

concern. While macrolide AMR is increasing globally, ESC AMR is low and extensive drug-resistance (XDR) rare.

**Methods** We report the clinical management and microbiology of two recent cases of XDR NG in the UK.

**Results** Case A (female) presented to a sexual health clinic (SHC) in October 2018 with urinary symptoms. She cleared the infection following treatment with ceftriaxone 500 mg plus azithromycin 1g. She had recently had vaginal intercourse with  $\geq 1$  male partner in Ibiza, Spain. Case B (female) presented to a SHC elsewhere in England in November 2018 with anal and genital symptoms. She had recently had unprotected vaginal, oral and anal sex with an asymptomatic man who had been in Ibiza and had links with the same sexual network as case A. He tested NG NAAT-negative in December without treatment. Case B initially responded clinically to treatment with ceftriaxone 1g, but symptoms relapsed and she remained culture-positive 2 weeks later. She failed subsequent treatment with gentamicin 240 mg plus azithromycin 2g but cleared the infection with 3 days of IV ertapenem. Both isolates were resistant to ceftriaxone (MIC 1.0 mg/L), cefixime, penicillin, ciprofloxacin and tetracycline, had intermediate susceptibility to azithromycin (MIC 0.5 mg/L), and were susceptible to spectinomycin. Whole genome sequencing indicated that both isolates were from the FC428 clone, which has been reported sporadically globally, usually with epidemiological links to the Asia-Pacific region.

**Conclusion** These FC428 clone isolates are able to cause both asymptomatic and symptomatic infection with a variable response to ceftriaxone and azithromycin treatment. This clone is likely to increase over time in Europe and threatens the effectiveness of gonorrhoea treatment. Surveillance of AMR, test-of-cure, extra-genital sampling and partner notification are vital to maintain effective treatment and prevent spread.

**Disclosure** No significant relationships.

**P676** **AZITHROMYCIN RESISTANCE AMONG NEISSERIA GONORRHOEAE CASES IN KING COUNTY, WASHINGTON, USA, 2017–2018**

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**Background** Public Health – Seattle & King County (PHSKC) participates in Strengthening the U.S. Response to Resistant Gonorrhoea (SURRG), funded by the Centers for Disease Control and Prevention, to enhance surveillance of antimicrobial resistance in *Neisseria gonorrhoeae* (GC). We aimed to identify predictors of azithromycin-resistant GC.

**Methods** GC culture specimens were collected from patients with GC infection who attended the PHSKC STD Clinic or one of five King County, Washington, medical clinics during 2017–2018. Positive culture isolates underwent azithromycin susceptibility testing with Etest; azithromycin resistance (AZI-R) was defined as minimum inhibitory concentration  $\geq 2.0$   $\mu\text{g}/\text{mL}$ . Clinical and sociobehavioral data was obtained from medical records and partner services interviews; we compared

characteristics of cases with and without AZI-R and evaluated statistical significance with chi-square and Fisher's exact tests.

**Results** During 2017–2018, 1,164 GC isolates from 1,048 unique cases underwent azithromycin Etest susceptibility testing. Overall, 6.5% of isolates and 6.8% of cases had AZI-R. Prevalence was higher in rectal isolates (8.3% of 373) than urethral (5.0% of 496,  $p=0.05$ ) and similar to pharyngeal (7.4% of 270,  $p=0.68$ ). AZI-R was more common in men who have sex with men (MSM) than heterosexuals (8% vs 3%,  $p=0.04$ ), and in Hispanics vs. non-Hispanics (12% vs 6%,  $p<0.01$ ). Age, GC history, number of sex partners, HIV-status, PrEP-status, and diagnosing facility type were not associated with AZI-R. Most (95%) AZI-R cases were treated with an azithromycin-containing regimen (dual therapy with ceftriaxone (92%) or gentamicin (4%)). Nearly all (96%) had a documented negative test of cure (culture and/or NAAT); no treatment failures were observed.

**Conclusion** AZI-R was identified in 6.8% of GC cases in King County, Washington. While more common in MSM and Hispanic persons, AZI-R was not strongly associated with other characteristics we evaluated. Health care providers should be aware of the potential for AZI-R in patients with GC.

**Disclosure** No significant relationships.

**P677** **PRESCRIBED TREATMENTS FOR NEISSERIA GONORRHOEAE INFECTIONS AND TREATMENT FAILURES IN THE QUEBEC SENTINEL NETWORK, 2015–2017**

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**Background** *Neisseria gonorrhoeae* is becoming increasingly resistant to the antibiotics used and many countries reported therapeutic failures. The WHO published a global action plan on antimicrobial resistance. Several measures were undertaken in Québec including the use of a dual therapy. Since 2015, the provincial sentinel network aims to 1) maintain sufficient cultures for the surveillance of antimicrobial resistance 2) complement the reference laboratory antimicrobial surveillance by providing epidemiological and clinical information and 3) complement the surveillance of treatment failures.

**Methods** Two clinics specialized in STBBIs and several general practitioners, located in three regions (Montreal, Montérégie, Nunavik) are enrolled. Epidemiological and clinical data (including reasons for visits, laboratory samples and treatments prescribed) of gonococcal infections are collected on a centralized secured web application. Cases are classified as retained treatment failures (presence of all predefined criteria) or suspected treatment failures.

**Results** From September 2015 to December 2017, 1240 episodes in 1115 individuals were recorded (111 women, 1000 men, 3 transgender, 1 unknown sex). At least 83% of the

prescribed treatments fully respected the recommended first-line treatments (ceftriaxone 250 mg or cefixime 800 mg in combination with azithromycin 1g). Among the 731 (59%) episodes with a test of cure performed, 47 (6.4%) were positive; specific questionnaires for the treatment failure assessment were available for 28. After analysis, 5 episodes were classified as retained or suspected treatment failure, including 4 pharyngeal infections and 2 cases who received azithromycin monotherapy. In 2018 (preliminary data), 15 additional assessment questionnaires were completed, adding 5 treatment failures (3 suspected and 2 retained).

**Conclusion** The results of the sentinel network help to guide Quebec public health decision-making. When certain B-lactam allergy forces clinicians to prescribe an alternative treatment, a dual therapy including gentamicin is now recommended. Overrepresentation of azithromycin monotherapies among treatment failures in the sentinel network also contributed to this recommendation change.

**Disclosure** No significant relationships.

#### P678 AN EFFECTIVE GONOCOCCAL LIPOOLIGOSACCHARIDE (LOS) VACCINE: WE KNOW ENOUGH TO MAKE ONE

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**Background** Long-lived gonococcal LOS IgG, induced during an initial challenge, prevented re-infection in 7/8 subjects ( $v. = 1/6$ ;  $p=0.026$ ), but treatment within three days of urethritis onset prevented an antibody response. This suggested that recidivism was related to early treatment. These data form the basis for an effective LOS vaccine.

**Methods** MS, NMR Spectroscopy and immunochemistry were used to structure the LOS made by the challenge strain, MS11mkC. Gonococci in scrapings of diagnostic slides were LOS genotyped. A multiplexed indirect immunofluorescent assay for LOS IgG was used to quantify LOS IgG.

**Results** MS11mkC LOS are genetically identical to those of gonococci within PMNs, with two  $\alpha$  oligosaccharide chains, nLc4 (Gal $\beta$ 1-4GlcNAc $\beta$ 1-3Gal $\beta$ 1-4Glc $\beta$ ) and GalNAC-nLc4 (GalNAC $\beta$ 1-3-nLc4). Protective MS11mkC LOS IgG should protect against all circulating gonococci. The multiplex assay detected IgG specific for the nLc4 terminal Gal residue, the internal nLc3 GlcNAc and the basal Lc2 disaccharide. Concentrations ( $\mu\text{g/mL}$ ) of IgG in sera of contacts of persons with gonorrhoea, specific for the three antigens, summed to the concentrations that bound the native nLc4  $\alpha$  chain and were greater in sera from those seen  $\geq 7$  days after exposure than those seen earlier ( $p = 0.04$  for the nLc4 Terminal Gal comparison). Contacts of persons with gonorrhoea who resisted infection circulated higher concentrations of IgG specific for the nLc4 terminal Gal than those who became infected during exposure ( $\Delta = 1.78 \mu\text{g/mL}$ ;  $p = 0.10$ ). The  $1.78 \mu\text{g/mL}$  difference is close to the  $2 \mu\text{g/mL}$  that provides protection against meningococcal infection.

**Conclusion** An effective gonococcal vaccine can be made based on the human challenge study and an understanding of the immunochemistry of LOS. Gonococcal LOS is not pyrogenic in rabbits and can be made less so by deletion of *lptA*. A seed strain that is suitable for industrial production is available, as is an immunogenicity assay.

**Disclosure** No significant relationships.

#### P679 NEISSERIA GONORRHOEAE (GC) CULTURE POSITIVITY BY INDICATION FOR CULTURE AND ANATOMIC SITE, SEATTLE, WASHINGTON, 2017–2018

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**Background** In order to increase the number of gonococcal isolates available for antimicrobial susceptibility surveillance, we expanded indications for GC culture in a municipal STD clinic in Seattle, Washington. We evaluated GC culture positivity by clinical criteria.

**Methods** In 2017–2018, GC culture specimens were collected from STD clinic patients who met these criteria: (1) contact to GC, (2) GC NAAT+ not yet treated, or (3) symptomatic urethritis/cervicitis with intracellular diplococci on gram stain. Clinicians inoculated Modified Thayer-Martin agar plates at the bedside and incubated in a candle jar. Patient characteristics and indication for culture were abstracted from medical records; culture positivity was compared by indication, anatomic site, and patient group with Fisher's exact test.

**Results** Clinicians collected a total of 3,884 specimens, of which 1,107 (29%) were GC culture positive. Culture positivity among 74 endocervical, 1,611 pharyngeal, 1,154 rectal, and 1,045 urethral isolates was 30%, 17%, 29%, and 46%, respectively. Among contacts to GC, endocervical culture positivity was 6/26 (23%), pharyngeal 79/752 (11%), rectal 88/549 (16%), and urethral 71/445 (16%). Urethral culture positivity in male contacts without urethral discharge was low (6/221 [3%]). Pharyngeal culture positivity among GC contacts who were men who have sex with men was similar to heterosexual men (10% of 719 vs 12% of 17,  $p=0.68$ ) but lower than pharyngeal positivity among women (43% of 14,  $p<0.01$ ). Among patients with a recent NAAT+ screening test, cultures were positive in 12/35 (34%) endocervical, 133/514 (26%) pharyngeal, 168/337 (50%) rectal, and 30/94 (32%) urethral specimens. Most (91% of 476) men with urethritis and intracellular diplococci on gram stain were culture positive.

**Conclusion** Men with symptomatic urethritis had the highest GC culture yield (91%), followed by persons with recent GC NAAT+ (26–50%). Cultures in GC contacts had a modest yield (11%–23%). These criteria were appropriate for obtaining GC isolates for antimicrobial surveillance.

**Disclosure** No significant relationships.

#### P680 OROPHARYNGEAL GONORRHOEA IN THE ABSENCE OF UROGENITAL GONORRHOEA IN A SEXUAL NETWORK OF MALES AND FEMALES

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**Background** We describe a sexual network consisting of two males and five females who were tested for gonorrhoea at