position 83 or 87 of ParC, which are highly associated with clinical resistance to fluoroquinolones, were detected in ten participants (9.7%) including four in Togo (16.7% of 24), five in Mali (11.9% of 42), and one in Côte d'Ivoire (7.7% of 13).

Conclusion While no macrolide RAM in MG was detected, the high prevalence of fluoroquinolone RAMs calls for public health attention. Between-country heterogeneity of fluoroquinolone RAMs prevalence figures may be explained by different treatment guidelines or over-the-counter use of fluoroquinolones.

O11.6 ACCEPTABILITY OF A POTENTIAL GONOCOCCAL VACCINE AMONG SEXUALLY-ACTIVE MEN WHO HAVE SEX WITH MEN – AMERICAN MEN'S INTERNET SURVEY, 2019

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Background New approaches, such as vaccination, are needed to address increasing gonorrhea rates and the threat of antibiotic-resistant gonorrhea. Although prospects for a gonococcal vaccine have advanced, vaccine acceptability is crucial to maximizing population-level protection among key groups, such as men who have sex with men (MSM). We assessed correlates of acceptability of a potential gonococcal vaccine among sexually active MSM in the United States.
Methods We used data from the American Men's Internet Study (AMIS) conducted during 8/2019–12/2019. We calculated frequencies of socio-demographic characteristics, vaccine acceptability (responses classified as willing or unwilling) and preferred location for vaccine receipt. Using log-binomial regression analyses, we calculated unadjusted prevalence rates (PR) and 95% confidence intervals (CI) to evaluate factors associated with vaccine acceptability. Reference group for vaccine acceptability was unwilling to accept a vaccine.
Results Of 10,130 MSM, 83.5% were willing to accept a potential vaccine and 16.5% were unwilling. Preferred locations for vaccination were primary care provider's offices (83.5%) and sexual health clinics (64.6%). Willingness to accept a vaccine was more likely among young MSM (15–24 years [PR=1.09, 95% CI=1.05–1.12], 25–29 years [PR=1.13, 95% CI=1.09–1.17], and 30–39 years [PR=1.10, 95% CI=1.05–1.14]) compared to older MSM (≥40 years), and MSM who reported condomless anal sex (PR=1.09, 95% CI=1.06–1.12), a bacterial sexually transmitted disease (STD) test (PR=1.18, 95% CI=1.15–1.21), HIV pre-exposure prophylaxis use (PR=1.17, 95% CI=1.14–1.19), HIV positivity (PR=1.05, 95% CI=1.02–1.09), a bacterial STD (PR=1.04, 95% CI=1.02–1.07), and a healthcare provider visit (PR=1.11, 95% CI=1.06–1.16) in the past 12 months. MSM who reported ≤high school education (PR=0.93, 95% CI=0.90–0.97) were less willing to accept a vaccine compared to those with >high school education.
Conclusion Most respondents were willing to accept a potential gonococcal vaccine. These findings can inform the planning and implementation of a future gonococcal vaccination program that targets MSM.

HIV

O12.1 USE OF MACHINE LEARNING ALGORITHMS TO ASSESS THE RISK OF ACQUISITION OF HIV AND SEXUALLY TRANSMITTED INFECTIONS

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Background Early identification of HIV and sexually transmitted infections (STIs) leads to early intervention and treatment. We assessed whether ensemble machine-learning methods may provide an accurate assessment of the risk of acquiring HIV and STIs in both heterosexual and homosexual populations.
Methods To develop the machine learning models, we used data from the Melbourne Sexual Health Centre's electronic health records between January 2015 and September 2019 (210,271 consultations). We developed 31 machine learning models, using ensemble learning to predict the risk of HIV, syphilis, gonorrhoea, and chlamydia. The models included five base models (Logistic Regression (LR), Naive Bayes (NB), Deep Learning (Neural Networks) (DL), and Random Forest (RF), and Gradient Boosting Machine (GBM); and twenty-six stacked ensemble models based on the different combinations of the above five base models.
Results The models with the highest area under the receiver operating characteristic curve (AUC) were: for HIV (LR+GBM+RF+NB+DL, AUC=0.8048 [0.7641–0.8455]), for syphilis (GBM+RF+NB, AUC=0.8483 [0.8339–0.8627]), for gonorrhoea (LR+GBM+NB+DL, AUC=0.8136 [95%CI 0.8058–0.8214]), and for chlamydia (LR+GBM+RF+NB, AUC=0.7373 [0.7279–0.7468]). The commonly identified predictors for four infections were being men who have sex with men, male gender, self-reported STIs symptoms, having sex with an opposite-sex partner in the past 12 months, and younger age.
Conclusions Our results suggest that ensemble learning algorithms could better assess HIV/STIs risk than the individual classifiers models. Our developed machine learning-based tool using self-reported questions could reasonably accurately predict the risk of HIV, syphilis, gonorrhoea, and chlamydia in a population attending an STI service.

O12.2 A NOVEL ANALYSIS OF NSW HIV SURVEILLANCE DATA TO HIGHLIGHT HIV PREVENTION PROGRAM IMPACT AND GAPS

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Background HIV surveillance data are routinely reported by local health district or area of residence, and rates calculated using the entire population as the denominator (0.034 per 1,000 in Australia in 2018). Given most HIV prevention programs are targeted at gay men, we conducted a novel analysis of NSW HIV surveillance data that incorporates new estimates of gay men in each NSW suburb.

Methods We used a recently reported method of determining suburb concentrations of gay men, combining data from the 2016 Australian Census with self-reported population surveys to estimate, per postcode, numbers and proportions of adult males who are gay. We grouped postcodes into three categories: >20%, 5–19.9%, and <5% males estimated to be gay. We then assigned each HIV notification in MSM within these categories, and analysed new HIV notifications reported among MSM between 2013 and 2019 per 1,000 gay males.

Results Of the adult male population in NSW in 2016, 1.8% (52,893) were estimated to be gay. Among these, 12,218 (23.1%) lived in postcodes where >20% of adult males are estimated to be gay ('high concentration'), 12,434 (23.5%) in postcodes where 5–19.9% are gay ('moderate concentration'), and 28,241 (53.4%) in postcodes where <5% are gay ('low concentration'). Overall HIV notifications in MSM decreased 23.5% (from 281 in 2013 to 215 in 2019): by 57.1% in MSM living in high concentration postcodes (from 6.7 in 2013 to 2.7/1,000 in 2019), 36.4% in moderate concentration suburbs (5.5 to 3.5/1,000) and rose 6.5% in low concentration suburbs (from 4.6 to 4.9/1,000).

Conclusion This new surveillance analysis method highlights where HIV prevention programs have had greater or lesser impact, and shows efforts in NSW have been well-targeted to 'gay neighbourhoods' but increase focus on low gay concentration suburbs to achieve the NSW HIV Strategy goal of virtual elimination of transmissions.

O12.3 **THE NETHERLANDS ON TRACK TO ACHIEVE UNAIDS' '95–95–95' HIV TARGETS FOR 2025 IN ALL STI SURVEILLANCE REGIONS**

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Background On a national level, the Netherlands is closing in on the ambitious 95–95–95 HIV targets set by UNAIDS for 2025. Here, we investigated to what extent this is also the case on a regional level.

Methods From the ATHENA national HIV cohort, we retrieved data about all individuals with an HIV-1 infection living in each of the eight sexually transmitted infection (STI) public health surveillance regions in the Netherlands. Based on those newly-diagnosed during 2002–2019 data, we estimated the number of people remaining undiagnosed by the end of 2019, using ECDC's HIV Modelling Tool, a CD4 count-based back-calculation method. We subsequently estimated a four-stage HIV care continuum: (i) living with HIV, including those undiagnosed, (ii) diagnosed, (iii) in care and on antiretroviral treatment (ART), and (iv) with viral suppression (HIV RNA <200 copies/ml). The total number of people with HIV was estimated by adding the estimated number remaining undiagnosed to the observed number of diagnosed HIV-positive individuals living in each region.

Results The estimated number living with HIV nationwide by the end of 2019 was 23,560 (95% confidence interval [CI] 23,370–23,820), or 135 (134–137) per 100,000 population; approximately 1,770 (1,570–2,030) were still undiagnosed. Numbers living with HIV per 100,000 population were highest in Noord-Holland/Flevoland (273, 95%CI 270–276), Zuid-Holland Noord (164, 159–171), and Zuid-Holland Zuid (144, 142–149), which include the three largest cities Amsterdam, The Hague, and Rotterdam. Across the eight regions, 90%-95% had been diagnosed, 92%-96% of those diagnosed were on ART, and 95%-98% of those on ART had a suppressed viral load.

Conclusion All STI surveillance regions are on track of achieving UNAIDS' 95–95–95 2025 targets. Increased efforts are necessary to reduce the undiagnosed population and the number of individuals not retained in care and on treatment.

O12.4 **DIAGNOSIS OF LEARNING DISABILITY IS ASSOCIATED WITH APPROXIMATELY 2-FOLD INCREASE IN NEUROCOGNITIVE IMPAIRMENT IN PEOPLE LIVING WITH HIV**

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Background Milder forms of HIV-associated neurocognitive disorders (HAND) remain prevalent and can often be difficult to diagnose. Assessment of pre-morbid ability and consideration of morbidity factors remain important to diagnosis of HAND. Among relevant pre-morbid conditions, presence of learning and academic problems in school and diagnosis of learning disabilities (LD) have not been systematically studied in relation to neurocognitive impairment and self-reported cognitive symptoms in HIV.

Methods We examined an urban city cohort of 903 people living with HIV infection referred for assessment of HAND. Patients were classified as having no learning disabilities (n= 474), learning or academic difficulties in school (n= 352) or having a diagnosis of learning disability or ADHD (n=77). Participants' level of depressive symptoms (Beck Depression Inventory), cognitive symptoms (Patient's Assessment of Own Functioning), and neuropsychological status (based on comprehensive neurocognitive testing of complex attention, learning and memory, psychomotor efficiency and executive functioning) were compared across the three groups classified