Conclusions CIN2+ rates varied by catchment area, possibly reflecting differences in screening or case ascertainment. HPV16 or 18 were present in ~52% of lesions. Type-specific monitoring of CIN2+ can allow evaluation of vaccine impact on cervical disease, and may be useful in determining whether type replacement occurs.

Epidemiology oral session 3: bacterial resistance

O1-S03.01 ANTIMICROBIAL RESISTANCE TO *NEISSERIA GONORRHOEA* IN A COHORT OF YOUNG MEN IN KISUMU, KENYA: 2002–2009

doi:10.1136/sextrans-2011-050109.13

[1]S Mehta, [2]I Maclean, [3]J Ndinya-Achola, [4]R Murugu, [4]L Agunda, [2]A Ronald, [5]I Martin, [1]R Bailey, [2]S Moses, [6]J Melendez, [6]J Zenilman. *[1]University of Illinois, Chicago, USA; [2]University of Manitoba, Winnipeg, Canada; [3]University of Nairobi, Nairobi, Kenya; [4]UNIM Kenyazs, Kenya; [5]National Microbiology Laboratory Canadian Science Centre for Human and Animal Health, Canada; [6]The Johns Hopkins University, USA*

Background We evaluated antimicrobial resistance in *Neisseria gonorrhoeae* (NG) isolated from men aged 18–24 enrolled in a randomised trial of male circumcision to prevent HIV.
Methods Urethral specimens were obtained from men with discharge. These were inoculated in modified Thayer-Martin agar and incubated at 37°C in 5% CO_2 for 24–48 h, with confirmation of NG colonies by standard procedures. Minimum inhibitory concentrations (MICs) were determined by agar dilution. Clinical Laboratory Standards Institute criteria determined resistance: MIC≥2.0 μg/ml for penicillin, tetracycline, and azithromycin; ciprofloxacin MIC≥1.0 μg/ml; spectinomycin MIC≥128.0 μg/ml. Susceptibility to ceftriaxone and cefixime was MIC<0.25 μg/ml. We used PCR amplification to detect mutations in the parC and gyrA genes, associated with quinolone resistance.
Results From 2002 to 2009, 168 NG isolates were obtained from 142 men. Plasmid mediated penicillin resistance (PPNG) was found in 65%, plasmid mediated tetracycline resistance (TRNG) in 97%, and 11% were ciprofloxacin resistant (QRNG). QRNG appeared November 2007, increasing from 9.5% in 2007 to 50% in 2009 see Abstract O1-S03.01 table 1. Resistance was not detected for spectinomycin, cefixime, ceftriaxone, and azithromycin, but MICs of cefixime (p=0.018), ceftriaxone (p<0.001), and azithromycin (p=0.097) increased over time. In a random sample of 51 men gentamicin MIC was assessed: 4 μg/ml (n=1), 8 μg/ml (n=49), 16 μg/ml (n=1). Increased MICs were associated with urban residence, multiple recent sex partners, not using condoms.
Conclusions Quinolone resistance increased rapidly and alternative treatment, such as cefixime, is required for NG in this area. Systematic surveillance of antimicrobial resistance in NG is necessary for appropriate drug choice. Increases in MICs for oral cephalosporins add to growing concern for multi-drug resistant NG. The high prevalence of PPNG and TRNG suggest strong selective pressure from background antibiotic use.

Abstract O1-S03.01 Table 1

Year	Quinolone resistance n/N (%)	95% CI
2002–2006	0/89 (0.0)	–
2007	2/21 (9.5)	1.2 to 30.4
2008	6/22 (27.3)	10.7 to 50.2
2009	7/14 (50.0)	23.0 to 77.0
p Value for trend		<0.001

O1-S03.02 CEPHALOSPORIN SUSCEPTIBILITY OF *NEISSERIA GONORRHOEAE* ISOLATES IN THE USA, 2000–2010

doi:10.1136/sextrans-2011-050109.14

[1]R Kirkcaldy, [1]E Murray, [2]C Del Rio, [3]G Hall, [4]E Hook, [5]W Whittington, [1]J Papp, [1]H Weinstock. *[1]Centers for Disease Control and Prevention, Atlanta, USA; [2]Emory University, USA; [3]Cleveland Clinic, USA; [4]University of Alabama, Birmingham, USA; [5]University of Washington, Seattle, USA*

Background Cephalosporins are recommended by CDC for first-line gonorrhoea treatment. Declining cephalosporin susceptibility and clinical cefixime treatment failure have been reported from Asia, Europe and other regions. We report cephalosporin susceptibility trends among US *N gonorrhoeae* isolates.
Methods The Gonococcal Isolate Surveillance Project (GISP) is a sentinel surveillance system that monitors antimicrobial susceptibility among isolates collected from men with urethritis. Minimum inhibitory concentrations (MICs) are determined by agar dilution. The proportion of isolates with elevated MICs to cefixime (≥0.25 μg/ml) and ceftriaxone (≥0.125 μg/ml) from 2000 through the first half of 2010 were tested for trends using the Cochran-Armitage trend test. Susceptibility tests for cefixime were not performed during 2007–2008.
Results 61 559 isolates were tested during 2000–June 2010 (annual mean=5845). Overall, 37% of isolates were from men in the northeastern or southern regions of the US, 25% were from the Midwest, and 38% were from the West; 21% were from men who have sex with men (MSM). The proportion of isolates with elevated MICs remained stable for cefixime (CFX) from 2000 to 2006 (0.2% to 0.1%; CFX susceptibility not tested 2007 and 2008) and for ceftriaxone (CRO) from 2000 to 2008 (0.1% to 0.1%); the proportions increased in 2009 and 2010 (CFX: 0.8% and 1.9% [n=53], p<0.001; CRO: 0.3% and 0.4% [n=11], p<0.001). In 2010, most isolates with elevated MICs to cephalosporins were from the West (CFX: n=48 [91%]; CRO: n=7 [64%]) and from MSM (CFX: n=46 [87%]; CRO; n=9 [82%]).
Conclusions The proportion of gonococcal isolates with elevated MICs to cefixime and ceftriaxone recently increased in the US. Most of the isolates with elevated MICs were from men in the West and MSM. This is worrisome given trends elsewhere in the world and the history of fluoroquinolone-resistance in the US, which, early in the epidemic, was most often detected in the western US and among MSM. Cephalosporins remain effective for gonorrhoea treatment in the US, yet increasing MICs suggest that resistance may emerge. If cephalosporin resistance does emerge, alternative antibiotic treatment options will be needed.

O1-S03.03 CLONALLY RELATED *NEISSERIA GONORRHOEAE* ISOLATES WITH DECREASED SUSCEPTIBILITY TO EXTENDED-SPECTRUM CEPHALOSPORINS IN AMSTERDAM, THE NETHERLANDS

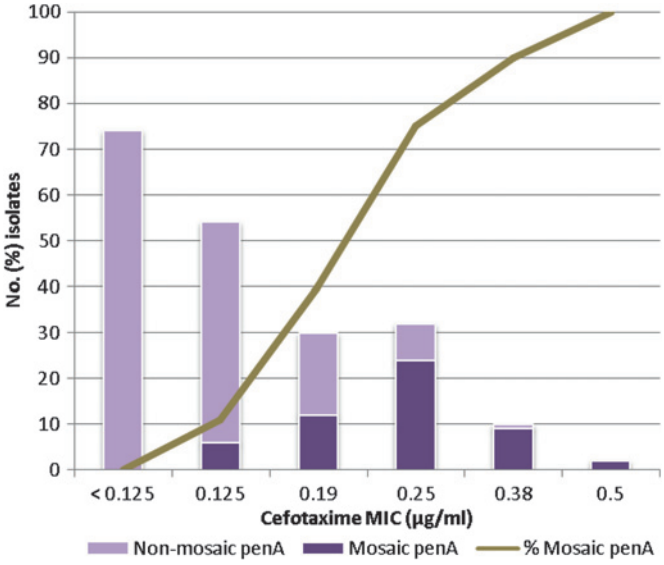
doi:10.1136/sextrans-2011-050109.15

[1]R Heymans, [1]S Bruisten, [2]D Golparian, [2]M Unemo, [1]H de Vries, [3]A van Dam. *[1]Health Service of Amsterdam GGD, Amsterdam, Netherlands; [2]Örebro University Hospital, Sweden; [3]OLVG General Hospital, Netherlands*

Background Between 2006 and 2008, the prevalence of *Neisseria gonorrhoeae* (NG) isolates with decreased susceptibility (0.125<MIC<0.5 μg/ml) to the extended-spectrum cephalosporin (ESC) cefotaxime (CTX) among visitors of the STI clinic in Amsterdam, the Netherlands increased from 4.8 to 12.1%. The transmission patterns, clonality, phenotypic and genotypic characteristics of the NG isolates transmitted within this high-risk group were examined.
Methods From 2006 to 2008, 74 NG isolates with a CTX MIC of >0.125 μg/ml (group A), 54 with a CTX MIC of 0.125 μg/ml (group

B), and a control group of 74 with a CTX MIC of <0.125 µg/ml (group C), were included. All isolates were characterised using antibiograms, conventional penA mosaic gene PCR, and genotyping by NG-multi-locus variable-number tandem repeat analysis (MLVA). PenA mosaic positive isolates and a strict selection of the remaining isolates were further characterised by NG-multilocus sequence typing (MAST) and sequencing of ESC resistance determinants (penA, mtrR, and porB1b).

Results The majority of the isolates in group A (n=47; 64%) but only 11% (n=6) of the isolates in group B contained a penA mosaic allele. No penA mosaic-containing isolate was identified in group C (see Abstract O1-S03.03 figure 1). All the 53 penA mosaic isolates had an identical penA sequence (type XXXIV) and were assigned to the same MLVA cluster, which additionally included three isolates that were susceptible to CTX (MIC<0.125 µg/ml). Within this MLVA cluster, 46 (87%) of the penA mosaic isolates were assigned NG-MAST ST1407, and the remaining 7 isolates had closely related STs. All these penA mosaic isolates contained a mtrR promoter deletion and in 52/53 isolates the porB1b alterations G101K and A102N were found. Decreased susceptibility to cefixime and ceftriaxone (MIC≥0.016 µg/ml) was found in 50/53 and 44/53 isolates, respectively. The mosaic penA MLVA cluster, containing ST1407 (87%) and closely related STs (13%), represented Dutch homosexual men (66%), patients with frequent chlamydia co-infection (32%), and commercial sex workers (7%).



Abstract O1-S03.03 Figure 1 GGD.

Conclusions A strong correlation was found between the decreased ESC susceptibility and a NG penA mosaic strain (ST1407) that was highly prevalent among visitors of the STI clinic Amsterdam. This strain was identified in many other countries. The rapid spread of this NG strain might be facilitated by high-risk sexual behaviour and should be monitored closely to identify potential treatment failure.

O1-S03.04 CORE GROUPS, ANTIMICROBIAL RESISTANCE AND REBOUND IN GONORRHOEA

doi:10.1136/sextrans-2011-050109.16

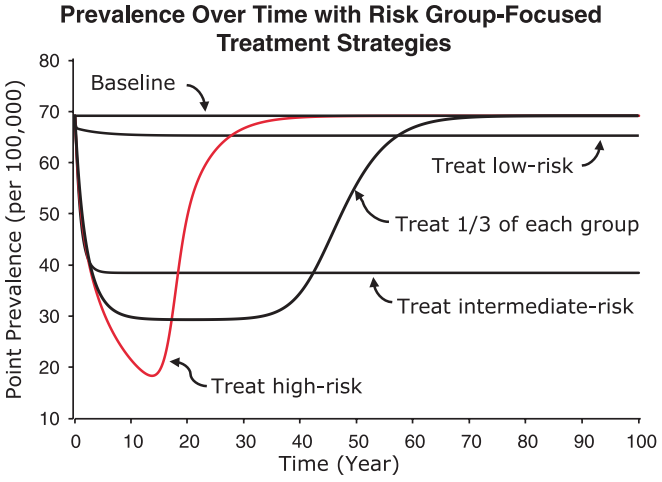
[1]C Chan, [2]D Fisman, [1]C McCabe. *[1]University of Toronto, Toronto, Canada; [2]University of Toronto, Faculty of Medicine, Toronto, Canada*

Background *Neisseria gonorrhoeae* (NG) is a major cause of sexually transmitted infection worldwide. Surveillance data from North America suggest that incidence has increased in recent years, after initially falling in the face of intensified control efforts, as antimicrobial resistance in NG has increased. We evaluated the likely mechanisms behind such rebound using simple compartmental models, and explored the implications of such rebound for disease control practice.

Methods We evaluated the impact of risk-focussed treatment strategies on long-term gonorrhoea trends using risk-structured susceptible-infectious-susceptible" (SIS) compartmental models that included and excluded the possibility of antibiotic resistance in gonorrhoea transmission and control. We also examined optimal treatment strategies to minimise gonorrhoea rates when more than one antibiotic is available.

Results Model projections, consistent with previous work, showed that when antibiotic resistance is not possible, strategies that focus on treatment of highest risk individuals (the so-called "core group"), result in collapse of gonorrhoea transmission see Abstract O1-S03.04 figure 1. In contrast, in the presence of antimicrobial resistance, a focus on the core group causes rebound in incidence, with maximal dissemination of antibiotic resistance. When two antibiotics are available for treatment, we found that random assignment of treatment was most effective at delaying rebound in overall rates in the population, while the current strategy, which is to switch first-line treatment when a threshold level of resistance is reached, produced the quickest rebound.

Conclusions While previous models have shown that the targeted treatment of core-group individuals is the most effective at lowering rates of gonorrhoea, our model suggests that core group-focused treatment strategies efficiently disseminate antimicrobial resistant strains of NG, with rebound in gonorrhoea rates. This paradox poses a great dilemma to the control and prevention of gonorrhoea, especially when development of new antibiotic classes has lagged in recent years and vaccine development for gonorrhoea still faces many challenges. Our study highlighted the need for focus on non-antimicrobial strategies for the prevention and control of gonorrhoea.



Abstract O1-S03.04 Figure 1 Prevalence over time with risk group-focused treatment strategies.

O1-S03.05 COMMUNITY-ACQUIRED METHICILLIN-RESISTANT AND SUSCEPTIBLE *STAPHYLOCOCCUS AUREUS* AMONG MEN WHO HAVE SEX WITH MEN

doi:10.1136/sextrans-2011-050109.17

H De Vries, I Joore, M van Rooijen, M Schim van der Loeff, A van Dam, H De Vries. *GGD Amsterdam, Amsterdam, Netherlands*

Background Community Acquired Methicillin Resistant Staphylococcus aureus (CA-MRSA) has been found more often among men who have sex with men (MSM) in some studies (USA). This study assesses the prevalence and sexual risk factors for CA-MRSA