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 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.

Estimating the Antibody Prevalence of Herpes Simplex Virus Type 2 Among Select Middle East and North Africa Populations

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%–7.2%) 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%) (Z^2 p-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.

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ABSTRACTS

P3.212 ANTIBIOTIC RESISTANCE DETECTION IS ESSENTIAL FOR GONORRHOEA POINT-OF-CARE TESTING: A MATHEMATICAL MODELLING STUDY
Stephanie M Fingerhuth, Nicola Low, Sebastian Bonhoeffer, Christian I Althaus. ETH Zurich, Zurich, Switzerland; University of Bern, Bern, Switzerland

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 36366 (median MSM) and 1228 (median HMW) observed cases per 100000 persons. POC+R results in the largest number of cases averted after 5 years (median MSM: 3353, HMW: 118 per 100000 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.

Stephanie Migchelsen, Sarah C Woodhall, David Mabey, Chrissy H Roberts. Public Health England, London, UK; Imperial College London, London, UK; University of Bristol, Bristol, UK; Public Health England, Manchester, UK

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 Seropidemiology 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=9798) 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
Stephanie Migchelsen, Sarah C Woodhall, David Mabey, Chrissy H Roberts. Public Health England, London, UK; Public Health England, London, UK; London School of Hygiene and Tropical Medicine, London, UK

Introduction Antimicrobial resistance threatens to make Neisseria gonorrhoeae and Chlamydia trachomatis 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 36366 (median MSM) and 1228 (median HMW) observed cases per 100000 persons. POC+R results in the largest number of cases averted after 5 years (median MSM: 3353, HMW: 118 per 100000 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.

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A172
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 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 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 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.

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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.