesis models are being developed to explore the use of these data to estimate incidence.

P3.214 TRACKING THE USE AND RE-EMERGENCE OF SEROLOGICAL TECHNIQUES FOR *CHLAMYDIA TRACHOMATIS* ANTIBODY DETECTION: A SYSTEMATIC REVIEW

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Introduction The presence of antibodies against *Chlamydia trachomatis* (Ct) is indicative of previous genital or ocular infection. Serology was introduced in the 1970s to support the diagnosis of pelvic inflammatory disease (PID), but fell out of favour due to its cross-reactivity with *Chlamydophila* (*Chlamydia) pneumoniae* bacteria. With the recent development of sensitive and specific assays, as well as the identification of immunogenic Ct antigens developed as recombinant proteins, serology holds the potential to be a useful tool in public health. To date, there has been no summary of the techniques used, their development and their potential usefulness in public and tropical medicine.

Methods We searched PubMed, Cochrane, Lilacs, Scielo, Scopus and Web of Science for articles published on serological techniques and their use in a public health context. Studies were categorised by technique employed, antigen used and antibody detected.

Results A total of 16 studies were included- 5 related to ocular Ct infection and 11 related to genital Ct infection. The trachoma studies were predominantly based on Tanzanian samples, while the genital studies were based on samples from an array of countries. The studies were heterogeneous in design, assay and antigen used, and immunoglobulin detected. The estimated prevalence of antibodies against Ct in trachoma studies ranged from 0%–62%; from 0%–88.9% in genital studies. For genital Ct infections, serology is commonly used to explore disease sequelae. For ocular Ct infections, serology is explored as a means to monitor elimination efforts.

Conclusion Techniques used to measure the prevalence of antibodies against Ct have reported increased sensitivity and specificity. There is wide diversity in antigens and assays used and antibodies detected. The practicality of an assay depends on resources available, purpose of the study, and population being studied. There is wide scope for the development and refinement of techniques to increase the value of serology as it relates to development of new techniques, research and public health.

P3.215 CHARACTERISE THE TEMPORAL EVOLUTION OF HIV INCIDENCE AMONG STABLE COUPLES IN SUB-SAHARAN AFRICA

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Introduction We quantified and characterised the temporal evolution of the contribution of several types of sexual-partnership HIV statuses to total HIV incidence in representative countries at different HIV epidemic scales in sub-Saharan Africa.

Methods A pair-based mathematical model was constructed to accommodate for movement of individuals between different forms of sexual partnerships and HIV infection statuses. Stable couples (SCs) were divided into sero-concordant negative (SCNCs), sero-discordant (SDCs), and sero-concordant positive couples. Throughout epidemic phases, historical and future trends (1980–2030) of sources of HIV incidence by partnership status were projected based on nationally-representative epidemiologic and demographic data.

Results As the epidemics emerged and peaked, HIV incidence resulting among SDCs increased from 6%–32% to 19%–44% of total HIV incidence, mostly due to transmissions within the SDCs. As the epidemics started their natural and further decline with antiretroviral therapy (ART) scale-up, this proportion declined in intermediate and high HIV-prevalence countries, but increased in low HIV-prevalence countries. As the epidemics emerged and peaked, HIV incidence resulting among SCNCs from extramarital sex declined from 54%–80% to 35%–73% of total HIV incidence. As the epidemics started their decline, this proportion increased in intermediate and high HIV-prevalence countries, but declined in low HIV-prevalence countries. HIV incidence resulting among individuals not in SCs was 9%–29% of total HIV incidence and was stable throughout the epidemics, but larger with higher HIV prevalence.

Conclusion The contribution of different forms of sexual-partnership HIV statuses to total HIV incidence was dependent on HIV epidemic phase and scale. Throughout the epidemics, more than two thirds of HIV incidence occurred among individuals engaged in SCs. The majority of incidence among SCs was due to extramarital sex. To achieve reductions in HIV incidence, prevention approaches should target both SCs and individuals not in SCs.

P3.216 ASSESSING HPV GENOTYPE PREVALENCE IN INFECTION AND DISEASE IN YOUNG AUSTRALIAN WOMEN FOLLOWING THE INTRODUCTION OF A NATIONAL VACCINATION PROGRAM

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Introduction The National HPV Vaccination Program, utilising the quadrivalent HPV vaccine, was implemented in Australia in 2007. As the first country to introduce this scheme, Australia is ideally placed to identify changes in HPV genoprevalence in a vaccinated population, as well as in cervical intraepithelial neoplasia grade 3 (CIN3) lesions.

Methods The VACCINE (Vaccine Against Cervical Cancer Impact and Effectiveness) study was designed to assess prevalence of vaccine-targeted HPV genotype infections. In sub-study A, sexually active Victorian women aged 18–25 years, recruited through targeted social media advertising on Facebook, were asked to complete an online questionnaire and provide a self-collected vaginal swab for HPV DNA genotyping. The National HPV Vaccination Program Register (NHVPR) was utilised to verify self-reported vaccination status. In sub-study B, causal HPV genotypes in 529 CIN3 cases among vaccine-eligible young women were determined using