(ICD-9) codes were available 2007 through 2009. GW cases were defined as unduplicated clients with either an ICD-9 diagnostic code for viral warts (078.10) or condyloma (078.11) or a National Drug Code (NDC) for pharmacy-dispensed imiquimod or podofilox. Inclusion of procedure codes for destruction of genital lesions was unnecessary because these claims closely correlated (>95%) with appropriate ICD-9 codes. Denominators included unduplicated clients served. The proportions of clients with GW were stratified by age (<21, 21–25, 26–30, 31+), gender, and year. No data on vaccination status were available. Statistical significance of gender- and age-specific trends was assessed using the Cochran-Armitage test for linear trend.

Results Between 2007 and 2009, an average of over 1 735 000 female and 248 000 male clients were served annually. Total clients served increased each year for both females and males across all age groups, with the greatest increases seen among older age groups. Overall, 0.7% of females and 3.4% of males were diagnosed with GW. Between 2007 and 2009, GW diagnoses declined 19.4% among females less than age 21 (p trend <0.0001), whereas GW diagnoses were stable or increasing among females in older age groups see Abstract O1-S02.04 table 1. No statistically significant declines in GW diagnoses were observed among males of any age group; however, significant increases were observed among older males.

Conclusions This analysis provides preliminary evidence that the HPV vaccine may be preventing GW among young women. Although using existing administrative claims data to assess trends in HPV-related diseases was inexpensive and expeditious, trends are ecological and may be explained by factors other than vaccination.

Abstract O1-S02.04 Table 1 Per cent change between 2007 and 2009 in GW diagnoses by gender and age group

	Females		Males	
Age group	% Change	p_{trend}	% Change	p_{trend}
<21	−19.4	<0.0001	−3.3	0.328
21–25	−2.8	0.137	−4.1	0.061
26–30	+8.8	0.006	+12.6	0.0004
31+	+10.9	0.002	+11.4	0.004

O1-S02.05 POPULATION BASED SURVEILLANCE FOR CERVICAL INTRAEPITHELIAL NEOPLASIA GRADE 3 AND ADENOCARCINOMA IN SITU IN THREE CENTRAL CANCER REGISTRIES, USA 2009

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Background Human papillomavirus (HPV) vaccine has been recommended routinely to 11–12-year-old US girls for cervical cancer prevention since 2006, and evaluation of the population impact of HPV vaccine is a critical need. In addition to measuring the impact of HPV vaccines on cervical cancer incidence, surveillance should include endpoints more proximal in time to HPV infection such as cervical intraepithelial neoplasia grade 3 (CIN3) and adenocarcinoma in situ (AIS). These immediate precursors to invasive cervical cancer manifest only 5–10 years after HPV infection. Although CIN3/AIS are detected during cervical cancer screening, these lesions are not routinely reported to US central cancer registries (CCRs). Compared to other precursor lesions, CIN3/AIS show the most consistent inter-pathologist agreement in histopathology interpretation making them the most suitable precursor lesion surveillance endpoints.

Methods The Centers for Disease Control and Prevention conducted a project in three statewide CCRs to assess the feasibility of collecting data on CIN3/AIS lesions using existing registry infrastructure, a standardised case definition, and well-defined coding rules. State-specific vintage 2009 bridged-race postcensal population estimates were used to calculate incidence rates.

Results Statewide age-adjusted incidence rates of CIN3/AIS in 2009, using the 2000 US Standard Population, were 76.8 (Kentucky), 57.5 (Michigan), and 54.7 (Louisiana) per 100 000 women. Highest rates were observed in those aged 20 to 29; rates among these women were 272.8 in Kentucky, 196.7 in Louisiana, and 192.6 in Michigan. Race was missing for 16% of records. Among records for which race was reported, incidence rates in Kentucky were highest for whites, while rates in Michigan were highest for blacks; in Louisiana rates did not differ significantly between whites and blacks. In each state, overall rates of CIN3/AIS were over sixfold higher than invasive cervical cancer rates. Only 3.8% of cervical lesions were AIS.

Conclusions These results are the first reports of statewide population based incidence of CIN3/AIS in the US, and demonstrate that routine collection of CIN3/AIS lesions by cancer registries is feasible and could provide an earlier endpoint than cervical cancer with which to evaluate the impact of HPV vaccination in the US. Sentinel registries should be established to collect ongoing data on CIN3/AIS to monitor the impact of HPV vaccine in the US.

O1-S02.06 DETECTION OF CERVICAL CANCER PRECURSORS AND ASSOCIATED HPV TYPES IN THE USA: HPV-IMPACT PRELIMINARY RESULTS

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Background Cervical intraepithelial neoplasia (CIN) grade 2 or 3 and adenocarcinoma in situ (AIS) (CIN2+) can be used to monitor HPV vaccine impact. This spectrum of preinvasive cervical lesions are commonly associated with multiple HPV types and detected through screening. This abstract describes baseline CIN2+ data and associated HPV types among defined populations of US females.

Methods As part of a vaccine impact monitoring project (HPV-IMPACT), CIN2+ cases in females 18–39 years were reported from pathology laboratories in five catchment areas (CA, CT, NY, OR, TN). One diagnostic block was selected and unstained serial sections were prepared for PCR. Extracts from samples with residual lesion on both H&Es were used in Roche Linear array to detect and type HPV. CIN2/3 diagnosis rates were determined in catchment areas (CA, CT and NY) with complete case reporting. HPV typing data were analysed from all five defined catchment areas.

Results In 2008, rates per 1000 population in 18–39-year-old females were 2.8 in CA, 5.3 in CT and 4.9 in NY. In all five sites, CIN2 was most common (49%), followed by CIN3 (31%) and AIS (2%). The proportion of lesions not distinguished by grade (CIN2/3) varied across sites (from 12 to 27%). Median diagnosis age was 31 years in CA, 29 in CT, 27 in NY, 29 in OR, 28 in TN. Among 5035 18–39-year-old females, 1413 (28%) specimens were tested; 96% were HPV DNA positive. HPV16 was most prevalent (47%), followed by HPV31 (11%), HPV52 (9%) and HPV51 (8%). HPV18 prevalence was 5.4%. HPV16 prevalence varied by diagnosis: 38% in CIN2, 51% in CIN2/3, and 59% in CIN3.

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

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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

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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

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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