

Intracerebral Hemorrhage in a Young Pregnant Woman with HIV/AIDS

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Human Immunodeficiency Virus (HIV) infection has been identified in studies as an independent risk factor for developing stroke especially in the younger population, the exact means by which this occurs though has not been extensively studied. This is a case of a pregnant patient with HIV infection who was poorly compliant with anti-retroviral therapy, with a CD4 count of 5 cells per microliter. She developed intracerebral hemorrhage and aneurysm presenting as left-sided weakness, in the absence of other known risk factors. It has been suggested that AIDS illness may increase the expression of inflammatory mediators causing endothelial injury that could predispose to ischemia or hemorrhage. This study emphasizes the need to exclude other potential causes for stroke in an HIV/AIDS patient especially during pregnancy which can contribute to the hypercoagulable state, and the importance of adherence to anti-retroviral therapy to ensure suppressed viral load to maintain immune function and reduce HIV-related morbidity and mortality.

the management of STIs / HIV by community organizations with key populations: the case of ALCONDOMS CAMEROON

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Method: The objective of the CHAMP project, which is funded by USAID and implemented by Care Cameroon and implemented by community-based organisations, is to systematically screen for STIs, GBV cases and target HIV screening among key populations and their management. During the fiscal year, FY19 Alcondoms Cameroon screened 2,366 beneficiaries (sex workers, injecting drug users, men who have sex with men, clients of sex workers, transgender people) for STIs and HIV. During this fiscal year, we had 507 positive cases of HIV infection and all of them were put on treatment.

Problem: Inclusive self-stigmatisation in the management of STI/HIV among key populations affects the STI/HIV management services offered by identity-based organisations by increasing the number of people lost to stigmatisation

Conclusion: the management of STI/HIV among key populations will always be a major challenge, especially in the covid19 period, despite the efforts of the staff of ALCONDOMS CAMEROON, who have taken action to say no to new infections.

Internet exposure on sexual partners and sexual risk behavior among sexually experienced college males: evidence from a population-based study

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Background: As a young subgroup, college students have become the main participants of mobile social networks. Considering the increase of HIV infections in male college students, it is important to explore the status of using the internet to meet sexual partners among these young students and examine the correlates of this use with risky sexual behaviors.

Methods: A population-based cross-sectional study was conducted among male students from 44 colleges located in Hangzhou. A total of 1045 sexually experienced male students were incorporated in our analysis. Sequential logistic regression models were employed to determine the independent influence of meeting sexual partners via the internet on sexual risk behavior after controlling for factors associated with risk sexual behaviors.

Results: Anonymous social software (e.g., Momo, Tantan, Blued and Aloha) were the most common sites (87.6%) for males to seek sexual partners online. The risk sexual behavior was heterogeneous among the aims for finding partners online and the risk was the highest for males who meet partner for sex (75.52%-85.36%). Compared to non-internet partners' seeker, internet partners' seekers tend to have more casual (53.87% vs 10.14%), paid (5.9% vs 2.39%) and homosexual sex (64.39% vs 8.15%), use psychoactive drugs (35.82% vs 12.2%) and more partners. With the increase of HIV/STD knowledge, the probability of having unprotected sex was increasing for internet partner seekers. Meeting sexual partner on internet was statistically associated with unprotected sex (OR=0.255, P<0.05).

Conclusions: Meeting sexual partners via the internet were common among male colleague students, and those meeting partners online exhibited higher levels of risk sexual behaviors although they had enough HIV/STD knowledge, especially students with the aim of finding partners for sex. Thus, more attention should be paid to those general young adults to address the risky sexual behaviors that may contribute to increase HIV spread among this population.

Painful ano-rectal syphilis in men who have sex with men (MSM)

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There has been a significant increase in infectious syphilis in men who have sex with men (MSM). Recent data also suggests a corresponding increase in ano-rectal syphilis. Despite this, there is a lack of syphilis testing in MSM with ano-rectal symptoms.

The aim of this study is to describe the presentation and management of MSM with ano-rectal syphilis. The sexual health clinic in Brighton sees 6500 MSM per year for sexually transmitted infection testing and treatment. We reviewed the electronic clinic notes of MSM with ano-rectal syphilis from January 2017 to August 2020 and collected data on patient demographics, HIV status, previous syphilis, syphilis serology including VDRL titre, TP-PCR testing and details of treatment.

In the study period, 128 MSM were diagnosed with early syphilis, 108 (84%) with genital lesion(s), 4 (3%) with oral lesion(s) and 16 (13%, 95%CI=7.3-19.5) with painful ano-rectal lesion(s). All 16 had reactive serology and 12/16 had a TP-PCR taken of which 12/12 was positive. The median age was 51 years (IQR 40-58) and 7/16 (44%) were HIV positive and 4/16 (25%) had a previous history of syphilis. Clinicians treated 6/16 (38%) presumptively for syphilis on the day of presentation; the 10/16 who were not treated presumptively on the day waited a median of 8 days (6-28) for treatment. HIV positive MSM with ano-rectal syphilis were significantly more likely to have had previous treated syphilis (OR=24.4, 95%CI 1.03-580.7, $p<0.05$) than HIV negative MSM, and clinicians were significantly more likely to treat HIV positive MSM presumptively on the day (OR=20.0, 95%CI=1.4-282.5, $p<0.03$).

We have shown that a small, but significant number of MSM with syphilis present with painful ano-rectal symptoms and suggest that all MSM with ano-rectal symptoms should be tested for syphilis. Point of care testing for syphilis from ano-rectal samples would support syphilis control and prevention.

HIV-1 transmitted drug resistance between 2014 – 2020 in a HIV large population in Brighton, UK.

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Background: HIV-1 transmitted drug resistance (TDR) is associated with sexually transmitted infections (STIs) and sexual clusters including MSM and non-MSM. TDR can lead to antiretroviral failure, and therefore UK guidelines recommend TDR testing in all new HIV patients. Subtype B is most common in urbanised western populations however is decreasing in proportion. Within the UK TDR is estimated to be 7.5% and non-B subtype 51%.

Methods: Using the WHO TDR list, we aimed to determine from our clinic database; the prevalence of TDR, non-B subtype and associated features in our large tertiary HIV department (~2500 patients) from 2014-2020.

Results: Of the 218 new diagnoses, 217 had a resistance test attempted (1 stored due to COVID-19). 212/217 had an available genotype (5 failed to amplify).. 191/212(90%) were MSM, 12/212(6%) cis-female, 80/212(38%) non-UK born and the median age was 36 years (IQR=29–46). The overall prevalence of TDR was 17/212(8%;95%CI=5.0–12.4), seven (3%) had a NRTI mutation, six (3%) had at least one nNRTI mutation and 4(2%) had a PI mutation. There were no dual/triple class/INI mutations. There was no significant change in the prevalence of TDR over the study period. The overall prevalence of non-B subtype was 53/212(25%;95%CI=19.6–31.2), and was not more frequently seen in non-UK born individuals (OR=1.24;CI=0.66–2.33,p=0.51). Patients with TDR were older [45.v.36 years, p=0.006] and have non-B subtype (OR=2.96;CI=1.08-8.13,p=0.03). Although overall rates of bacterial STIs was high (34%), having a bacterial STI was not associated with TDR(OR=1.77;95%CI=0.66–4.82,p=0.26).

Conclusion: TDR is associated with age and non-B subtype in our population. HIV TDR is not decreasing locally and remains a small but significant concern despite effective HIV prevention strategies, which may not reach hidden populations affected by HIV. Continued efforts to reduce HIV transmission must target hidden populations and we must maintain adequate surveillance of TDR.

Sexually Transmitted *Shigella flexneri* and *Shigella sonnei* in men who have sex with men.

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Shigella outbreaks in MSM are associated with sexual networks involving transmission of other sexually transmitted infections (STIs), geosocial app use for meeting sexual partners and chemsex. There is increasing antimicrobial resistance (AMR) in *Shigella* amongst MSM. We aimed to describe cases and patterns of AMR amongst MSM with *Shigella* between 2016-2019.

There were 33 cases of shigellosis in MSM identified, with a median age of 38-years (IQR 34-47). 11/33(33%) reported recent chemsex use, 14/33(42%) were HIV positive. Of the 19/33 HIV negative MSM, 7/19(37%) were using HIV pre-exposure prophylaxis. The mean number of sexual partners in the previous 3 months was six. 15/33(45%) had *Shigella sonnei*, 5/33(15%) *Shigella flexneri*, and 13/33(39%) were DNA-PCR positive but culture negative. 14/33(42%) were diagnosed with at least one other STI. MSM with *Shigella flexneri* were more likely to be HIV positive than *Shigella sonnei*($p<0.05$). Antimicrobial sensitivities were only available in 11/15 cases of *Shigella sonnei*[fully sensitive(9%), resistant to ciprofloxacin(9%), resistant to azithromycin(36%), resistant to ciprofloxacin and azithromycin(45%)]. 7/33(21%) were treated presumptively on the day of presentation with intramuscular ceftriaxone 2g for 1-3 days followed by oral ciprofloxacin. No MSM with ciprofloxacin resistance received ciprofloxacin; the remaining 26/33 (78%) did not receive antimicrobials and their diarrhoea resolved.

We have shown that *Shigella flexneri* is more frequently seen in HIV positive MSM and is associated with chemsex, and resistance to both azithromycin and ciprofloxacin is common in *Shigella sonnei*. The increasing use of PCR culture independent diagnostic tests make it more difficult to identify cases and clusters within sexual networks in MSM of multi-drug resistant shigellosis: clinicians and microbiologists should be vigilant when managing MSM with diarrhoea to prevent large outbreaks of highly resistant shigellosis.

How would sexual health clinicians manage first attendance of men who have sex with men with ano-genital ulcers?

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Background: There has been a significant increase in infectious syphilis in men who have sex with men (MSM). Primary syphilis classically presents as painless ano-genital ulceration however recent data suggests that up to 50% of lesions are painful. We aimed to discover current clinical practice when experienced sexual health clinicians are faced with MSM presenting with ano-genital ulcers.

Method: An anonymous online survey was sent to clinicians in Brighton, UK and Western Sydney, Australia.

Results: Twenty-nine sexual health clinicians (17 doctors and 12 nurses) from the UK (Brighton) and Australia (Sydney) responded to an anonymous online survey; (16/29, 55%) had been working in sexual health for more than ten years. In the absence of dark-field microscopy, when faced with a scenario of a non-penicillin allergic MSM with a 5-day history of a large painless penile ulcer, 26/29 (90%; 95%CI=78.6-100.7) would treat presumptively on the day. Most (21/29, 72%; 95%CI=56.1-88.7) would treat MSM presumptively for syphilis with a large painful anal ulcer. Sexual health clinicians are more likely to offer empirical treatment based upon (1) clinical history (number of sexual partners, previous syphilis, sexual contacts of syphilis, PrEP use, HIV positivity, chem-sex), (2) clinical examination (confidence with clinical diagnosis or having 'classical features' of syphilis) or (3) patient factors (vulnerability factors, less likely to return for treatment or abstain from sex), and are less likely to offer presumptive treatment if they have penicillin allergy, a painful lesion and acceptable laboratory reporting times.

Conclusion: In the absence of same day highly sensitive assays, experienced sexual health clinicians are managing MSM with ano-genital ulcers based upon sexual history, clinical examination and patient factors. The turn-around-times for laboratory-based assays are vital for syphilis control and prevention. To reduce infectious syphilis, we need to improve access to real time, ideally point-of-care, molecular assays for detection of *Treponema pallidum* in ano-genital ulcer samples.

Symptomatic Lymphogranuloma Venereum (LGV) proctitis in men who have sex with men (MSM)

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Lymphogranuloma venereum (LGV) is a sub-type of *Chlamydia trachomatis* and is associated with proctitis. LGV proctitis is associated with recreational drug use particularly chemsex, HIV, hepatitis C, and other sexually transmitted infection transmission. The presenting symptoms of LGV proctitis are not well characterised. We aimed to describe the rectal symptoms of HIV positive and HIV negative MSM with LGV proctitis.

This is a cross-sectional study of MSM who tested positive for LGV attending our large STI centre in Brighton, UK between January 2013 and December 2019. We collected data on age, number of recent sexual partners, ano-rectal symptoms, HIV status, use of HIV Pre-exposure prophylaxis (PrEP) and recreational drug use.

49 MSM had a positive rectal LGV PCR between 2013-2019. The median age was 45 years (IQR=39-53), 44(90%) of the MSM tested were symptomatic and the remaining five were asymptomatic. Eleven (22%) reported recent chemsex, 35(71%) were HIV seropositive and six(43%) of the 15 HIV negative MSM were using PrEP. The symptoms described by the symptomatic MSM were: rectal pain[27,(61%)], rectal bleeding[21,(54%)], rectal discharge[23,(52%)], diarrhoea[8,(18%)], tenesmus[6,(15%)] and constipation[5,(13%)]. There were no significant differences between the characteristics and presenting symptoms between HIV positive and negative MSM.

The symptoms of MSM diagnosed with LGV proctitis are varied and there were no differences between HIV positive and negative MSM. The heterogeneity of presenting symptoms of MSM with LGV proctitis leads to missed opportunities for diagnosis, increased morbidity due to delays in diagnosis and implications for onward transmission particularly where clinicians are not so familiar with LGV or do not have access to testing. Increasing awareness of the heterogeneity of the presentation of LGV in MSM may improve the diagnosis and the impact of public health campaigns to control LGV.

Pharyngeal Chlamydia trachomatis in HIV positive and HIV negative men who have sex with men (MSM)

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Background: Simultaneous testing for both Gonorrhoea and Chlamydia using dual nucleic acid amplification tests (NAAT) has increased pharyngeal Chlamydia testing in MSM. There has been increasing interest in pharyngeal Gonorrhoea due to emerging Gonorrhoea antimicrobial resistance but less is understood about the characteristics of pharyngeal Chlamydia in MSM.

Methods: We aimed to explore the prevalence and associated features of pharyngeal Chlamydia amongst HIV positive and negative MSM in a large urban population. We collected data on HIV status, pharyngeal symptoms, number of recent sexual partners, use of HIV pre-exposure prophylaxis (PrEP), concomitant STIs, previous history of syphilis and current smoking status. Statistical analysis was performed using bivariate odds ratio and Mann Whitney U tests and 95% confidence intervals.

Results: In 2019, 6613 MSM attended for pharyngeal STI testing. 75/6613(1.13%,95%CI=0.9-1.14) tested positive for pharyngeal Chlamydia. The median age was 35 years(IQR=28-43), the median number of sexual partners in the preceding 3 months was three, four(5%) reported throat symptoms, 22(29%) were current smokers, 20(26%) were HIV positive, and 24(44%) of the HIV negative MSM were using PrEP. MSM with pharyngeal Chlamydia often had multi-site infection; rectal chlamydia[39(52%)], urethral chlamydia[12(16%), and concomitant infection; early syphilis[2(3%)] and gonorrhoea at any site[14(19%]. Twenty two(29%) had previously treated syphilis. HIV positive MSM with pharyngeal Chlamydia were significantly more likely to have had previous syphilis(OR=4.9,95%CI1.6-14.7,p=0.005) and were significantly older(p=0.02) than HIV negative MSM.

Conclusion: We have shown that the prevalence of pharyngeal Chlamydia is 1.13% in MSM and only 5% reported pharyngeal symptoms, similar to other studies. HIV positive MSM with pharyngeal Chlamydia were older and more likely to have had previous syphilis. Further research is needed to explore the characteristics of pharyngeal Chlamydia and the benefits of increased screening for asymptomatic pharyngeal Chlamydia in MSM.

HIV post-exposure prophylaxis to pre-exposure prophylaxis transitioning in men who have sex with men.

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Background: HIV post-exposure prophylaxis following sexual exposure (PEPSE) and pre-exposure prophylaxis (PrEP) are used by people at sexual risk of HIV acquisition including men who have sex with men (MSM). Owing to the high risk of HIV seroconversion due to on-going risk behaviours, it is becoming commonplace for HIV-negative MSM requiring PEPSE (e.g. HIV sexual-exposure within 72-hours) to transition immediately to PrEP following the 28-days of PEPSE. We aimed to review how frequently PrEP is discussed and used by MSM following PEPSE.

Method: We reviewed the electronic notes of MSM who had accessed PEPSE between January 2018 - November 2020 and collected information on sexual assault, recreational drug use at the time of PEPSE initiation, whether direct transition to PrEP had been discussed, and if PrEP had been initiated after PEPSE. **Results:** During the study period, 277 MSM accessed PEPSE. The median age was 32 years (IQR 26-43), 17 (6%) started PEPSE following a sexual assault, 36 (13%) were using recreational drugs during sex and 30(11%) had used PrEP previously. Discussion about direct transition to PrEP after PEPSE was documented in 155 (56%) MSM, including 128 (51%) MSM who had never used PrEP before, and 67 (24%) MSM actually transitioned directly from PEPSE to PrEP. Clinicians were more likely to discuss PEPSE to PrEP transition in MSM with prior PrEP use ($p<0.0001$), and MSM were more likely to transition to PrEP from PEPSE if they had used PrEP previously ($p<0.00001$).

Conclusion: Only 56% of MSM who used PEPSE had a documented discussion about transitioning to PrEP and only a 24% actually transitioned from PEPSE to PrEP. Where indicated, MSM who access PEPSE should have a documented discussion and ideally transition immediately onto PrEP following completion of PEPSE.

Hepatitis A susceptibility in men who have sex with men (MSM)

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Hepatitis A is an important sexually transmitted enteric infection in MSM and an effective vaccination is available. It has been estimated that 70% of MSM need to be immune to hepatitis A in order to provide adequate herd immunity. In the UK, hepatitis A transmission in MSM is associated with high risk behaviours such as anonymous sex, multiple sexual partners, sex-on-premises venues and dating apps. European Centre of Disease Prevention and Control (ECDC) and the British Association for Sexual Health and HIV (BASHH) recommend opportunistic vaccination for all MSM.

We aimed to estimate the proportion of MSM who were susceptible to hepatitis A over a 10-year period (from 2010-2019) and to determine if there are any demographic factors associated with susceptibility which may provide useful information for future vaccination programmes.

6884 MSM attended for the first time during the study period. 1401/6884 (20%) were tested for hepatitis A IgG at this first attendance. Testing rates increased significantly between 2010-2019 (OR=67.79;95%CI=39-118, $p<0.0001$). 626/1401 (45%, 95% CI=42-47) were susceptible to hepatitis A (conferred by a negative IgG). Susceptibility rates did not change significantly during the study period (OR=0.98;95%CI=0.33-2.89, $p=0.98$). MSM aged 35 years and under had significantly higher susceptibility vs MSM over 35 years (OR 3.42;95%CI=2.71 to 4.31, $p<0.0001$). UK-born MSM had significantly higher susceptibility vs non-UK born MSM (OR=1.5,95%CI=1.21-1.86, $p=0.0002$). There was no difference in the presence of a sexually transmitted infection (chlamydia, gonorrhoea, syphilis, HIV) at their first attendance between susceptible and immune MSM (OR=1.2,95%CI=0.95-1.62, $p=0.1099$)

Susceptibility of Hepatitis A in MSM is much lower than necessary to control future outbreaks. It is important that effective targeting of MSM, particularly young MSM occur at all levels of healthcare, rather than waiting until opportunistic presentation at a sexual health clinic.

VAGINAL MICROBIOTA CHARACTERISTICS AND GENITAL INFECTIONS AMONG PREGNANT WOMEN IN PEMBA ISLAND, TANZANIA

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BACKGROUND: Genital infections burden and frequency of detrimental, non-Lactobacillus dominated vaginal microbiota (VMB) are high in sub-Saharan Africa. In countries such as Tanzania these challenges overlap with, and possibly contribute to, maternal complications.

OBJECTIVES: This study reported on prevalence of common, and often curable, Chlamydia trachomatis (CT), Neisseria gonorrhea (NG), Trichomonas vaginalis (TV), Mycoplasma genitalium (MG), human papillomavirus (HPV) infections, and on VMB composition among pregnant and post-delivery women in Pemba Island, Tanzania.

METHODS: Vaginal swabs were collected at two timepoints during pregnancy and once after delivery by Pemba Biobank. Molecular assays were used to detect HPV, CT, NG, TV, and MG in samples from 438 individual women. IS-pro kit was used to characterize the VMB in a subset of women (n=90) based on 16S-23S rDNA interspacer region length. VMB were defined based on dominant species. Shannon diversity index, for number (richness) and relative abundance of species, was calculated and Mann-Whitney test used for analysis.

RESULTS: In samples from 20.5% of the women, at least one pathogen was detected. Infection with HPV was the most prevalent (10.3%), followed by TV (7.1%), CT (4.6%), MG (2.1%), and NG (0%). The most common VMB were Lactobacillus-dominant during pregnancy (77% at first, and 81% at second timepoint), and non-Lactobacillus-dominant (73.9%) postdelivery. The Shannon diversity was lower during pregnancy than postdelivery (p=0.03). A decrease in VMB richness (p=0.02) was observed during pregnancy. Klebsiella species and Streptococcus anginosus were the most common microorganisms with pathogenic potential (pathobionts) at all timepoints. A high abundance of pathobionts was seen in women with non-Lactobacillus-dominant VMB. At second timepoint during pregnancy, 67% of the women carrying a genital pathogen had Lactobacillus iners-dominant VMB.

CONCLUSION: This study contributes knowledge on VMB composition and its changes during pregnancy and post-delivery, as well as simultaneous presence of pathobionts and genital pathogens.

The sensitivity and clinical features of Pharyngeal gonorrhoea cultures in men who have sex with men

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Background: Gonorrhoea remains a global health threat, due to increasing infection rates and antimicrobial resistance (AMR). Pharyngeal gonorrhoea in MSM drives ongoing transmission and AMR: taking pharyngeal gonorrhoea culture samples before antibiotic treatment is essential for monitoring AMR and is recommended by international guidelines. We aimed to review how frequently pharyngeal culture samples (modified Thayer Martin©) are taken in MSM with a positive gonorrhoea NAAT (BD Probetec©), the sensitivity of gonorrhoea culture compared to NAAT and any associated demographic and clinical features associated with positive gonorrhoea cultures.

Methods: We reviewed the electronic case notes of MSM presenting between January-December 2019 with a positive pharyngeal gonorrhoea NAAT. We collected data on demographics, gonorrhoea culture sampling and positivity, the presence of throat symptoms and simultaneous pharyngeal chlamydia and urethral and rectal gonorrhoea. We excluded repeat testers within 3 months of treatment including test of cure samples from the analysis.

Results: A total of 6613 MSM attended for pharyngeal testing and 383/6613 (5.8%) had a confirmed positive pharyngeal gonorrhoea NAAT. Pharyngeal gonorrhoea culture samples were taken in 270/383 (70%) and 73/270 (27%) were culture positive with available antimicrobial sensitivities. Only 7/73 (10%) had a fully sensitive organism. 28 (7%, 95% CI=5.11-10.36) reported throat symptoms at presentation. Overall, the presence of pharyngeal symptoms was not associated with positive gonorrhoea cultures (OR=1.9, CI=0.78-4.62, p=0.2), pharyngeal chlamydia (OR=1.6, CI=0.19-13.32, p=0.7), HIV status (OR=1.1, CI=0.47-2.57, p=0.8), or age [p=0.3].

Conclusions: Pharyngeal gonorrhoea is usually asymptomatic and culture sensitivity is poor. Increasing effort is required to increase pharyngeal gonorrhoea culture testing and sensitivity, including ensuring clinical staff are using optimal sampling techniques and reliable transport of gonorrhoea culture samples to testing laboratories to maintain gonorrhoea AMR surveillance.

Primary syphilis presentation characteristics and serological response, is there still more to learn?

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Background: Rates of infectious syphilis has significantly increased in men who have sex with men (MSM). Recent data has shown that primary syphilis does not always present with painless genital lesions. Our aim was to describe the clinical characteristics, serological response and management of primary syphilis in HIV-positive and negative MSM.

Methods: We reviewed the microbiological and demographic data of MSM presenting with primary syphilis between January 2016 – March 2020 in our clinic-based population in Brighton, UK.

Results: There were 111 cases of primary syphilis in MSM, the median age was 46 years (IQR=37–53 years) and 40 (36%) were living with HIV. 56/111 (50%) of MSM presented with painful lesions and 14% with extra-genital lesions. Extra-genital lesions were significantly more likely to be painful than genital lesions (OR 4.72; 95% CI 1.25–17.83, $p=0.02$). Overall, serology had a sensitivity of 80% (57/71) compared with *Treponema pallidum* PCR. Serology was more sensitive in MSM with no previous syphilis (OR= 3.38, 95%CI 1.002– 11.43, $p< 0.05$). There were no differences in the characteristics, serological response or management between HIV positive and negative MSM.

Conclusion: Fifty percent of MSM with primary syphilis presented with painful lesions; extra-genital lesions are more likely to be painful than genital lesions and serology is sensitive in 80% of MSM, and there were no differences between HIV positive and negative MSM. Understanding the characteristics of primary syphilis will underpin public health campaigns.

The sensitivity and associated features of culture positive rectal gonorrhoea in men who have sex with men.

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Background: Rectal *Neisseria gonorrhoea* is an important sexually transmitted infection in men who have sex with men (MSM). The past decade has seen and increasing rates of rectal gonorrhoea and antimicrobial resistant (AMR) gonorrhoea associated with recreational drug use, geo-spatial mobile phone dating apps and HIV risk reduction strategies including undetectable = untransmissible (U=U) and HIV pre-exposure prophylaxis (PrEP). Our aims were to review the microbiological findings and clinical characteristics of MSM with rectal gonorrhoea.

Methods: A cross sectional study between January 2018-December 2019 to characterise the clinical and laboratory features of MSM with rectal gonorrhoea from our large clinic population of MSM attending the sexual health clinic in Brighton, UK.

Results: There were 12,186 MSM attendances during the study period, of which 379/12186 (3.1%, CI=2.8–3.4) had a positive rectal gonorrhoea NAAT. The median age was 34 (IQR= 27-34), 103/379 (27%) were HIV positive and 72/379 (19%) also had rectal Chlamydia. HIV positive MSM with rectal gonorrhoea were significantly older than HIV negative MSM ($p=0.0001$). 73/379 (19%, 95%CI= 15.6 to 23.5) presented with ano-rectal symptoms. Gonorrhoea culture was performed in 291/379 (77%) overall and was positive in 190/291(65%); MSM with symptomatic gonorrhoea were more likely to be culture positive than asymptomatic MSM (OR= 8.04, CI 3.34-19.35, $p>0.0001$). There were no differences in age or HIV status between MSM with symptomatic versus asymptomatic mono or dual (Chlamydia) infections.

Conclusion: Most MSM with rectal gonorrhoea are asymptomatic and asymptomatic MSM are significantly less likely to have gonorrhoea cultures taken and have a positive culture than symptomatic MSM. Measures are needed to ensure that all MSM (including asymptomatic) with rectal gonorrhoea have cultures taken prior to treatment to maintain adequate surveillance of AMR to prevent the urgent threat of multidrug resistance to gonorrhoea in MSM.

Estimating the prevalence of zoliflodacin resistance mutations among a global database of *Neisseria gonorrhoeae* whole genome sequences

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Background: Zoliflodacin is a novel antibiotic currently being evaluated in the treatment of uncomplicated *N. gonorrhoeae* infections. Three amino acid alterations have been associated with resistance to zoliflodacin, all located in the *gyrB* gene: D429N, K450N, and K450T. To determine the prevalence of those mutations within *N. gonorrhoeae* whole genome sequences, we searched PathogenWatch, an online global database for genomic surveillance.

Methods: We downloaded all available *N. gonorrhoeae* genomes from PathogenWatch (<https://pathogen.watch/>) on November 17th, 2020. The *gyrB* and *gyrA* gene sequences were obtained from the EzBioCloud database. We used the *N. gonorrhoeae* FA 1090 genome as our reference, and the wildtype *gyrA* sequence was included in our search as a control. BLAST (2.2.26+) was used to query each of the two genes to the reference genomes with a 60% identity/length threshold value. Biopython BLAST IO package was used to parse the result, and subsequent DNA translation to protein was conducted. The counts of the mutations of interest were measured using in-house python code, which generates the counts of different amino acids with given position value. Some fragmented genes were manually validated after the protein alignment using MUSCLE (3.8.31).

Results: In total, 12,943 *N. gonorrhoeae* genomes were searched. No sequences contained the D429N, K450N, or K450T mutations in *gyrB*. One sequence was identified with a D429V mutation, a mutation previously unreported but similar to D429N. In total, 5395 sequences harbored the *gyrA* S91F mutation, while 5392 (99.9%) of those sequences were correctly identified by PathogenWatch. The three *gyrA* sequences with discrepancies were confirmed manually.

Conclusion: Of the 12,943 publicly available *N. gonorrhoeae* genomes on the PathogenWatch database, none were found to harbor mutations in *gyrB* known to be associated with zoliflodacin resistance. When zoliflodacin becomes clinically available, resistance due to known mutations in *gyrB* is likely to be rare.

HIV transmission and previous PrEP awareness and use in men who have sex with men (MSM)

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Background: HIV Pre-Exposure Prophylaxis (PrEP) has been available to men who have sex with men (MSM) via clinical trials or self-funding (online) in the UK since 2017. Despite its effectiveness and availability, we are still observing HIV transmission in MSM. This study aimed to assess prior awareness, prior usage and reasons for non-uptake of PrEP in MSM newly diagnosed with HIV.

Methods: All MSM who were diagnosed with HIV at this sexual health clinic between January 2017 and September 2020 were identified and their clinical records examined for information on previous clinic attendances; PrEP discussion with a clinician and PrEP use prior to HIV diagnosis.

Results: 59 MSM were diagnosed with HIV during the study period, with a median age of 42[IQR=31.0-50.4]. 24 (41%) had attended the sexual health clinic between the time PrEP became available and HIV diagnosis. 24 (41%) had a concurrent bacterial STI at HIV diagnosis and 23 (39%) reported recreational drug use prior to HIV diagnosis, with 4 (7%) reporting intravenous drug use. 16 (27%) had prior awareness of PrEP. Of these, 1 MSM had used PrEP inconsistently due to concern about stigma and low self-perceived HIV risk, 5 were unable to access PrEP due to insufficient clinical trial spaces or barriers to self-funding, 2 cited no specific reason for non-uptake and 8 were found to be HIV positive at date of first PrEP discussion.

Conclusion: The majority of MSM diagnosed with HIV had poor prior PrEP awareness. Access to PrEP was poor despite evidence of risk taking behaviour such as bacterial STIs and drug use. Barriers to uptake included lack of places in clinical trials, difficulty self-funding, low perceived risk and stigma. PrEP is now freely accessible in the UK, but continued efforts are needed to increase awareness and accessibility to further reduce HIV transmission.

Prevalence of syphilis in people living with HIV/AIDS in the Americas: a systematic review and meta-analysis of prevalence studies

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Background: Syphilis remains a public health threat, particularly in People Living with HIV/AIDS (PLWHA), due to its potential complications. The prevalence of syphilis in PLWHA in the Americas is not well characterised. Therefore, the aim of this systematic review and meta-analysis was to estimate the prevalence of syphilis in this population and to investigate sources of variation in these prevalences (PROSPERO CRD42020189246).

Methods: PubMed, Embase, LILACS and Web of Science were searched for studies reporting the prevalence point of Likely Exposure to Treponema Pallidum (LETP) by treponemal tests or Likely Current Syphilis Infection (LCSI) by the combination of treponemal and non-treponemal tests, in a broadly representative sample of PLWHA in the Americas. Published studies with less than 200 PLWHA, languages other than Spanish or English, and conference abstracts were excluded. A standardised data extraction form was used. A random-effects meta-analysis was performed to obtain the pooled prevalence of LETP and LCSI with their corresponding 95% prediction intervals (95%PI). Heterogeneity was investigated by a priori defined subpopulations diagnostic algorithm and geographical region. Heterogeneity was assessed via the Cochran's Q test and I² statistic, while Egger's test was used to assess for publication bias.

Results: 25,848 records were identified, of which 49 unique studies with 67 prevalence points were included. The pooled prevalence in the Americas was 16.4% (95%PI 2.3-49.3) for LEPT, and 7.2% (95%PI 0.01-25.15) for LCSI, with high heterogeneity (I² >75%, p-value <0.001). The prevalence of LETP was higher in men who have sex with men (MSM), while the prevalence of LCSI was higher in Latin America. There was no evidence of publication bias (Egger p-value>0.5).

Conclusions: The prevalences of LETP and LCSI are high in the Americas. Public health strategies should aim to create surveillance systems of syphilis in PLWHA and assure annual screening and timely treatment.

Minority HIV/AIDS Research Initiative: Advancing HIV Prevention and Treatment Through Data-Informed Research, Community-Informed Practices and Innovative Intervention Strategies

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Black/African American (Black thereafter) and Hispanic/Latino (Latinx thereafter) communities bear disproportionate burden of HIV infections in the U.S. These communities also tend to be disproportionately affected by social and structural determinants of health that hamper access to and engagement in HIV prevention and care services. Public health research efforts must advance HIV prevention and care through biomedical and structural interventions tailored to the needs of and culturally acceptable for the affected communities.

The CDC Minority HIV Research Initiative (MARI) was established in 2003 to build capacity for HIV epidemiologic and prevention research in mostly Black and Latinx communities and among historically underrepresented early-career scientists working in highly affected communities. The MARI program supports the goal of promoting health equity and reducing HIV-related health disparities.

From 2007-2020, 11 MARI investigators have developed HIV prevention interventions in highly affected communities. The interventions developed by seven MARI investigators will be discussed. Best practices about the recruitment and engagement of communities of color using evidence-based online recruitment campaigns, establishing community and scientific advisory boards, engaging community members in all stages of HIV research, and integration of mobile technologies to sustain HIV prevention and care interventions during the COVID-19 pandemic will be illustrated. We will also highlight the accomplishments of MARI investigators building successful partnerships with local health departments and community-based organizations to promote disseminations of findings and sustainability of interventions tailored to their communities. Lastly, we describe why initiatives like MARI that support the development of innovative and effective interventions to reduce HIV disparities in communities of color are essential to ending the HIV epidemic in the U.S.

Ensuring the communities' engagement in HIV policy changes and intervention development are crucial to intervention uptake and sustainability. As such, MARI research initiative is filling gaps in how we address HIV in racial/ethnic and sexual minority communities.

Implementing a rapid sexual health testing, diagnosis and treatment service: qualitative evaluation

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Background: Unity Sexual Health in Bristol UK, re-designed its service to improve access and delivery of care. This includes a Panther (Hologic Inc) system at the point of care to provide rapid STI tests, allowing Nucleic acid amplification testing results for STIs including gonorrhoea and chlamydia to be available within four hours. Previously patients waited over a week for results.

Methods: A qualitative evaluation running alongside the implementation of the new service, to understand experiences, and inform its iterative development. A total of 21 members of staff and 26 patients were interviewed, and 40 hours of observations conducted of the service in operation, were analysed thematically.

Results: The new service implementation required co-ordinated changes in practice across multiple staff teams. Patients also needed to make changes to how they accessed the service. Multiple small 'pilots' of process changes were necessary to find workable options. This responsive model created challenges for delivering comprehensive training/communication in advance to all staff. However, staff worked together to adjust and improve the new service, and morale was buoyed through observing positive impacts on patient care. Patients valued faster results and avoiding unnecessary treatment. They were willing to drop off samples and return for a follow-up appointment the same/next day, enabling infection-specific treatment in accordance with test results thus improving antimicrobial stewardship.

Conclusions: Implementation of service changes to improve access and delivery of care in the context of stretched resources can pose challenges for staff at all levels. Early evaluation of pilots of process change, provide opportunities for prompt feedback enabling adjustment, is valued. Visibility to staff of positive impacts on patient care is important in maintaining morale. The service was acceptable to patients.

Barriers and Facilitators to Antiretroviral Therapy Initiation and Adherence in Indonesia: Health Care Provider's Perspectives

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Background. Indonesia has the fourth-largest number of new HIV diagnoses per year worldwide, is the only country in the Asia-Pacific region where HIV prevalence is increasing, and the WHO aims of 90-90-90 has not yet been reached. It is therefore important to investigate barriers and facilitators to antiretroviral (ARV) therapy initiation and adherence. This study set out to delineate these barriers and facilitators from the perspective of health care providers.

Methods. Between March and May 2020, 20 semi-structured interviews were conducted with health care providers in Indonesia. Thematic analyses were subsequently conducted to ascertain categories of barriers and facilitators to initiation and adherence.

Results. Main facilitators to ARV initiation and adherence were social support; good client-provider communication; less bureaucracy or easy access to ARV; and sufficient HIV and ARV knowledge among people with HIV. Additionally, the use of euphemistic terminology for ARV was a facilitator for adherence, but not for initiation; whereas having sufficient self-care motivation, a desire to live or having health goals, and HIV status acceptance were facilitators to initiation but not adherence.

Barriers to initiation and adherence included stigma; complicated bureaucracy; insufficient health care facilities, health care coverage or ARV supply; and distance to clinics. Side effects and experiencing regimens as tedious were additional barriers to adherence; and being in denial, being asymptomatic, fatalism, and the influence of anti-ARV social media were additional barriers to initiation.

Conclusion. Barriers and facilitators to initiation and adherence occur on various socio-ecological levels and should therefore be targeted on structural, interpersonal, and individual levels. Health care providers can play a key role in promoting facilitators and reducing barriers, but must be supported by national and organizational level efforts that increase access to HIV clinics and health care coverage, and decrease bureaucracy and community-level initiatives that correct myths and misinformation.

Prevalence and associated factors of being diagnosed with syphilis amongst MSM attending as sexual contacts of syphilis.

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Partner notification strategies have increased the number of MSM attending sexually transmitted infection (STI) clinics as sexual contacts of syphilis. Current guidelines suggest testing and consideration of presumptive antimicrobial treatment. Syphilis treatment with benzathine penicillin; requires clinic resources, is painful and is associated with complications: it is important we consider strategies to rationalise presumptive antimicrobial use in MSM and promote antimicrobial stewardship.

We aimed to determine if there are any factors associated with having syphilis among MSM attending as sexual contacts of syphilis. We examined the clinical records of MSM attending as sexual contacts of syphilis from January through December 2019.

Of the 6613 MSM who attended for STI testing, 142/6613 (2.1%) presented as sexual contacts of syphilis. The median age was 40 years (IQR = 31-51), 43/142 (30%) were HIV positive, 38/142 (27%) had been diagnosed and treated for syphilis in the past and 11/142 (8%) presented with symptoms (possible lesions of primary or secondary syphilis). Thirteen (9%, 95%CI=4.4-13.9) tested positive for syphilis on the day of presentation and all were treated presumptively. MSM who were symptomatic (genital ulcer or body rash), HIV sero-positive or had a history of previous syphilis were significantly more likely to test positive for syphilis (OR=51.88, 95%CI-3.01-893.14, p=0.007).

Factors associated with acquiring syphilis amongst MSM presenting as sexual contacts of syphilis were; being HIV sero-positive, having a previous history of syphilis, or presenting with symptoms (possible lesions of primary or secondary syphilis).

Enteric and sexually acquired pathogens in men who have sex with men with clinical proctitis

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Background: Rectal infections are common in men who have sex with men (MSM) and may increase HIV risk. This study aimed to identify enteric and sexually acquired rectal pathogens, other than chlamydia and gonorrhoea, associated with symptomatic proctitis in MSM.

Methods: Anorectal swab samples were obtained from MSM presenting with rectal symptoms and a clinical diagnosis of proctitis at the Melbourne Sexual Health Centre between January-2017 and March-2019. Samples that tested positive for *Neisseria gonorrhoeae* and *Chlamydia trachomatis* were excluded. As a comparison group, anorectal samples were also obtained from MSM not reporting symptoms of proctitis between November-2018 and February-2019. Samples from both groups were tested for 15 viral, bacterial and protozoal enteric pathogens including *Shigella* spp., *Treponema pallidum*, *Mycoplasma genitalium* and herpes simplex virus (HSV) using PCR.

Results: Anorectal samples from 499 men with symptomatic proctitis and 506 asymptomatic men were analysed. Age, HIV status and PrEP use did not differ between men with proctitis and asymptomatic men. Among men with proctitis, 38% were HIV negative and taking HIV PrEP and 16% were HIV-positive. *T. pallidum* was more common in men with proctitis compared to asymptomatic men (3.6% vs 0%, risk difference [RD]=3.6%, 95%CI:2.0-5.2%). Most men with anorectal *T. pallidum* presented with painful anal primary infections. *Shigella* spp. was more common in men with proctitis (2.8% vs 1.0%, RD=1.8%, 95%CI:0.1-3.5%). Most men with *Shigella* did not report diarrhoea. *M. genitalium* was more common in men with proctitis (9.4% vs 5.1%, RD=4.3%, 95%CI:1.1-7.5%). HSV-1 (12.6% vs 2.6%, RD=10.1%; 95%CI:6.8-13.3%) and HSV-2 (8.8% vs 1.6%, RD=7.2%; 95%CI:4.5-10.0%) were more common in men with proctitis.

Conclusion: Testing for *Shigella* and *T. pallidum* should be considered in MSM presenting with symptomatic proctitis. These data provide support for *M. genitalium* as a significant cause of proctitis.

Towards the spread of the new L2-L2b/D-Da hybrid variant in men who have sex with men in France?

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Background: Recent European studies reported lymphogranuloma venereum (LGV) cases caused by a recombinant *Chlamydia trachomatis* strain presenting L2-L2b/D-Da hybrid *ompA* sequence, which mostly affected high-risk group of men who have sex with men (MSM). Given the potential risk of dissemination of this hybrid variant, it seemed important to take stock of the situation in France.

Methods: All LGV-positive anorectal specimens collected in the French National Reference Centre for bacterial Sexually Transmitted Infections (STIs) in 2018 from HIV-positive MSM with anorectal symptoms were selected. All specimens were analysed by sequencing of the *ompA* gene. The obtained sequences were compared by alignment with currently available chlamydial L genovars-*ompA* gene sequences.

Results: A total of 184 LGV-positive anorectal specimens matched the selection criteria. The mean age of patients was 40.7 years [23-68]. The *ompA* gene was successfully sequenced for 146/184 specimens. Most specimens had *ompA* sequences identical to that of *C. trachomatis* L2 (41.7%, 61/146) and L2b strains (36.3%, 53/146). We also identified the co-circulation of several genovariants: six (4.1%) L2-L2b/D-Da hybrid variants, two (1.3%) L2 variants (one specimen with the A997G substitution and one with the G868A substitution) and 27 (18.4%) L2b *ompA* variants (L2bv1 n=12, L2bv2 n=3, L2bv3 n=1, L2bv6 n=5, L2bv8 n=1, new L2b variant C340G n=1). We also found one specimen with L1 *ompA* genotype.

Conclusion: The circulation of the recently described L2-L2b/D-Da hybrid variant is sparse (4.1%) in France whereas it represents 16.9% of LGV cases in Italy and 12.5%-16.5% of LGV cases in Portugal. Patient's clinical characteristics did not differ with regard to the different LGV variants. Further investigations are needed to better understand the transmission dynamics of this hybrid variant.

Assessment of *Neisseria gonorrhea* prevalence and resistance in the Eastern Mediterranean Region

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Background: *Neisseria gonorrhea* (NG) has been identified as a high-priority public health concern because of a widespread antimicrobial resistance. The objective is to discuss the findings and implications of this emergence in the Eastern Mediterranean Region (EMR).

Methods: A review of paper, reports and guidelines from the region about NG was conducted.

Results: In 2015, the estimated prevalence of NG in the EMR was 0.7% for women and 0.6% for men compared to global estimations of 0.9% and 0.7% respectively. Prevalence in 2016 was higher by 0.2% for both men and women. Concerning antimicrobial resistance, regional countries from the EMR reporting data on gonococcal isolates with resistance to azithromycin, ciprofloxacin and extended-spectrum cephalosporins (ESCs) were 2 in 2009; 0 in 2010 and only 1 from 2011 to 2014. The reported data show full susceptibility to ESCs and azithromycin and >90% resistance to ciprofloxacin. Another report mentioned 1 reporting country in 2015 and 2016 respectively with resistances of >90% for ciprofloxacin. Cefixime, Ceftriaxone and azithromycin resistance testing were negative. Empirical articles are very scarce. In Lebanon (n=53), resistance prevalence was 38.3% to ciprofloxacin and 40.4% to azithromycin. Two papers from Morocco (n=72 and n=135) reported ciprofloxacin resistance in 86.8% and 77.9% respectively in 2013 and 2018 without ceftriaxone resistance detected. A case report from Egypt was resistant to ceftriaxone and ciprofloxacin but not to azithromycin.

Discussion: It is consistently clear that the EMR has the lowest number of reporting countries compared with all other regions. A call for exploration of NG epidemiology and resistance is recommended through a regional action plan to control and minimize the impact of this public health issue. The promising diagnostic technologies in NG would be beneficial for both the general and the key populations in the absence of financial support to cover current tests.

Geographic variation in HIV testing among transgender and non-binary adults in the United States

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Background: Transgender and non-binary (TNB) populations are disproportionately impacted by HIV in the United States (US), and prior studies show that approximately half of TNB adults meet CDC recommendations for HIV testing at least annually. In addition, few local health departments or HIV surveillance systems report data for TNB identities. Thus, we aimed to estimate the county-level prevalence of HIV testing among TNB adults living in the US.

Methods: We applied a Bayesian hierarchical spatial small area estimation model to data from the 2015 US Transgender Survey, a nationwide internet-based survey of TNB adults, to estimate county-level prevalence of ever testing and testing for HIV in the last year overall and by gender, race/ethnicity, and age.

Results: Our analysis included 26,100 TNB participants with valid zip codes who resided in 1,688 counties (54% of all 3,141 counties that cover 92% of the US population). The median county-level proportion of TNB adults who ever tested for HIV was 45% (range 9-80%) and who tested for HIV in the last year was 17% (range 4-44%). Within most counties, testing was highest among transgender women, Black respondents, and people age ≥ 25 ; it was lowest among non-binary and young adults age < 25 . Patterns in HIV testing among White, Hispanic/Latinx, and Asian/Pacific Islander TNB people varied significantly across geographies. Notably, the proportion of TNB people who tested for HIV in the last year was very low—below 25%—in 28 of the 50 counties in the US where the majority of HIV diagnoses occur.

Conclusions: We observed significant variation across US counties in the proportion of TNB adults who have tested for HIV. Ever and recent HIV testing was below recommended levels in the majority of counties. HIV testing by gender and race/ethnicity also varied geographically, suggesting that HIV testing strategies may need to be tailored to local settings.

Sexual health among HIV-negative gay and bisexual men in Lebanon: a comparison between native and immigrant/refugee communities

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Background: Unlike native gay and bisexual male (GBM), immigrants/refugees GBM have an added vulnerability to poor sexual health due to their stigmatized sexual minority status. The objective of this cross-sectional study was to compare sexual health variables in a sample of native-born and immigrants/refugees GBM in Lebanon. This study also aimed to identify the correlates of sexually transmitted infections (STIs) knowledge.

Methods: This study was conducted in November 2019 following modified time-location sampling. Instruments included rapid tests for HIV and Hepatitis B and C and a behavioral questionnaire.

Results: Our results can be grouped into three main levels: education, stigma and risky behavior. Compared with native-born GBM, immigrants/refugees GBM were more likely to report non-university level of education, and lower STIs knowledge. Moreover, they showed more healthcare and employment respective stigma. Hence, more heterosexual marriage, more commercial sex work, more history of syphilis in the last 12 months and a higher mean number of male sex partners in the last 6 months were noted among these communities. Positive correlations were found between STIs knowledge and socioeconomic status; feeling sufficiently informed about STIs. Being immigrants/refugees and feeling sufficiently informed about STIs were strong indicators of STIs knowledge.

Conclusion: This study highlights the respective roles of education and immigrant/refugee status in STIs knowledge in Lebanon. Efforts to increase general educational opportunities for immigrants/refugees and specifically sexual education would be helpful inherently, and might also support higher STIs knowledge. Moreover, our participants most probably had to conform to cultural and religious norms and get married. This entails a degree of hiding their true identity and causing distress. Both hiding identity and experiencing stigma may push people of sexual minorities to cope in a wide range of ways and one possible strategy might be sexual risk-taking.

The emerging impact of the COVID-19 outbreak on sexual health in Lebanon

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Background: The coronavirus-2019 (COVID-19) has had compounding effects on the political and economic crisis with severe economic and health consequences. Throughout the lockdown, one of the largest sexually transmitted infections (STIs) and HIV clinics in Beirut with linkages to major civil organizations in direct contact with sexual health beneficiaries has remained open for emergencies. The main objective of this study was to measure COVID19 impact on sexual health services in this clinic in Beirut.

Methods: A review of electronically based STIs screenings and diagnoses for the period February-December 2020 was conducted.

Results: The clinic has noted a major reduction in STI testing rates. Only 116 screenings were recorded in the mentioned period which contrasts with the 334 screenings conducted during the same period of 2019 (65% drop in 2020). All the screenings were among men who have sex with men (MSM). On the other hand, PEP was prescribed 86 times in the period February-December 2020 compared to 67 times during the same period of time in 2019 (28% increase). All cases of PEP prescriptions were for MSM. A range of risky behaviors and a 12% prevalence of HIV have been documented in MSM in Lebanon.

Conclusion: The increase in PEP prescription for MSM indicates that sexual risk-taking has persisted despite potential fear of contracting COVID-19. Two factors could explain our results: (1) social psychological stressors (political and economic instability, huge explosion, COVID19) may threaten identity and wellbeing, leading MSM to resort to sexual risk behaviours; (2) data on epidemiology of STIs in COVID19 time are inconsistent due to the lack of stratification by incubation period, acute versus chronic type, duration of symptoms and sexual orientation. Future studies should ascertain the impact of COVID19 on both mental and sexual health especially in stigmatized communities such as MSM.

Predicting sexual risk and sexual health screening in a sample of university students in Lebanon: a cross-sectional study

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Background: There are very few studies from the Middle East on HIV knowledge, attitudes, and other sexual health issues among university students. This is particularly true for Lebanon. The present study focuses on factors that predict sexual risk behaviors and sexual health screening behaviors in a sample of university students in Lebanon.

Methods: A diverse sample of 250 undergraduate students at a university in Beirut, Lebanon participated in a survey study. They completed measures of religiosity, ethnic identification, identity threat, psychological distress, self-harm, contraceptives usage, HIV/STI screening, and sexual risk behaviors.

Results: Religion is negatively associated with a range of risky sexual behaviors. Psychological distress is associated with having sex under the influence of alcohol and drugs, engaging in a sexual activity later regretted, and feeling forced to engage in a sexual activity that they did not want to engage in. Sex under the influence of alcohol and drugs/substances, discussing methods of contraception, and willingly engaging in sexual activities later regretted had significant effects on the variance of having had condomless vaginal sex in the past month. Gender and sex under the influence of alcohol had significant effects on screening for STIs.

Conclusion: Religiosity appears to be protective against identity threat and psychological distress and negatively associated with a variety of sexual risk behaviors. Perceived stigma associated with female sexuality can limit STIs screening. Interventions that focus on managing different variables (drug and alcohol use in students, unwanted pregnancy, religion, stigma related to screening, and sexual health education) are recommended.

Motives and barriers for complying with 'sexual distancing' among MSM during the first COVID-19 pandemic lockdown, a qualitative study

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Backgrounds: On March 12 ,2020 the Dutch government imposed a lockdown and health measures to curb the COVID-19 pandemic. As part of social distancing, sexual distancing was one of these measures. Sexual distancing implied no sex with partners outside of one's household. We tried to elucidate motives and barriers for complying with sexual distancing among men who have sex with men (MSM) and the relation with social distancing.

Methods: In this exploratory qualitative study we interviewed STI clinic visiting MSM during the first COVID-19 lock down using a semi-qualitative questionnaire from March-May 2020. We interviewed both men who complied and did not comply with the sexual distancing measures. The interviews were transcribed using verbatim transcription and analyzed using MAXQDA.

Results: We included 18 non-compliers and 4 compliers. Motivations mentioned to comply with sexual distancing measures were: perceiving COVID-19 as a serious health threat, experiencing critically ill COVID-19 patients first hand, protecting someone dear from COVID-19, and being satisfied with social and/or sexual distancing measures. Barriers mentioned to comply with sexual distancing measures were: not being aware of the need for sexual distancing, being single, previously having had an active sex life, importance of the social aspect of sex, a strong urge for sex, having sex to reduce stress, being under the influence of alcohol or drugs, and not perceiving COVID-19 is a serious health threat.

Conclusion: Our findings suggest that the information on sexual distancing needs to be made more explicit, accessible, understandable, customized and relatable to the key populations. This will improve effective measures and health advises for the current COVID-19 pandemic and future droplet borne outbreaks.

General practitioners' (GPs') knowledge of and attitudes to prescribing pre-exposure prophylaxis for HIV (PrEP): A pilot study

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Background: In the UK PrEP is available only from sexual health services. The 2018 BHIVA/BASHH PrEP guidelines acknowledge the advantages of PrEP being delivered in sexual health services but raise concerns that this may restrict access for some people. Locally we have a large population of men who have sex with men (MSM) and provide PrEP to over 800, however many MSM and other people who would benefit from PrEP do not access sexual health services and may have more contact with primary care. We aimed to gain some insight into the knowledge and attitudes primary care have around PrEP to design an educational package.

Methods: An online survey was circulated to GPs and trainee GPs working in an acute hospital trust.

Results Of the 12 respondents; 11(92%) were aware of PrEP, 6(50%) reported having been asked about PrEP by patients, 5(42%) had previously prescribed PrEP (as part of training in attachment in a sexual health clinic): 7(58%) felt that some of their patients would benefit from PrEP, with the remaining 5(42%) being unsure. 3(25%) said they would prescribe PrEP for a patient at high risk of HIV in future, 4 (33%) said they would not prescribe PrEP and 5(42%) were unsure. Barriers to prescribing PrEP included unfamiliarity and uncertainty around which patients would benefit. 10(83%) respondents felt PrEP should only be prescribed in dedicated clinics or sexual health and 2(17%) suggested that PrEP should be available in primary care: 8(67%) felt training in prescribing and monitoring PrEP would be useful for primary care.

Conclusion: Our educational package on PrEP in primary care needs to focus on identification of patients at high risk of HIV and increase the general knowledge of PrEP in primary care to facilitate clinical pathways and signposting to sexual health services.

Performance of Three Commercial Molecular Diagnostic Assays for the Simultaneous Detection of *Mycoplasma genitalium* and Macrolide Resistance

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Background

The increasing frequency of macrolide resistance is an emerging issue in the treatment of *Mycoplasma genitalium* infection. Evaluation of new commercial kit detecting *M. genitalium* and macrolide resistance-associated mutations is needed.

Methods

We evaluated the performance and handling characteristics of the Allplex MG & AziR (Seegene), the Macrolide-R/MG ELITE MGB (ELITechGroup), and the ResistancePlus MG FleXible kits (SpeeDx-Cepheid) in comparison with an in-house real-time PCR and 23S rRNA gene sequencing used as reference. A total of 239 urogenital specimens (135 *M. genitalium*-positive and 104 *M. genitalium*-negative specimens) collected between April and December 2019 at the French National Reference Center for bacterial Sexually Transmitted Infections were assessed.

Results

The overall agreement for *M. genitalium* detection of the three commercial kits compared with the in-house real-time PCR was 94.6–97.6%, and there was no significant difference. A total of 97 specimens were found *M. genitalium*-positive with the three kits and were used to assess macrolide resistance detection. The clinical sensitivity for resistance detection was 74.5% (95% confidence interval 61.7–84.2%), 96.2% (87.2–99.0%), and 92.8% (82.7–97.1%) for the Allplex MG & AziR, Macrolide-R/MG ELITE MGB, and ResistancePlusMG FleXible kits, respectively. The sensitivity of the Macrolide-R/MG ELITE MGB kit was significantly higher than that of the Allplex MG & AziR kit. The clinical specificity for resistance detection of the three kits was 97.4–97.6%. The random-access possibility, the input sample volume, and DNA extract availability for detecting resistance to other antibiotics may also influence the selection of a commercial kit by diagnostic laboratories.

Conclusion

The three kits showed good performance for the detection of *M. genitalium* but the Allplex MG & AziR kit showed lower sensitivity for detecting macrolide resistance-associated mutations.

Identification and Functional Characterization of Antimicrobial Peptides from *Treponema pallidum*

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Background: Antimicrobial peptides (AMPs) are low molecular weight proteins involved in pathogen elimination. Bacteria, in particular Gram-positive commensals, have been shown to produce AMPs to inhibit and kill competing microbes. The observations that *Treponema pallidum* can survive and establish infection within polymicrobial sites that are abundant in commensals and/or pathogens, and ~ 6-9% of the *T. pallidum* proteome is predicted to be composed of “miniproteins” (≤150 amino acids in size) of unknown function provided a rationale for investigating whether these small *T. pallidum* proteins function as AMPs.

Methods: A bioinformatics pipeline comprised of six AMP prediction servers was developed for identifying potential treponemal AMPs and their critical core regions (AMPCCRs) in *T. pallidum* miniproteins of unknown function. Selected AMPCCR candidates were chemically synthesized and assessed for antimicrobial activity against a panel of biologically and clinically relevant bacterial species using broth microdilution and a modified agar dilution method.

Results: Four potential AMPCCRs (Tp0451a_N, Tp0451a_C, Tp0749_N and Tp0749_C) exhibited bacteriostatic and bactericidal activity (MIC and MBC ranges of 1.0 – 256 µg/ml) against *Escherichia coli* (Tp0749_C), *Pseudomonas aeruginosa* (Tp0749_C), *Streptococcus pyogenes* (Tp0451a_C), *Mycobacterium* species (Tp0451a_N, Tp0451a_C, Tp0749_N, Tp0749_C), and *Neisseria gonorrhoeae* (Tp0451a_C).

Conclusion: Our findings are consistent with the novel concept that AMP production is an important, previously undiscovered mechanism that may contribute to survival of *T. pallidum* within the host. These investigations have established proof-of-concept for our AMP discovery bioinformatics pipeline via the experimental identification of the first AMPs from *T. pallidum*. This novel research approach has the potential to reveal an important survival mechanism that is more widespread in pathogenic bacteria than current data suggest.

“It’s behaviors; It’s not identity”: Attitudes Related to HIV Risk and Pre-Exposure Prophylaxis Among Transgender Women in the Southeastern US

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Background: Transgender women (TGW) are significantly impacted by HIV in the Southeastern U.S., where HIV prevalence is the highest in the nation. Uptake of HIV Pre-Exposure Prophylaxis (PrEP) is low among TGW nationwide. We aimed to explore barriers to PrEP awareness and uptake among TGW in the Southeastern U.S.

Methods: HIV-negative TGW ≥18 years old in Alabama participated in virtual focus groups (FGs) exploring barriers and beliefs related to HIV risk and PrEP among TGW in the Southeastern U.S. Participants were recruited via social media, community outreach, and financial incentives to participants for referrals. A trained qualitative researcher coded transcripts after each FG and iteratively amended the FG protocol as new themes emerged.

Results: Between July 2020 and December 2020, 17 TGW participated in 4 FGs. Mean participant age was 28.1±8.5 years. Black, non-Hispanic and white, non-Hispanic TGW represented 41% (n=7) and 47% (n=8) of participants, respectively. Fifteen participants had heard of PrEP but only one had ever taken PrEP.

Participants identified several barriers to PrEP use, including frustration regarding the conflation of transgender identity and HIV risk, lack of appropriate transgender representation in PrEP advertising, concerns for drug-drug interactions between PrEP and hormone replacement therapy, the perception that PrEP is primarily meant for cisgender men who have sex with men, and limited trans-affirming healthcare resources. Participants expressed that sexual risk behaviors, rather than transgender identity, should be central to healthcare providers’ discussion of PrEP with TGW.

Conclusion: Nuanced messaging from healthcare providers and media is necessary to properly educate and engage TGW in HIV prevention strategies such as PrEP. A one-size-fits-all approach is inappropriate given the diversity among TGW regarding sexual behaviors and HIV risk factors. Discussions between TGW and healthcare providers should focus on individual HIV risk and patient concerns when determining whether or not PrEP is appropriate.

Is there an optimal testing scenario for pharyngeal Chlamydia trachomatis in women?

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Background: Pharyngeal Chlamydia trachomatis (CT) in women might possibly contribute to autoinoculation to own genital or rectal site and transmission to sexual partners. Isolated pharyngeal CT (without concurrent anogenital CT) is most relevant as this is not coincidentally treated with concurrent anogenital infections. By comparing different testing scenarios, this study aims to inform testing policy and practice. **Methods:** Surveillance data in women from all Dutch STI clinics between 2008 and 2017 were used (n=541,945 consultations). The pharyngeal CT positivity rate was compared between routine universal testing (>85% tested pharyngeally per clinic-year) and selective testing (5-85%). Missed cases were calculated by extrapolating the proportion positive found by routine universal testing to all selectively tested women. Multivariable generalized estimating equations analyses were used to assess independent risk factors for pharyngeal CT.

Results: Routine universal oropharyngeal testing was performed in 9.5% (51,293/541,945) of all consultations in women. Pharyngeal CT positivity was lower using routine universal testing (2.4%, 95%CI 2.2-2.5, 1,081/45,774) compared to selective testing (2.9%, 95%CI 2.8-3.0, 3,473/121,262, P<0.001). Hypothetically, selective testing would have missed 64.4% (95%CI 63.5%-65.3%, 6363/9879) of the estimated total of pharyngeal CT cases. The proportion isolated pharyngeal CT was comparable between routinely universally tested women (22.9%) and selectively tested women (20.4%, P=0.07). When using risk factors independently associated with pharyngeal CT as testing indicators, 79.6% of women would be tested finding 80.6% infections.

Conclusion: No optimal testing scenario was found for pharyngeal CT, in which only a selection of high-risk women needs to be tested to find most pharyngeal CT cases. The relative low prevalence of isolated pharyngeal CT assessed in this large study and probably limited clinical and public health impact of pharyngeal CT in women do not provide support for routine universal testing.

An overview of pharyngeal Chlamydia trachomatis in men who have sex with men using Dutch STI-clinic data from a 10-year-period

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Background: The majority of Chlamydia trachomatis (CT) infections in men who have sex with men (MSM) are extra-genital. The pharynx is a common reservoir for CT in MSM and might enable ongoing transmission. This study provides an overview of pharyngeal CT in MSM by describing its prevalence, occurrence relative to other genital and rectal anatomic sites, and risk factors by using routine universal testing data.

Methods: Routine universal testing (defined as >85% tested pharyngeally per clinic-year) surveillance data from all Dutch STI clinics between 2008 and 2017 were used (n=185,253). Multivariable generalized estimating equations (GEE) analyses were used to assess independent risk factors for pharyngeal CT and isolated pharyngeal CT.

Results: Routine universal oropharyngeal testing was performed in 77.2% (185,253/240,007) of all MSM consultations. Pharyngeal CT was found in 1.2% (95%CI 1.1-1.2; 2,041/176,895) of routinely universally tested MSM. Pharyngeal CT comprised 11.1% (2,041/18,380) of all CT infections. The proportion isolated pharyngeal CT (without concurrent anogenital infection) was 43.9% (897/2,041); 42.7% were concurrent anorectal infections; 8.3% were concurrent with both anorectal and urogenital infections; and 5% were concurrent urogenital infections. Independent risk factors for isolated pharyngeal CT were young age (<43 years), a higher number of sex partners in the past six months (>4), being notified for any STI and having concurrent anorectal N. gonorrhoeae.

Discussion: Routine universal pharyngeal CT testing in MSM is widely implemented in Dutch STI clinics. The relative high proportion of isolated pharyngeal CT might argue for routine universal testing. However, the low prevalence of pharyngeal CT, probably limited public and clinical health impact and risks of overtreatment should be taken into account when determining the benefit-to-risk ratio of testing and treating all pharyngeal CT in MSM.

Intersectoral costs of sexually transmitted infections (STIs) and HIV: a systematic review of cost-of-illness studies

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Background: This review aims to explore the intersectoral costs (costs spilling over to other non-health sectors) associated with sexually transmitted infections (STIs) and HIV are considered in cost-of-illness (COI) studies, and to categorise and analyse these costs according to sector.

Methods: Medline (PubMed), EMBASE (Ovid), Web of Science, CINAHL, PsycINFO, EconLit and NHS EED were searched. Key search terms included terms for cost-of-illness, cost analysis and all terms for HIV/STIs including specific infections. Studies were included that assessed costs beyond healthcare costs. A standardised data extraction form was adopted. A disease-specific cost component table was established based on pre-defined sector-specific classification schemes. Cost results for intersectoral costs were recorded. The quality of studies was assessed using a modified version of the CHEC-list.

Results: 75 COI studies were considered for title/abstract screening. Only six studies were available in full-text, and eligible for data extraction and narrative synthesis, having considered intersectoral costs in their analyses. Intersectoral costs were captured in the following sectors: Patient & family, Informal care, Leisure & domestic work, and Paid Labour. Patient & family costs were addressed in four studies, including patient out-of-pocket payments/co-payments and travel costs. Two studies considered household cost in terms of care provided by family/friends. All six studies estimated productivity costs for paid labour, including costs in terms of absenteeism, short-term/partial/long-term disability, cease-to-work, presenteeism, and premature death.

Conclusion: The importance of intersectoral costs has not been sufficiently highlighted in COI studies in this area. There is a lack of exploration of the wider costs associated with STIs and HIV that needs to be addressed in order to ensure the true economic burden of STIs/HIV on society is assessed and communicated to policy/decision-makers.

Syphilis in Germany – a New All-Time High of Cases

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Background: Since 2001, laboratories are required to notify syphilis diagnoses anonymously in Germany, physicians complement clinical information. Between 2010 and 2017, the number of syphilis cases increased between 5% and 15%, while in 2018 we observed a 2% decline. We analysed syphilis surveillance data from 2019 and January to June 2020 to assess the current dynamics in order to initiate appropriate prevention measures.

Methods: Potential double notifications are identified. We analyzed syphilis cases by year of diagnosis, age, sex, area of residence, and transmission category.

Results: 7,889 cases were reported in 2019, corresponding to a 7% rise compared to 2018. Incidence was 9.5/100,000 inhabitants, with highest incidences in metropolitan cities as Cologne (57.8), Berlin (39.7), and Munich (30.2). From January to June 2020, incidence dropped by 3% compared to this period in 2019.

Men accounted for 94% of cases in 2019. 86% of cases with information on transmission route were men who have sex with men (MSM), 14% heterosexuals. Median age of MSM ranged between 39-41 years since 2009. HIV-coinfection was reported for 44% MSM. HIV-negative MSM were diagnosed less frequently with reinfection (27%) compared to HIV-positive MSM (66%), and more frequent during primary state of infection (34% vs 23%).

Conclusion: Data showed a high burden of disease in MSM in metropolitan cities across all age groups. Considering the high proportion of Syphilis reinfections, substantial risk behavior seems to fuel the syphilis epidemic in Germany in MSM, especially in HIV-positive. Targeted approaches to increase early screening and treatment, like internet counselling, home sampling, home testing, and venue-based (rapid) testing should be intensified. The slightly decreasing incidence in the first six months of 2020 may be caused by reduced sexual encounters due to the SARS-CoV-2 pandemic.

Heterogeneity among American Men who have sex with men and women: National Survey of Family Growth (NSFG) 2011-2019

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Background: Nearly 6% of American men report having had sex with another male since puberty. However, as men age, their sexual repertoires likely change. Recent sexual behaviors may be more important with respect to risk for bacterial STDs. We investigated recent sexual behaviors and STD/HIV testing among US men who report having had sex with both men and women in their lifetime (MSMW).

Methods: MSMW aged 15-44 years who participated in the National Survey of Family Growth during 2011-2019 were included. MSMW were further classified based on gender of recent (past 12 months) sex partners: (1) both men and women, (2) only men and (3) only women. Weighted percentages and corresponding 95% confidence intervals (CI) of behaviors were estimated.

Results: Among all MSMW (n=801), 23% (95% CI: 20-27) reported recent sex with both men and women, 21% (95% CI: 17-24) with only men and 56% (95% CI: 51-61) with only women. Among MSMW who recently had sex with both men and women, half (52%, 95% CI: 41-62) identified as bisexual and almost half (46%, 95% CI: 36-56) had 4+ sex partners in the past year, higher than MSMW who recently had sex with only men (29%, 95% CI: 20-38) or only women (6%, 95% CI: 4-9). Compared to MSMW who recently had sex with both men and women, MSMW who recently had sex with men only were more likely to have had a recent HIV test (57%, 95% CI: 49-68 versus 30%, 95% CI: 21-39) and a recent STD test (55%, 95% CI: 46-64 versus 45%, 95% CI: 35-55).

Conclusion: MSMW are a heterogeneous group with respect to recent sexual behaviors and may have different sexual health needs. The collection of sexual history at clinical visits is critical to ensuring culturally competent sexual health care for this population.

Evaluating intramuscular injection techniques to reduce injection associated pain in adults

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Background: Intramuscular injections (IMI) are used to deliver preventive and curative treatment in sexual health clinics, but can result in severe and prolonged pain for patients, cause significant anxiety, and limit future treatment options.

Methods: A survey to assess the importance of interventions to reduce injection pain amongst sexual health clinic attendees, and an integrative literature review exploring IMI delivery.

Results: Two hundred and three patients who were receiving an IMI participated in the survey. More than half (27/52[52%]) of patients receiving gluteal injections and a third (49/151[32%]) of those receiving deltoid injections reported that approaches to reduce IMI pain would be 'important' or 'very important'. A variety of IMI techniques with the potential to reduce injection pain were identified in the review. The Z track injection technique (stretching the overlying skin and subcutaneous tissues to one side just prior to injection) was widely recommended, but with limited supporting evidence, and adopted only to a small extent in clinical practice. More evidence was available supporting the use of manual pressure over the injection site or Helfer (rhythmic) tapping on the injection site before injection but this was mostly from small studies. Other factors including patient demographics, anthropometry, injectate volume, needle length, and muscle site affected perceived injection pain and risk of subsequent complications.

Conclusion: Intramuscular injection pain is of importance to sexual health patients. The use of localised pressure over the injection site prior to injection may reduce pain but high quality studies are required to confirm the optimal injection technique.

ASYMPTOMATIC TRICHOMONAS VAGINALIS INFECTION AMONG UNDERGRADUATE STUDENTS IN A SELECTED UNIVERSITY IN OGUN STATE, NIGERIA

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Background: Trichomoniasis is caused by the adhesion of *Trichomonas vaginalis* to mucosa of vagina or urethra. Its incidence rate is estimated to be higher than both gonorrhea and chlamydia combined. While largely asymptomatic, it's associated with preterm delivery, premature rupture of membrane, PID and increased predisposition to HIV infection. Targeted screening of high-risk populations is imperative to identify, treat partners, eliminate reservoir and prevent reinfection. This study was aimed to determine the prevalence and risk factors associated with *T. vaginalis* among asymptomatic undergraduate students at Babcock University, Ilishan-Remo, Ogun State, Nigeria.

Methodology: Descriptive cross-sectional study involving 123 female and 123 male students of Babcock University was done from February 2019 to April 2020. The institution's ethical committee approved the study. Information regarding demographics, behavioural and sexual characteristics was obtained from consenting participants using questionnaire. First-void urine samples were collected from each participant for the detection of *T. vaginalis* using the traditional wet preparation method and TV in-pouch. The data were analyzed by using IBM SPSS version 23.

Result: The prevalence of *T. vaginalis* among the participants was 12.2% (30/246) using TV in-pouch and 8.5% (21/246) using the traditional wet preparation method. This differential rate was statistically significant. The prevalence rate was slightly higher among females 53.3% (16/30) compared to males 46.7% (14/30). Excessive alcohol intake and low condom use lost their significance on multivariate analysis while there was no significant association with prior STI. Recent sexual intercourse (OR= 22.26, 95% CI: 4.73-104.65), use of hormonal contraceptives (OR= 0.07, 95% CI: 0.006-0.742) and internet-based sex seeking behaviour (OR=31.17, 95% CI: 2.59-375.19) had increased likelihood of *T. vaginalis* infection on multivariate analysis.

Conclusion: The occurrence of *T. vaginalis* among the asymptomatic population in this study is very high. Associated risk factors identified may be helpful for counseling, screening and management of patient.

Gonococcal pharyngeal susceptibility to ceftriaxone, cefixime and azithromycin among men and women in eGISP, 2018 – 2020

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Background: Most gonorrhea treatment failures on ceftriaxone-based regimens, the foundation of current treatment recommendations, have been associated with pharyngeal infections; however, antimicrobial susceptibility data for pharyngeal infections are limited. We present preliminary pharyngeal susceptibility data collected through a U.S. sentinel surveillance project.

Methods: The enhanced Gonococcal Isolate Surveillance Project (eGISP) collects gonococcal isolates from male and female genital and extragenital sites. Samples are collected for culture from symptomatic and/or exposed patients at participating STD clinics. Gonococcal isolates undergo antimicrobial susceptibility testing by agar dilution with results reported as minimum inhibitory concentrations (MIC). Since eGISP began, 13 clinical sites across the U.S. have participated in eGISP.

Results: During 2018–2020, 628 pharyngeal isolates were collected in eGISP among men who have sex with men (MSM) (n=370; 59%), men who have sex with women only (MSW) (n=142; 23%) and women (n=116; 18%). Two isolates displayed reduced susceptibility to ceftriaxone (MIC ≥ 0.125 $\mu\text{g/mL}$), an overall point prevalence of 0.3%; both isolates were among MSM. One isolate in an MSM displayed reduced susceptibility to cefixime (MIC ≥ 0.25 $\mu\text{g/mL}$), a prevalence of 0.2% overall. The prevalence of reduced susceptibility to azithromycin (MIC ≥ 2.0 $\mu\text{g/mL}$) was 8.0% overall (8.4% MSM, 8.5% MSW, 6.0% women). Similar patterns were seen among the 3898 urogenital isolates collected; overall prevalence of reduced susceptibility for ceftriaxone was 0.1% (0% MSM, 0.1% MSW, 0.4% women), for cefixime was 0.3% (0.4% MSM, 0.3% MSW, 0% women), and for azithromycin was 6.4% (8.8% MSM, 5.3% MSW, 3.4% women).

Conclusion: Based on sentinel surveillance in multiple U.S. cities, the prevalence of pharyngeal reduced susceptibility to cephalosporins appears low; however, prevalence of reduced susceptibility to azithromycin was high among MSM, MSW, and women. As many pharyngeal gonococcal infections are asymptomatic, monitoring susceptibility patterns at this anatomic site can support public health action to ensure effective treatment.

Evaluation of Chlamydia trachomatis positive specimens escaping detection in the Aptima Combo 2 assay in the United States

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Background: The Aptima Combo 2® (AC2, Hologic) assay detects Chlamydia trachomatis (CT) and Neisseria gonorrhoeae in clinical specimens. The assay target for CT is a region within the 23S ribosomal RNA (rRNA). Recent international reports highlighted a failure to detect CT variants with nucleotide substitutions in the AC2 target region. We explored the presence of CT 23S variants in the United States and whether a redesigned AC2 assay would successfully detect them.

Methods: A total of 50 specimens (tested using the AC2 assay between December 2019 – February 2020) with CT-negative or equivocal results (and having relative light unit (RLU) signal ≥ 15 -99) were selected for further analysis. Additional specimens (RLU < 15 [n=300], RLU > 100 [n=51]) were also examined. A custom real-time PCR was used to detect CT DNA in these samples and a portion of the CT 23S rRNA gene was amplified and sequenced. Samples were then tested using a redesigned AC2 assay provided by the manufacturer as research use only (RUO) reagent.

Results: All samples with AC2 results < 15 RLU were CT-negative by real-time PCR. A subset of five AC2 CT-positive samples with 100+ RLU were sequenced, which confirmed wild-type 23S rRNA sequences. CT DNA was detected in seven of the 50 specimens with ≥ 15 -99 RLU by PCR. Four of these specimens contained wild-type CT 23S rRNA sequences and two separately contained previously unreported 23S rRNA mutations (A1518G, G1526A). The redesigned AC2 assay detected 22 previously CT-negative or equivocal specimens, including six (four wild-type 23S rRNA, two variant 23S rRNA) of the seven identified by real-time PCR.

Conclusions: Our findings show the redesigned AC2 assay is able to detect 23S rRNA point mutation variants that were not detected by its predecessor. Neither of these variant strains were associated with recent reports of diagnostic escape mutants in Europe.

Quick online STI risk-assessment questions for asymptomatic young people: the computer said I should get tested.

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Background:

Both healthcare providers and clients identify barriers to sexually transmissible infections (STI) testing associated with time, embarrassment, anxiety or stigma. Online testing options are one mechanism to address some of these constraints and engage people who prefer technology facilitated processes.

Methods:

Queensland Health in Australia offers a free chlamydia and gonorrhoea urine test and uses four STI risk-assessment questions with yes/no answers to guide client decisions whether to continue to use the online service to order a Webtest. The STI risk-assessment generates high, medium and low-risk categories with messages recommending where or how to get tested. Data was extracted from the Webtest system on 3 August 2020 about the online activity since 3 August 2017 and tests ordered between 3 August 2017 and 30 June 2020.

Results:

For the high-risk category, the online message recommends testing at a clinic and many people who chose not to order a Webtest (56.0%, 2418/4320) were in this category. The majority of Webtest orders (57.2%, 3401/5943) were made from a medium-risk outcome where the online message recommends testing. Very few testing requests are received from people classified as low-risk (0.3%, 20/5943).

For people with valid STI results (n=3737), the risk-assessment was effective in identifying increased risk. Chlamydia positivity rates were 11.6% for high (166/1429, 95% CI 10.1–13.4), 4.4% for medium (101/2296, 95% CI 3.6–5.3), and no positive results received for those with low-risk outcome scores (0/12).

Conclusion:

While not intended as a stand-alone intervention, a personalised internet-based self-assessment tool enabling a quick STI risk-assessment may help people to seek testing. An online self-assessment can enhance privacy and confidentiality, empower clients, and is likely to appeal to more technology confident groups such as young people.

Oral and anal *Treponema pallidum* detection in men who have sex with men with early infectious syphilis: a cross-sectional study.

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Background

While syphilis transmission is increasing, precisely how *Treponema pallidum* is transmitted sexually is unclear. This study of MSM with early syphilis determined the frequency of *Treponema pallidum* shedding from potentially asymptomatic sites and the stage with the most frequent shedding.

Methods

MSM were recruited between 2015 and 2019, at Melbourne Sexual Health Centre, Australia. Men were eligible if they reported sex with men during the previous year, were aged ≥ 18 years and had laboratory-confirmed primary, secondary, or early latent syphilis. All syphilis lesions were swabbed. Non-lesion samples collected were oral rinse, oral cavity swab, anal canal swab, urine, and semen. Specimens were tested for *T. pallidum* using two PCR assays.

Results

200 men with serologically-confirmed early syphilis were included: 54 (27%) primary, 93 (46.5%) secondary and 53 (26.5%) early latent cases. *T. pallidum* DNA was detected orally in 48 (24%; 95% CI: 18.3-30.5%) men by oral rinse and/or oral lesion swab, 24 with no oral lesion. Oral *T. pallidum* detection was most frequent during secondary syphilis compared to other stages, (44%(41/93) versus 7% (7/107), $p < 0.0001$); and in men with RPR titres $\geq 1:64$ (32% (37/117) versus 13% (11/83), $p = 0.0026$). *T. pallidum* was detected by anal canal swab and/or anal lesion swab in 45/196 (23%; 95%CI: 17.3-29.5%) men, 10 with no anal lesion. 74% (69/93) of men with secondary syphilis had *T. pallidum* detected at any site: 26% (24/93) had detection at ≥ 2 separate sites. *T. pallidum* was detected in 6% (12/198) of urine and 12% (6/50) of semen samples.

Conclusion

Unrecognised oral and anal shedding of *T. pallidum* may be a factor in sustaining syphilis transmission. Secondary syphilis may be the most infectious stage, with oral transmission possibly being important. Earlier detection and treatment for syphilis to prevent progression to the secondary stage may improve syphilis control.

Timing of primary syphilis treatment and impact on the development of treponemal antibodies: A cross-sectional clinic-based study.

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Background

Serology is negative in a proportion of primary syphilis cases where *Treponema pallidum* polymerase chain reaction (PCR) testing is positive. We aimed to identify discordant, *T. pallidum* PCR-positive, serology negative primary syphilis cases and any clinical or laboratory factors associated with failure to subsequently seroconvert.

Methods

Serodiscordant primary syphilis cases that were *T. pallidum* PCR positive and serology negative (including rapid plasma reagin, *T. pallidum* particle agglutination, *T. pallidum* enzyme immunoassay or *T. pallidum* chemiluminescence assay) were identified from the Melbourne Sexual Health Centre electronic records between April 2011 and December 2019. Clinical and laboratory associations were examined.

Results

There were 814 primary syphilis cases in the study period and 38 (4.7%) were serodiscordant, 35 in men who have sex with men. Thirty-two had follow-up serology performed a median of 24 days later, of which 16 (50%) seroconverted, mostly (81%) within six weeks. Failure to seroconvert was significantly associated with treatment on day 1. Of the 12 cases treated on day 1, 10/12 (83%) failed to seroconvert compared to 6/20 (30%) among those who were treated after day 1.

Discussion

Earlier treatment of primary syphilis can prevent the development of serological markers. *T. pallidum* PCR can identify primary syphilis lesions before the development of serological markers and improve diagnosis of early primary syphilis lesions. Serology alone will miss a proportion of primary syphilis infections and should be repeated if a diagnosis of syphilis is being considered.

Clinical improvement after treatment for urethritis: the role of *Mycoplasma genitalium*

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Introduction:

Mycoplasma genitalium (MG) is associated with urethritis in men. Treatment of urethritis with azithromycin is expected to become less effective in clients infected with MG due to an increase in macrolide resistance-associated mutations (MRAM) in MG. Therefore, we examined clinical improvement of symptoms in men receiving empirical treatment for urethritis, and correlated the clinical outcome to *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), MG and MRAM status.

Methods:

At the STI clinic in Amsterdam, the Netherlands, empirical treatment for gonococcal urethritis is 1g ceftriaxone and for non-gonococcal urethritis (NGU) azithromycin 1g. From May 2018 through November 2019, we tested urine samples of all men with urethritis for CT, NG and MG using TMA assays. MG-positive samples were tested for MRAM using qPCR. Men were sent a text message two weeks after receiving empirical treatment, enquiring after the clinical improvement of urethritis.

Results:

We evaluated 2505 cases of urethritis. The positivity rate of NG, CT and MG was 26% (648/2489), 29% (726/2489) and 23% (522/2288) respectively. In 768/2288 (34%) of the cases no NG, CT or MG was detected. The majority of the cases (53%) were infected by one bacterial species, 18% only by NG, 486/2288 21% only by CT and 14% only by MG. Evaluation of presence of MG-MRAM could be assessed in 439/522 (84%) samples. The prevalence of MG-MRAM was 74% (327/439). In 642 (26%) cases men responded to the enquiry, of whom 515 (80%) indicated that their symptoms had improved or disappeared; 91% (159/174) in NG cases, 82% (160/195) in CT cases, 86% (24/28) in MG wild-type cases, and 60% (56/94) in MG-MRAM cases ($p < 0.001$).

Conclusions:

The efficacy of empirical treatment of NGU with macrolides is limited by the presence of MG-MRAM. Testing for MG-MRAM is advised in case of NGU.

The epidemiology of herpes simplex virus type 2 in sub-Saharan Africa: systematic review, meta-analyses, and meta-regressions

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Background: Herpes simplex virus type 2 (HSV-2) infection is a prevalent sexually transmitted infection with a sizable disease burden that is highest in sub-Saharan Africa. This study aimed to characterize HSV-2 epidemiology in this region.

Methods: Cochrane and PRISMA guidelines were followed to systematically review, synthesize, and report HSV-2 related findings. Meta-analyses and meta-regressions were conducted.

Results: From 218 relevant publications, 451 overall outcome measures and 869 stratified measures were extracted. Pooled incidence rates ranged between 2.4-19.4 per 100 person-years across populations. Pooled seroprevalence was lowest at 37.3% (95% confidence interval (CI): 34.9-39.7%) in general populations and high in female sex workers and HIV positive individuals at 62.5% (95% CI: 54.8-70.0%) and 71.3% (95% CI: 66.5-75.9%), respectively. In general populations, pooled seroprevalence increased steadily with age. Compared to women, men had a lower seroprevalence with an adjusted risk ratio (ARR) of 0.61 (95% CI: 0.56-0.67). Seroprevalence decreased in recent decades with an ARR of 0.98 (95% CI: 0.97-0.99) per year. Seroprevalence was highest in Eastern and Southern Africa. Pooled HSV-2 proportion in genital ulcer disease was 50.7% (95% CI: 44.7-56.8%) and in genital herpes it was 97.3% (95% CI: 84.4-100%).

Conclusions: Seroprevalence is declining by 2% per year, but a third of the population is infected. Age and geography play profound roles in HSV-2 epidemiology. Temporal declines and geographic distribution of HSV-2 seroprevalence mirror that of HIV prevalence, suggesting sexual risk behavior has been declining for three decades. HSV-2 is the etiological cause of half of GUD and nearly all genital herpes cases.

Epidemiology of herpes simplex virus type 2 in Latin America and the Caribbean: systematic review, meta-analyses, and meta-regressions

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Background: Herpes simplex virus type 2 (HSV-2) infection is a sexually transmitted infection of global concern. This study aims to characterize epidemiology of herpes simplex virus type 2 (HSV-2) in Latin America and the Caribbean.

Methods: HSV-2 reports were systematically reviewed and synthesized, and findings were reported following PRISMA guidelines. Meta-analyses and meta-regressions were conducted.

Results: 102 relevant reports were identified including 13 overall incidence measures, 163 overall (and 402 stratified) seroprevalence measures, and 7 and 10 proportions of virus detection in genital ulcer disease (GUD) and in genital herpes, respectively. Pooled mean seroprevalence was 20.6% (95% confidence interval (CI): 18.7-22.5%) in general populations, 33.3% (95% CI: 26.0-41.0%) in intermediate-risk populations, 74.8% (95% CI: 70.6-78.8%) in female sex workers, and 54.6% (95% CI: 47.4-61.7%) in male sex workers, men who have sex with men, and transgender people. In general populations, seroprevalence increased from 9.6% (95% CI: 7.1-12.4%) in those aged <20 years, to 17.9% (95% CI: 13.6-22.5%) in those 20-30, 27.6% (95% CI: 21.4-34.2%) in those 30-40, and 38.4% (95% CI: 32.8-44.2%) in those >40. Compared to women, men had lower seroprevalence with an adjusted relative risk (ARR) of 0.68 (95% CI: 0.60-0.76). Seroprevalence declined by 2% per year over the last three decades [ARR of 0.98 (95% CI: 0.97-0.99)]. Pooled mean proportions of HSV-2 detection in GUD and genital herpes were 41.4% (95% CI: 18.9-67.0%) and 91.1% (95% CI: 82.7-97.2%), respectively.

Conclusion: One in five adults is HSV-2 infected, a higher level than other world regions, but seroprevalence is declining. Despite this decline, HSV-2 persists as the etiological cause of nearly half of GUD cases and almost all of genital herpes cases.

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.

Racial-ethnic mixing patterns in the United States, 2006-2019

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Background: Racial-ethnic mixing patterns have been associated with STIs in the U.S.; recent national data are lacking.

Methods: We used data from the National Survey of Family Growth (NSFG), a national probability sample, from 2009-2019 (response rate: 63-77%). Analyses were limited to those 15-44 years who had a current, opposite-sex partner. Respondents reported the race-ethnicity of their most recent partner (not spouse or cohabiting partner) (n=20,640). We coded partner race-ethnicity as concordant-discordant with the respondent's race-ethnicity. We examined differences by race-ethnicity and sex and, within sex, by race-ethnicity, age, education, poverty, residence, and U.S. nativity (Wald F). Variables $p < 0.25$ in bivariate analyses were entered into separate logistic regression models by sex. Adjusted prevalence ratios (aPR) were calculated.

Results: Race-ethnicity concordance significantly differed ($p < 0.001$) among women and men among non-Hispanic (NH) whites (77.7% vs 84.4%, respectively) and NH blacks (92.1% vs. 70.3%). Significant bivariate analyses ($p < 0.25$) included race-ethnicity, education, poverty, and residence for women and race-ethnicity, education, residence and U.S. nativity for men. Among women, Hispanic (aPR=0.75; 95%CI:0.69-0.82), NH white (aPR=0.84; 95%CI:0.80-0.88) and NH other (aPR=0.32; 95%CI:0.25-0.42) were less likely than NH black to have a race-ethnicity concordant partner. Women who lived in major cities (aPR=0.90; 95%CI:0.84-0.97) or suburbs (aPR=0.92; 95%CI:0.86-0.99) were less likely than women who lived in rural areas to have a race-ethnicity concordant partner. Among men, residence findings were similar to women. NH other (aPR=0.42; 95%CI=0.35-0.49) were less likely, but NH white (aPR=1.20; 95%CI:1.14-1.25) were more likely, than NH black to have a race-ethnicity concordant partner. Finally, men who were not U.S. natives (aPR=0.84; 95%CI:0.81-0.87) were less likely to have a race-ethnicity concordant partner than U.S. natives.

Conclusion: Given STI disparities, high concordance means lower STI exposure for NH white women but higher exposure for NH black women. Continually monitoring concordance may be important for understanding STI prevalence.

Molecular investigation of *Treponema pallidum* strains associated with ocular syphilis in the United States

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Background: Ocular syphilis cases continue to be identified in the United States since two clusters were reported in late 2014 into early 2015. Ocular syphilis (OS) is an inflammatory eye condition that can occur at any stage of syphilis with vision loss and blindness reported in some patients. We performed genotyping and whole genome sequencing (WGS) on *Treponema pallidum* strains from OS cases as part of molecular surveillance activities.

Methods: A total of 79 specimens from 57 patients with suspected or confirmed OS were received from 14 states between February 2016 and November 2020. Specimens included CSF, whole blood, serum, plasma, vitreous fluid, and a throat swab. *T. pallidum* DNA was detected with a real-time PCR assay targeting the *polA* gene. Genotyping was done using the four-component typing scheme (tpr E, G, & J; arp, tp0548, and tp0279). *T. pallidum* genomic DNA was enriched by selective whole genome amplification (SWGA) using Multiple Displacement Amplification (MDA) with custom oligonucleotides followed by WGS on an Illumina MiSeq v2 500 cycle platform.

Results: Twenty-three patients (40.4%) were MSM and HIV positive, respectively; 41 (71.9%) identified as White race, 4 (7%) Hispanic, and 3 (5.3%) Black. Twenty-three specimens from 18 (31.6%) patients tested positive for *T. pallidum* DNA. Thirteen of 23 (56.5%) specimens were CSF, while the remaining 10 included whole blood, serum, vitreous fluid, and a throat swab. Specimens from 3 patients were fully typed, revealing strain types 14b9g, 14d10g, and 14e9f. Six patients had partial genotypes. WGS was successful on 1 CSF and 2 vitreous fluid specimens from 2 cases resulting in 87% - 98% genome coverage with at least 5 reads/site. Phylogenetic analysis showed that the 2 strains belonged to the Street 14 clade.

Conclusions: Our findings show that multiple strain types are responsible for ocular syphilis in the United States.

In vitro and in vivo efficacy of linezolid on *Treponema pallidum*, the syphilis agent

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Background: Penicillin G (PG), the current standard for syphilis treatment, has important drawbacks that hamper public health efforts to curtail the spread of this infection, particularly in low- and middle-income countries where syphilis is still endemic.

Methods: To identify viable alternatives to PG, we tested—both in vitro and in vivo—three marketed antibiotics with adequate pharmacokinetic and pharmacodynamic properties to treat syphilis.

Results: We found that linezolid, an oxazolidinone overcoming most of the current drawbacks of PG, showed in vitro bactericidal activity at concentrations of 0.5 µg/mL or higher. When administered orally to experimentally infected rabbits, it induced healing of early lesions at a similar time of PG and effectively treated the infection. The hazard ratio for healing was 3.84 (95% CI 2.05 – 7.17; $p < 0.0001$) compared to untreated controls.

Conclusions: Our findings warrant further research to assess the efficacy of linezolid as an alternative to PG to treat early syphilis in clinical settings.

Trends in Discussion of Pre-Exposure Prophylaxis for HIV on Reddit, 2014-2019

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Background: Data from social media forums offer a window into real-time discussions and emerging issues, often from individuals who might not otherwise be represented in research settings. Pre-exposure prophylaxis (PrEP) for HIV prevention among individuals without HIV has become a key preventive measure for ending the HIV epidemic. In the United States, gay, bisexual, and other men who have sex with men (GBMSM) constitute the majority of new HIV diagnoses. To provide insight on topics of most concern to GBMSM regarding PrEP, we examined user-generated posts on the Reddit subreddit r/askgaybros.

Methods: We collected Reddit posts from Pushshift.io's and Reddit's application program interfaces that contained "PrEP" and/or "Truvada" (case insensitive) posted between November 1, 2012 and December 31, 2019 on the r/askgaybros subreddit which produced the most mentions of Truvada. We developed a codebook based on themes identified in a subset of posts and thematically coded all posts based on the primary purpose expressed in post titles and body. All data are descriptive.

Results: We identified 1,163 PrEP-related posts in total. There was a 23.3 fold increase in posts per year from 2014 (first year of posts) to 2019. The proportion of posters self-identifying as not on PrEP (26.8%) and on PrEP (30.3%) were similar. Incidental mentions of PrEP (54.5%), access challenges (19.1%), information seeking (17.5%), and cultural effects (16.3%) were the most common themes. 19.2% of posts involved assessment of risk following a sexual encounter. The topics mentioned least frequently, each with <5.5% of posts, focused on active promotion of PrEP use, stigma, and usage questions.

Discussion: Reddit is a useful way of documenting user-initiated interest in discussion of PrEP. The frequent incidental mention of PrEP reflects the normalization and perceived importance of PrEP. Reddit may be less useful for gaining insight into issues like usage and side effects.

Evaluation of three automated nontreponemal Rapid Plasma Reagin (RPR) tests for the diagnosis of syphilis

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Background: Automated nontreponemal rapid plasma reagin (RPR) tests were recently introduced in the United States and limited performance data is available.

Methods: In collaboration with the Association of Public Health Laboratories, three public health laboratories (PHL) were selected through competitive bidding to evaluate the performance of three FDA-cleared automated RPR tests: AIX-1000 (Gold Standard Diagnostics); ASI Evolution (Arlington Scientific); and BioPlex 2200 Syphilis Total & RPR assay (Bio-Rad Laboratories) for syphilis testing. CDC prepared three panels that included: a qualitative panel comprised of 455 syphilis reactive/nonreactive specimens; a quantitative panel comprised of 50 syphilis reactive (titer 1:64 to 1:1024) specimens; and a reproducibility panel comprised of 15 nonreactive and reactive (titer 1:1 to 1:64) specimens. Specimens were tested following manufacturers' instructions. For the reproducibility panel, each specimen was tested 10 times. Prior test results were blinded throughout testing to all sites. Results from the automated RPR tests were compared to CDC data obtained by manual RPR (Arlington Scientific) and T. pallidum particle agglutination assays (TPPA, Fujirebio) for analysis.

Results: Testing of the qualitative panel demonstrated sensitivity and specificity of 97.5% and 99.5% for AIX1000, 91.1% and 98.5% for ASI Evolution, and 90.1% and 99.0% for Bioplex, respectively, when compared to the manual RPR and confirmed by TPPA. Testing of the quantitative panel showed within range results (± 2 -fold to manual RPR titer) for 94%, 48%, 68% of specimens by AIX-1000, ASI Evolution and BioPlex, respectively. For the three automated RPR tests, reproducibility testing demonstrated 30-100% agreement, with Bioplex showing slightly elevated titer when compared to manual RPR.

Conclusion: The introduction of automated RPR assays for syphilis could help expediting syphilis testing, reducing workload and interpretation related errors. However, further testing is needed to establish reproducibility and full titer range validation relative to manual RPR.

Viral load monitoring for people living with HIV in the era of Test and Treat – an updated systematic review

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Background

Treatment of HIV with antiretroviral therapy (ART) can save lives and stop the spread of the virus. In 2014, UNAIDS launched the 90-90-90 treatment target. By 2020, it remains unattainable in many low and middle-income countries (LMICs). This review aimed to identify research gaps and needs for interventions to improve viral load monitoring and viral suppression for people living with HIV (PLHIV) in LMICs.

Methods

Medline and PubMed were searched to identify relevant literature, published in English between Dec 2015 and May 2020, using key search terms of a review published in 2016. The primary outcome was initial viral load (VL) monitoring (the proportion of PLHIV on ART and eligible for VL monitoring who receive a VL test). Secondary outcomes include follow-up VL monitoring (the proportion of PLHIV who receive a follow-up VL after an initial elevated VL test), confirmation of treatment failure (the proportion of PLHIV who had two consecutive elevated VL test results) and switching treatment regimen rates (the proportion of PLHIV switching treatment regimen after confirmation of treatment failure).

Results

The search identified 1829 non-duplicate records, of which 23 were included in the review. More than 80% (19/23) of included studies were conducted in 11 sub-Saharan African countries (SSA) and most were published in 2019–2020. Marked variations in initial VL monitoring coverage were reported across study settings (11–93%) and study populations (adults (25–93%), children and adolescents (2–94%), and pregnant women (32–67%)). Suboptimal uptake of follow-up VL monitoring and low regimen switching rates after confirmed treatment failure were observed.

Conclusions

Substantial gaps in VL coverage across study settings and study populations remained evident with limited data availability outside of SSA. Further research is needed to fill the data gaps. Interventions to address the “failure cascade” in PLHIV on ART who fail to achieve viral suppression are required.

Syphilis Reinfection among Women:
Florida and Louisiana, USA 2000-2018

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Background: Syphilis rates have continued to rise in the United States. Florida and Louisiana consistently report high numbers of cases. In a previous study, reinfections accounted for 30.4% of new infections among men in 2018. In this analysis, we evaluated rates of reported reinfections in women.

Methods: We evaluated all syphilis records, all stages (primary, secondary, early latent, and late latent) in females aged 15-70 years from the Florida and Louisiana Departments of Health surveillance databases during 2000-2018. Demographics of cases and repeaters (individuals reported with 2 or more cases of syphilis) were examined. Percentages of syphilis cases from repeaters by year were calculated as were percentages from HIV+ females.

Results: From 2000-2018, 124,827 syphilis cases were reported from 107,405 individuals: 33,594(31%) were female accounting for 35,279(28%) of all cases. Of 33,594 females, 32,050(95%) reported a single episode of syphilis and 1,544(5%) were repeaters. Most women with a single case report were African American 18,429(57.5%) and 1,510(4.7%) of single cases were HIV+. Women with a single episode of syphilis were likely in the age range of 20-39 (primary child-bearing years) 20,037(63%). Repeaters were primarily African American 914(59.2%) and 218(14.1%) were HIV+. Women reported with two or more episodes of syphilis also were likely to be of child-bearing age 20-39: 1,065(69%). Repeaters had 1,685 cases reported; range 2 to 5. Mean time to second infection was 3.5 years (median=2.3 years). From 2010-2018, repeaters accounted for a slowly increasing percentage of all syphilis reported: 2010 (5.1%), 2013 (5.9%), 2016 (6.8%), and reached (10.3%) in 2018. Within females living with HIV, cases from repeaters also increased: 2010 (13%), 2014 (16%), 2016 (21%), and 2018 (25%).

Conclusion: Most syphilis diagnosed in Florida and Louisiana was among persons infected for the first time and among men. However, syphilis infection and reinfections are increasing in women.

The role of exogenous sex steroids on the vaginal microbiota: a systematic review

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Background: There is considerable interest globally in understanding the influence of exogenous sex steroids/hormones on the vaginal microbiota (VM). We conducted a systematic review summarising the influence of hormonal contraception (HC) and hormone replacement therapy (HRT) on the VM among reproductive-aged women and peri/post-menopausal women, respectively. PROSPERO registration: CRD42018107730.

Methods: To be eligible for inclusion, studies had to report on sex steroid use (HC or HRT) and provide a measurement of the VM by molecular methods. Two authors systematically identified and extracted data from eligible studies. Data regarding the 'positive', 'negative' or 'neutral' effect of exogenous sex steroid use on the VM was summarised. A positive effect was defined as an increased abundance of lactobacilli, decreased abundance of bacteria associated with a non-optimal VM, decreased bacterial diversity and/or increased bacterial stability, relative to participants' pre-treatment specimen or compared to a non-exposed control population. A negative effect was defined as parameters in the opposite direction, and a neutral effect was defined as no specific effect identified.

Results: Of the 2647 unique studies screened for inclusion, 266 full-texts were assessed for eligibility and 33 studies were included in qualitative data analysis. Among 28 studies of reproductive-aged women using HCs, 15/28 reported on >1 HC type. Oestrogen-containing contraceptives, mostly reflecting the combined-oral contraceptive pill, had a positive effect on the VM in 11/15 studies. The effect of progesterone-only contraceptives were less clear; of 21 studies, 8 showed a positive effect, 8 a negative effect and 5 a neutral effect. In particular, the effect of Depo-Provera was negative in 7, positive in 4, and neutral in 2 studies. All 5 studies investigating HRT-use demonstrated a positive influence of HRT-use on the VM.

Conclusion: Exogenous sex steroids, particularly containing oestrogen, may play a role in supporting an optimal VM in both reproductive-aged and peri/post-menopausal women.

Significant difference in macrolide and fluoroquinolone resistance in *Mycoplasma genitalium* in metropolitan and overseas France in 2018 and 2019

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Background

Limited macrolide and fluoroquinolone resistance data are available in France for *Mycoplasma genitalium*. The aim of this study was to investigate the prevalence of macrolide and fluoroquinolone resistance in *M. genitalium*-positive men and women seeking care in metropolitan and overseas France in 2018 and 2019.

Methods

A one-month systematic prospective collection of *M. genitalium*-positive specimens was proposed between September 15th and October 15th 2018 and 2019 to metropolitan French diagnostic laboratories. A similar three-month collection between August 1st and October 31st 2018 and 2019 was proposed to overseas French microbiology diagnostic laboratories (La Réunion, Mayotte, French Guiana, French Polynesia, and New Caledonia). Macrolide resistance-associated mutations were detected using the ResistancePlus MG assay (Speedx) and 23S rRNA sequencing. Fluoroquinolone resistance-associated mutations in the *parC* gene were searched by sequencing.

Results

A total of 1361 specimens from 1328 patients were analyzed. In metropolitan France, macrolide resistance was 42.9% and 34.7% in 2018 and 2019, respectively, and was significantly higher in men (59.6% and 52.4%) than in women (18.7% and 15.9%, respectively, $p < 0.001$). These percentages of macrolide resistance were significantly higher than those of 6.1% and 14.7% observed in overseas France in 2018 and 2019, respectively, ($p < 0.001$), with no significant difference between men and women. Regarding fluoroquinolone resistance, rates of resistance were significantly higher in metropolitan France in 2018 and 2019 (16.1% and 14.9%, respectively) than in overseas France (1.3% and 2.6% in 2018 and 2019, respectively, $p < 0.001$). No difference was observed between men and women.

Conclusion

Macrolide and fluoroquinolone resistance rates are high in metropolitan France and contrast with significant lower rates in overseas France. In metropolitan France, macrolide resistance is up to 60% in men but three times lower in women, highlighting that gender and sexual behavior should be taken into account for the management of *M. genitalium* infections.

Assessing the impact of the coronavirus-19 (COVID-19) pandemic on internet searches for sexually transmitted infections in the United States, 2019-2020

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Background: Novel approaches to monitoring sexually transmitted infections (STI) may contribute to understanding of STI rates and associated behaviors, especially during the coronavirus (COVID)-19 pandemic, when healthcare and surveillance systems are likely affected. Therefore, we explored public interest in STI-related internet search terms from 2019-2020.

Methods: We downloaded Google Trends data for the United States (US) to capture number of searches including at least one of 64 search terms within four STI-related categories (STIs, symptoms, testing, and treatment) from January 1, 2019 to December 31, 2020. We expressed search interest across weeks as the unit of analysis, with scores normalized from 0-100; 100 represents the week with the most search interest for each variable.

Results: For many STI-related search terms, interest dropped in March 2020 (when most states deployed COVID mitigation measures), increased later in the year, but did not increase to pre-pandemic interest. For example, “chlamydia” ranged from 73-100 from January 2019-February 2020, dropped to a low of 55 in mid-April before increasing to values between 59-79 through December. Only a few search terms did not change during the pandemic. For example, besides one peak week of 100, “syphilis” ranged from 21-35. Although the COVID-19 pandemic shifted interest away from STIs for spring and summer of 2020, most search terms remained used throughout July to December 2020 (ranges for chlamydia: 60-79, gonorrhea: 32-44, herpes: 44-55, HPV: 38-57, STD: 60-92, and STI: 58-80).

Conclusions: In the US, internet searches for STI-related terms prior to and during the COVID-19 pandemic dropped from March through fall 2020. Concerns over STI symptoms, testing, and treatment increased by fall and winter 2020, which may indicate a need for access to STI services. Google Trends is a novel way to understand public interest in health topics, especially during a global pandemic.

TREATMENT OF MYCOPLASMA GENITALIUM INFECTION ACCORDING TO qPCR DETERMINATION OF RESISTANCE MUTATIONS: PRACTICE-BASED CASES

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Purpose: Mycoplasma genitalium 23S rRNA and parC genes are associated with antimicrobial resistance. In our study successful treatment of M. genitalium infections chosen according to additional tests on resistance mutations with AmpliSens® M.genitalium-ML/FQ-Resist-FL (Central Research Institute of Epidemiology, Russia) is shown.

Approach: We included 13 clinical cases of M. genitalium infection with prevalence of men practicing sex with men patients. Clinical samples were collected from urethra, oropharynx and rectum. Extraction was performed using DNA-sorb-AM (AmpliSens, Russia). Identification of M. genitalium was performed using «AmpliSens® N.gonorrhoeae/C.trachomatis/M.genitalium/T.vaginalis-MULTIPRIME-FRT» (CRIE, Russia). Resistance-associated mutations were detected using AmpliSens® M.genitalium-ML/FQ-Resist-FL (CRIE, Russia) with validation against Sanger sequencing.

Impact: M. genitalium was detected in all 13 studied cases of which 46.1% (n=6) in urethral swabs, 38.5% (n=5) in rectal swabs, and two with multiple sites of infection, including oropharynx. Most patients did not show clinical signs of M. genitalium infection while others reported urethral itching (7.7%), anal region pain (7.7%), and rectum bloody discharge after defecation (7.7%). Resistance-associated mutations were detected in ten (76.9%) cases, while seven of them (70%) contained both 23S rRNA and parC mutations. Adminstrated treatment was chosen according to qPCR resistance mutations test and consisted of Doxycycline or Minocycline (100 mg orally 2 times a day for 10 days) for resistant M. genitalium, and Josamycin (500 mg orally 3 times a day for 10 day) for non-resistant M. genitalium. In all cases infection was completely eradicated after treatment.

Innovation and significance: Determination of M. genitalium resistance associated mutations recommended both in European guideline on Mycoplasma genitalium infections and in BASHH UK national guideline. With high prevalence of both macrolides and fluoroquinolones associated mutations in our study authors imply that application of AmpliSens® M.genitalium-ML/FQ-Resist-FL kit with simultaneous detection of both 23 rRNA and parC genes mutations is a helpful tool to a clinical practice.

Screening of anorectal and oropharyngeal samples fails to detect bacteriophages infecting *Neisseria gonorrhoeae*

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Background:

There are real concerns that *Neisseria gonorrhoeae* may become untreatable in the near future due to the rapid emergence of antimicrobial resistance. Alternative therapies are thus urgently required.

Bacteriophages active against *N. gonorrhoeae* could play an important role as an antibiotic-sparing therapy which may even reduce the selection pressure for the emergence of resistance against conventional antimicrobials. Furthermore, they could be used in combination with antimicrobial agents to treat multi-resistant *N. gonorrhoeae*. To the best of our knowledge, no phages active against *N. gonorrhoeae* have ever been found.

Methods:

The aim of this study was to screen for bacteriophages able to lyse *N. gonorrhoeae* in 194 oropharyngeal and 18 anorectal ESswabsTM of 74 men who have sex with men attending a sexual health clinic in Antwerp, Belgium. ESswabsTM were enriched for bacteriophages using 11 different clinical *N. gonorrhoeae* strains. The spot test method was used as an initial indicator test to screen for the presence of phages by measuring lytic activity.

Results:

Multiple clear zones were detected as a result of antibacterial activity, but none of the confluent lysis zones could be replicated through further propagation. We screened 212 swabs but were unable to identify an anti-gonococcal bacteriophage.

Conclusion:

This is the first report of a large-scale screening that systematically searched for anti-gonococcal phages directly from clinical swabs. A strictly virulent *N. gonorrhoeae* phage would be of considerable utility in the fight against multi resistant *N. gonorrhoeae* infections. Further studies may derive more success by screening for phages at other anatomical sites (e.g., stool samples, urine) or in environmental settings (e.g., toilet sewage water of sex clubs or sexually transmitted infection clinics).

Changes in gonococcal incidence, screening, and reporting as explanations for increased gonococcal case reports between 2008 and 2018, United States.

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Background:

Though gonococcal case reports are related to incidence, case report increases may not necessarily indicate incidence increases. This results from incidence also being related to testing, reporting, and gonococcal natural history. In this work, we estimate the levels of change necessary in gonococcal incidence, testing, and reporting to explain changes in case reports between 2008 and 2018 in the United States.

Methods:

We applied a recently published mathematical model that relates gonococcal incidence to natural history (natural clearance rate, symptomatic probability), testing (background screening and symptomatic treatment seeking), and reporting (percent of diagnosed infections reported to CDC). We assumed natural history parameters did not change between 2008-2018. Using the closed form mathematical modeling solution for incidence, we determined what change in incidence, testing, and reporting was necessary to explain the observed changes in case reports.

Results:

Assuming no changes in the determinants of incidence between 2008-2018, 2018 estimated incidence was 1.2-3 times higher than 2008 incidence (depending on age and sex), except in 15-19-year-old women, where it was 15% higher in 2008. Changes in background screening could explain the increases if 2008 screening in women was substantially lower (8-20% of 2018 values, depending on age); in men, even with zero assumed 2008 screening, this alone was unable explain these increases. For symptomatic treatment seeking, 2008 levels would need to be 5-60% of 2018 values, depending on age and sex. For case reporting, 2008 levels would need to be 30-85% of 2018 values.

Conclusions:

Between 2008-2018, assuming no changes in testing or reporting, estimated gonococcal incidence increased, most apparently in 25-39-year-olds. Changes in testing and reporting necessary to explain these increases seem unrealistic (e.g., less than half of 2008 diagnosed gonorrhea being reported). Thus, these increased estimates likely reflect some true increase in gonococcal incidence, particularly in older age groups.

Prevalence of gonorrhea, chlamydia and syphilis among men who have sex with men initiating HIV pre-exposure prophylaxis in Cotonou, Benin

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Background: Men who have sex with men (MSM) experience a high burden of sexually transmitted infections (STIs). Data on STIs among MSM in West Africa are sparse, especially for HIV-negative MSM. We assessed the prevalence of gonorrhea (NG), chlamydia (CT) and syphilis among MSM initiating participation in an HIV pre-exposure prophylaxis demonstration study in Cotonou, Benin.

Methods: Following community mobilization, 204 HIV-negative MSM were recruited between August and November 2020. They answered a questionnaire, underwent clinical examination and provided clinical samples. Pharyngeal and rectal swabs, and urine samples were collected for NG and CT testing using GeneXpert CT/NG (CEPHEID). Serum samples were tested for syphilis with a rapid treponemal test, followed by a Rapid Plasma Reagin (RPR) test if positive.

Results: Site-specific NG (CT) prevalence was: rectal 9.8% (8.8%); pharyngeal 6.4% (2.5%); urethral 2.5% (9.8%). Overall, 31 (15.2%) and 38 (18.6%) men were infected at least at one site by NG and CT, respectively. Considering the 12 cases (5.9%) of co-infection, the overall prevalence of NG and/or CT (NG/CT) was 27.9% (57/204). Among all cases of NG/CT, only 5 (8.8%) had clinical symptoms or signs and were treated using the syndromic approach. Asymptomatic participants were contacted and treated. Receptive anal sex, reported by 36.9% of MSM, was the only significant factor for rectal NG [Prevalence ratio (PR): 6.8; 95% Confidence Interval (95%CI): 2.4-19.6), NG at any site (PR: 2.1; 95%CI: 1.1-3.9) and NG/CT at any site (PR: 1.6; 95%CI: 1.1-2.6). There was only one case of syphilis rapid test positivity; it was not confirmed by RPR.

Conclusion: NG and CT are extremely frequent and mostly asymptomatic among MSM in Benin. Consequently, alternatives to the syndromic approach for their management should be widely implemented. However, syphilis seems rare, as previously shown for female sex workers and the general population in Benin.

Spatial and temporal epidemiology of infectious syphilis in Victoria, Australia, 2015-2018

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Background:

The study aims to examine the trends of syphilis infection in Victoria and the characteristics of notified cases of syphilis among different population groups stratified by risk and in different geographical distributions.

Methods:

We analysed the demographic characteristics, notification trends and geographical distribution of notified cases of syphilis in Victoria between 2015 and 2018.

Infectious syphilis cases were categorised into four population groups: men who have sex with men (MSM), men who have sex with women (heterosexual males), females, and men who have sex with men and women (bisexual males). We examined the staging of syphilis, geographic location by residence of cases, HIV status, reasons for testing, and notifying source.

Results:

Of the 4,808 notified infectious syphilis cases, there were 3,801 (64%) MSM, 593 (12%) heterosexual males, 465 (10%) females, and 118 (2%) bisexual males. Females (219% increase, $p_{trend} < 0.001$) and bisexual males (220% increase, $p_{trend} = 0.004$) had the greatest increase in the number of cases, followed by heterosexual males (129% increase, $p_{trend} < 0.001$) and MSM (21% increase, $p_{trend} < 0.001$). Geographical mapping showed the majority of the syphilis cases in MSM occurred in inner metropolitan Melbourne suburbs, while the cases in heterosexuals occurred in outer Melbourne suburbs.

Conclusion:

Notified cases of syphilis infection had significantly increased across all population groups but particularly in heterosexual males and females. Campaigns and control measures should be specific for each population group with targeted screening and education in areas with a high number of syphilis cases.

Australian general practitioners' consideration of pelvic inflammatory disease in women diagnosed with an STI, and barriers to providing pelvic examinations

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Background:

Pelvic inflammatory disease (PID) comprises a range of inflammatory disorders of the female upper genital tract, often occurring after a sexually transmissible infection (STI). When left untreated, PID can cause reproductive complications including ectopic pregnancy and infertility. PID is under-diagnosed globally and requires a clinical diagnosis. Speculum and bimanual pelvic examinations are recommended to support a diagnosis.

Methods:

In 2019, an online survey about chlamydia, including PID diagnosis and management, was distributed to Australian-based general practitioners (GPs). From 323 respondents, 85.8% (n=277) responded to multiple-choice questions about PID and 74.6% (n=241) responded to a free-text question regarding barriers to performing pelvic examinations. We used multivariable logistic regression to analyse factors associated with the frequency GPs conducted pelvic examinations for women reporting symptoms of PID. Qualitative free-text data were explored using thematic analysis.

Results:

Most GPs routinely ask female patients with an STI about symptoms suggestive of PID, including pelvic pain (86.2%), abnormal vaginal discharge (95.3%), abnormal vaginal bleeding (89.5%), and dyspareunia (79.6%). Over half reported routinely conducting speculum (69.0%) and bimanual pelvic (55.3%) examinations for women reporting pelvic pain or dyspareunia. Female GPs were more likely to routinely perform speculum (adjusted odds ratio (AOR) 4.6; 95%CI: 2.6-8.2) and bimanual pelvic examinations (AOR 3.7; 95%CI: 2.1-6.5). GPs with additional sexual health training were more likely to routinely perform speculum (AOR 2.2; 95%CI: 1.1-4.2) and bimanual pelvic examinations (AOR 2.1; 95%CI: 1.2-3.7). Barriers to pelvic examinations included patient reluctance, GP gender, patient health concerns, time pressure, and GP hesitancy to perform an examination due to inexperience and/or uncertainty that it would add to their assessment.

Conclusions:

Encouragingly, many GPs routinely asked patients diagnosed with an STI about PID symptoms. However, many GPs in this study did not consistently perform pelvic examinations to support a diagnosis, potentially reducing capacity to diagnose PID.

Accuracy of Interpretation and Home Test Kit Result Reporting for Screening of Human Immunodeficiency Virus Infection

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Background:

Men who have sex with men (MSM) and individuals identifying as Black or Hispanic/Latino experience the largest burden of Human Immunodeficiency Virus (HIV) infection. The OraQuick In-Home HIV Test (OraSure Technologies®, Pennsylvania, USA) is the only HIV self-test approved by the US Food and Drug Administration. Self-testing can supplement HIV prevention to increase identification of infections among at-risk groups. During a larger study on social media and HIV prevention, we assessed the accuracy of participants' interpretations of their results.

Methods:

We recruited Black and Latino MSM between 18-30 years through advertisements on internet-based social media, informational sites, and dating sites. Participants ordered a free OraQuick self-test. They tested and interpreted their results following kit instructions. Participants submitted a test kit photograph to a secure online platform to report their results. Two trained researchers reviewed the photographs and interpreted results independently. We calculated the proportion of agreement and kappa coefficient between reviewers and between reviewers and participants.

Results:

We enrolled 271 participants, 191 (70%) ordered a kit, 159 (83%) used it. Of those, 113 (71%) submitted readable test result images. Among those submitting images, 71.3% were Black and 30.4% were Hispanic/Latino, mean age 25 years (SD 3.6). The proportion of agreement in result interpretation between reviewers was 100% (113/113), kappa coefficient 1.0. The proportion of agreement in result interpretation between participants and reviewers was 97.3% (110/113). Of the concordant results, 101 (89.4%) were negative, 7 (6.2%) were positive, 2 (1.8%) were invalid. Of the 3 discordant results, 2 participants interpreted their positive results as invalid and 1 participant interpreted their positive result as negative. The kappa coefficient was 0.85 (95% CI 0.67–1.0).

Conclusion: Most participants submitted results online. The level of agreement of interpretation between participants and researchers was good. Prevention programs could use self-testing during disruptions of care.

Condyloma acuminata in an infant : Case report in a resource limited setting

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Background: Condyloma acuminata are soft, skin colored, fleshy warts that are caused by the Human Papilloma Virus (HPV), typically HPV 6 and 11 genotypes . The disease is highly contagious, can appear singly, confluent, multiple, small or large. Although anogenital warts are considered to be sexually transmitted in adults, this may not be the case for children. Genital warts in children may result from several modes of transmission: from the maternal genital tract autoinoculation, from finger warts and nonsexual transmission from members/careers. Generally diagnosis of anogenital warts is usually made on physical examination. Surgical treatment options include cryotherapy, laser vaporisation, electrocautery and excision. Nonsurgical approaches in children include the use of podophyllotoxin and imiquimod.

Approach We present a 12-month-old female patient presented with a 6 month history of papillomatosis changes in the anogenital area. The child was born by vaginal delivery after full term normal pregnancy. No maternal medical history of genital warts during her pregnancy. She tested negative for Syphilis at pregnancy.

Physical examination of the child was normal except for the presence of multiple light purple skin-colored, confluent verrucous eruptions affecting the vulva and perianal region (Figure 1). Gynecological examination showed no abnormalities. The hymen was intact, and there was no evidence of ulcerations or other signs of trauma to the vaginal or anal orifices. Biopsy of the lesion was not performed. The girl was treated with 25% Podophyllotoxin solution, carefully applied at the hospital to the lesions once a week and at every visit, there was evident reduction in the number and size of warts. Treatment was continued for a total of 5 weeks, during which time the lesions cleared almost completely.

Conclusion: We conclude from this case that condylomas acuminata are not only transmitted sexually but through nonsexual ways as well, such is this case, from the infected mother to the infant. We also report safe and effective treatment of anogenital warts in a child with regular and carefully applied 25% Podophyllotoxin solution.

Incidence and duration of pharyngeal Chlamydia trachomatis (CT) among a cohort of men who have sex with men (MSM)

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Background: The prevalence of pharyngeal CT is low but its incidence and duration are unknown. A high incidence and/or duration may support the role of pharyngeal CT in sustaining CT transmission among MSM.

Methods: From March 2016 to December 2018 we enrolled MSM in a 48-week natural history cohort study in Seattle, Washington. Participants self-collected pharyngeal specimens weekly. We tested specimens using nucleic acid amplification testing (Aptima Combo-2) at the conclusion of the study. In primary analyses, we defined incident pharyngeal CT as ≥ 2 consecutive weeks with a CT-positive pharyngeal specimen. In sensitivity analyses, we defined incident pharyngeal CT as ≥ 1 week of a CT-positive specimen. We used Kaplan Meier methods to estimate the duration of pharyngeal CT, censoring at loss to follow-up, receipt of antibiotics, or end of study. We tested for differences in duration with the log-rank test.

Results: 140 participants contributed 70.5 person-years (PY) of follow-up. The mean age was 37, 51% were living with HIV, and 34% had CT in the past year. Two (1.4%) MSM had pharyngeal CT at enrollment and 16 (11.4%) tested positive for pharyngeal CT during ≥ 1 week of follow-up. In primary analyses, there were 8 pharyngeal CT cases among 6 MSM (incidence=11.4 per 100 PY; 95% CI=6.0-21.9). In sensitivity analysis, there were 19 cases among 16 MSM (incidence=27.1 per 100 PY; 95% CI=18.5-39.8). Median duration of pharyngeal CT was 6.0 weeks in primary analyses and 2.0 weeks in sensitivity analysis. In primary analysis, median duration was significantly shorter for those with a history of CT (3.6 weeks) vs. no history of CT (8.7 weeks), and significantly shorter for those living with HIV.

Conclusion: Incident pharyngeal CT was relatively common but the duration of infection was short, supporting the theory that pharyngeal CT likely contributes little to sustained population-transmission of CT.

Healthcare access and syphilis testing among Black and White MSM: Results from the Network Epidemiology of Syphilis Transmission Study

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Background: In 2018, men who have sex with men (MSM) accounted for nearly 65% of newly-reported primary and secondary syphilis cases in the U.S. Syphilis rates are higher among Black than White MSM. Barriers to healthcare access among MSM may contribute to racial disparities in syphilis testing which leads to missed diagnoses. These barriers can be exacerbated by geographic differences in healthcare access. We describe differences in the prevalence of syphilis testing by health insurance status comparing Black to White MSM in two cities (Baltimore, MD and Columbus, OH).

Methods: The Network Epidemiology of Syphilis Transmission study enrolled 655 sexually active MSM aged 18+ from January 2019 through March 2020 (n=329 Black, n=209 White). At the first study visit, participants were asked about current health insurance status (private or public) and syphilis testing in the 12 months prior to enrollment (yes or no). We used chi-square tests to examine health insurance status and syphilis testing by city comparing Black to White MSM.

Results: Although not statistically significant, lower percentages of Black than White MSM in Baltimore had health insurance (79.6% vs. 92.4%, p=0.11), while insurance was universally high in Columbus, regardless of race (95%, p=0.09). Lower percentages of Black than White MSM in Baltimore had been tested for syphilis in the past 12 months (61.7% vs. 78.7%, p=0.06), but we observed no testing differences by race in Columbus (65%, p=0.99). In Baltimore, fewer insured Black MSM had been tested for syphilis in the last 12 months compared to insured White MSM, but the difference was not significant (63.4% vs. 78.7%, p=0.12) and was similar in Columbus (64.9% vs. 66.4%, p=0.91).

Conclusions: Consistent, but non-significant, differences in insurance coverage by race in Baltimore compared with Columbus may indicate geographic variation in healthcare access which can impact timely syphilis testing among MSM.

Impact of COVID-19 hard lockdown measures on sexual behaviour in Victoria, Australia: findings from a national online survey

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Background: The residents of Victoria (Australia's second most populous state), were subject to a hard lockdown for several months as they experienced a second wave of COVID-19. Victorians could only leave their homes for essential activities, were required to wear facemasks, remain within 5km of their homes and were subject to a nightly curfew. Elsewhere in Australia, COVID numbers remained low with no lockdown in place. We examined the impact of the lockdown on the sexual behaviour of Victorians compared with elsewhere in Australia.

Methods: Our online survey was open for 2.5 weeks during the lockdown (August 13th to 31st). Participants aged 18+ were recruited via social media and asked to report on their current sexual practices. Logistic regression was used to calculate the difference in the proportion of practices between Victorians and non-Victorians.

Results: 976 people completed the survey: 71% identified as female, 75% were aged 18-29 years, 61% resided in Victoria. Compared with elsewhere in Australia, Victorians were less likely to report sex in the last 4 weeks (54.8% vs 68.0%, diff=-13.3%, 95%CI -19.6, -6.9). Victorians were also less likely to report casual hook-ups (10.6% vs 17.3%; diff=-6.7%, 95%CI -12.5, -0.8) and sex with a fuckbuddy (10.6% vs 16.9%; diff=-6.2%, 95%CI -12.1, -0.4). There was no difference in dating app use in the last 4 weeks between Victorians and others (27.0% vs 26.6%; diff=0.4; 95%CI -5.2, 6.1), but Victorians were more likely to report using apps for virtual dates (15.7% vs 2.9%, diff=12.8%, 95%CI 6.2, 19.3) and chatting (83.0% vs 72.5%; diff=10.5; 95%CI 0.0, 20.9) and less likely to use them for face-to-face dates (15.1% vs 56.9%; diff=-41.8%, 95%CI -52.9, -30.7). **Conclusions:** Hard lockdowns impact sexual behaviour and practices. However, sexual activity did not stop completely, highlighting the importance of ensuring accessibility of sexual and reproductive health services during periods of restriction.

Motivational Interviewing and the Prevention of STIs During Pregnancy: Coming Up “Empty”

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Background: Sexually transmitted infections (STIs) risk persist during pregnancy. Of special concern, rates of congenital syphilis continue to rise in the US and elsewhere. One effective approach for helping pregnant people reduce diverse maternal and neonatal risks is motivational interviewing (MI), which has demonstrated effectiveness in reducing alcohol/substance misuse and smoking during pregnancy, and STI risk among non-pregnant youth and adults. We sought to describe MI’s role in STI prevention in pregnancy to help inform the field of best practices.

Methods: We attempted a systematic review of the use of MI for STI prevention in pregnant women in PubMed, MEDLINE, Ovid, Embase and Scopus databases. Articles included for consideration were peer-reviewed studies conducted in the US, published between 2000 and 2020, in English, included women who were pregnant at the onset of the study, and reported STI outcomes. Articles were excluded if women in the sample became pregnant as a result of intervention failure.

Results: Of 595 citations, only one article was eligible for full-text review; all others failed to meet the inclusion criteria. This yielded an “empty” review, despite substantial literature and MI’s noted efficacy.

Conclusion: Arguments to support MI’s use to prevent STIs or re-infection among pregnant people are based on its success in this population in addressing other behavioral risks (alcohol and drug use). Despite its promise, published research in this area is absent. MI is proven to be effective, versatile, and has demonstrated success in promoting a multitude of health-benefiting and risk reducing behavioral changes among pregnant people. Our “empty review” underscores the need for attention in this area. Future research could compare interventions integrating MI to the standard of care to measure the effect on STI prevention among pregnant people.

General practitioner views towards patient delivered partner therapy for chlamydia infection in Australia

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Background: Patient delivered partner therapy (PDPT) refers to the process in which antibiotic treatment for chlamydia infection is prescribed or provided to an index case to pass onto their sexual partner/s. Since 2015, health authority guidance for PDPT has been provided in some areas of Australia. However evidence regarding PDPT use in Australia are limited. We investigated recent use and perceptions of PDPT for chlamydia among general practitioners (GPs) working in Australia.

Methods: During 2019 we conducted an online survey comprising multiple-choice and open-ended questions to investigate GPs' chlamydia management practices, including PDPT. We conducted logistic regression to identify factors associated with offering PDPT and directed content analysis of free-text data to explore GPs' perceptions towards PDPT.

Results: A total of 323 GPs responded to the survey, 85.8% (n=277) answered PDPT-focused questions, providing 628 free-text comments. Over half (53.4%) reported never offering PDPT while 36.5% sometimes and 10.1% often offered PDPT. GPs more likely to offer PDPT were aged ≥ 55 years (adjusted odds ratio, AOR 2.8, 95%CI 1.4-5.7), worked in non-metropolitan areas (AOR 2.5, 95%CI 1.5-4.4) and in Australian States/Territories with health authority PDPT guidance (AOR 2.3, 95%CI 1.4-3.9). Qualitative data showed many GPs recognised PDPT's potential to treat difficult to engage partners but expressed hesitancy to offer PDPT because they considered it best practice for partners to attend care. A case-by-case approach that considered patient and partner circumstances to determine PDPT suitability was emphasised. Many GPs indicated a need for professional and health authority guidance that PDPT is permissible and practical resources to support its use.

Conclusions: GPs appear to accept the place of PDPT as targeted to those who may otherwise not access testing or treatment. Availability of health authority guidance appears to have supported some GPs to incorporate PDPT into their practice.

Incidence and risk factors of *C. trachomatis* and *N. gonorrhoeae* among young women from the Western Cape, South Africa

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Background: Young women in South Africa are highly affected by sexually transmitted infections (STI), like *C. trachomatis* (CT) and *N. gonorrhoeae* (NG). We aimed to estimate the incidence of CT and NG, and its determinants, among young women from the Western Cape, South Africa, participating in an HPV vaccine trial (the EVRI study).

Methods: HIV-negative women aged 16-24 years were enrolled between October 2012 and July 2013. At enrolment and month 6 participants were screened for CT and NG. A questionnaire on demographic and sexual history characteristics was completed at enrolment and month 7. Treatment for CT and/or NG was offered to infected participants. Incidence rates (IR) of CT and NG were estimated. Determinants of incident CT and NG infections were assessed using Poisson regression.

Results: 365 women were tested for CT and/or NG at least twice. Prevalence of CT and NG at baseline was 33.7% and 10.4%, respectively. Prevalence of co-infection with CT and NG was 7.1%. During 113.3 person-years (py), 48 incident CT infections were diagnosed (IR=42.4 per 100 py, 95% confidence interval (CI) 31.9-56.2). Twenty-nine incident NG were diagnosed during 139.3 py (IR=20.8 per 100 py, 95%CI 14.5-29.9). Prevalent CT infection at baseline was associated with incident CT (adjusted incidence rate ratio (aIRR) 5.8, 95%CI 3.0-11.23). More than three lifetime sex partners increased the risk for incident NG (3-4 partners aIRR=7.3, 95%CI 2.1-26.0; ≥5 partners aIRR=4.3, 95%CI 1.1-17.5).

Conclusions: The IR of bacterial STIs among young women in the Western Cape is very high. Besides being previously infected and a higher lifetime number of sex partners, no other risk factors were found for CT and NG, suggesting that all these women were at risk. This indicates the need for intensified prevention of STIs as well as screening and treatment programs to increase sexual health in this region.

A mixed-method approach to mapping hematologists' HIV testing behavior in lymphoma patients at the Amsterdam University Medical Centers

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Background

Compared to HIV-negative individuals, people living with HIV have a higher risk of malignant lymphoma. To what extent hematologists miss HIV testing opportunities among lymphoma patients (LP) in the Amsterdam University Medical Centers (UMC) is currently unknown. We quantified the HIV testing rate among LP and assessed factors influencing hematologists' HIV testing behavior in LP at both Amsterdam UMC locations.

Methods

In this mixed-methods study, quantitative data from 2015 to 2019 from electronic health records of LP were retrospectively collected to assess both the HIV testing rate within three months around lymphoma diagnosis and the HIV positivity prevalence. An online survey among hematologists and semi-structured interviews among hematologists and authors of hematology guidelines were conducted.

Results

Data from 656 LP and 21 hematologists who responded to the survey out of 40 were used. Interviews were held with four hematologists and two authors of hematology guidelines. The HIV testing rates were 56.4% and 57.6%, and the HIV positivity prevalences were 0.8 % and 0.9% for both locations. Eighty-five percent (18/21) of hematologists indicated they often offered an HIV test to LP in the past year, and 42% (9/21) revealed HIV testing in LP is often discussed in their department. The type of lymphoma, lack of awareness regarding HIV testing recommendations in LP, low perceived risk of HIV among LP because of older age, and lack of guidelines recommending universal HIV testing regardless of lymphoma type, each influenced hematologists' HIV testing behavior.

Conclusion

Our results show routine HIV testing among LP and hematologists' attitudes and knowledge towards testing at the Amsterdam UMC are suboptimal, despite HIV testing being recommended in most lymphoma guidelines. This highlights the need for interventions to improve hematologists' behavior towards testing, such as education, as well as expansion and enhanced implementation of the hematology guidelines.

A capite ad calcem approach importance in case of syphilis

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Background: Nowadays, the patient full examination is challenging by limited time in different medical fields (Musellim B. et al, 2017). It can lead inappropriate diagnosis and treatment. Therefore, it is important to use patient examination gold approach: a capite ad calcem.

Methods: The medical documentation, pathology slides and data of laboratory results were reviewed in the context of up-to-date medical literature.

Results: A 34-year-old white man presents with a complaint about itching on his legs and arms that follow him around four months.

In objective examination of the overall status - without any deviation of the norm. In the local status, we found infiltrative, hyperaemic papules with yellowish crusted erosions on both legs and arms with well demarcated. On both legs we found varicose veins. Sexual history said that last sexual contact had been two years ago. The full blood test, infection tests (HIV, RPR, TPHA, HCV), microbiology and skin punch biopsy were done. Work diagnosis at the beginning: exacerbation of chronic eczema. Important to keep in mind, cutaneous features of secondary syphilis sometime can show as chronic dermatitis.

The blood test result, total IgE showed without any deviation of the norm. RPR – positive (4+), TPHA (4+, 1:1280), HIV – negative, HCV – negative. Excreted from the skin: *Staphylococcus aureus*, *Streptococcus pyogenes* (beta haemolytic group A). Other sexual transmissible disease – negative. The skin punch biopsy was done from arm skin. At the pathophysiological conclusion said that: histological picture is possible in the case of Lyme disease. Lyme disease parameters are not determined due to treatment interruption at the patient's request.

Conclusion: A capite ad calcem approach is an essential part in dermatovenerology practice. It can help for doctor find not just seemingly the main reason for patient's complain but allow watch wider.

High prevalence of curable sexually transmitted infections among HIV-uninfected women planning for pregnancy in KwaZulu-Natal, South Africa

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Background: HIV-exposed women in African settings planning to conceive are at heightened risk of acquiring sexually transmitted infections (STIs). STIs can increase HIV acquisition risks and cause maternal and child morbidity. Here, we describe the prevalence of curable STIs among HIV-uninfected women planning pregnancy with a partner who is living with HIV or of unknown serostatus in an HIV-endemic setting (eThekweni, KwaZulu-Natal (KZN)).

Methods: This is a descriptive longitudinal sub-study nested within the Safer Conception for Women study. HIV-uninfected women, aged 18-35 years with personal or partner plans for pregnancy were enrolled from November 2019 in eThekweni, KZN. A questionnaire was administered, and women were examined for STIs, and tested for *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG), *Trichomonas vaginalis* (TV), and *Mycoplasma genitalium* (MG) via PCR of a provider-collected swab, and *Treponema Pallidum* (TP) via TPHA testing. Women with symptomatic and/or laboratory-confirmed STIs are treated and provided with partner notification letters. Repeat sample collection is scheduled after six months, and during pregnancy. Here, we report on prevalent curable STIs at baseline.

Results: Among the 50 women enrolled, [median age: 24 (range: 19-33), HIV serostatus of partner: 47(94%) unknown], 3 (6%) reported STI symptoms, and 12 (24%) had curable STI organisms detected on laboratory testing. CT was the most frequent pathogen (6, 12%), followed by TV (5, 10%), NG (2, 4%) and MG (1, 2%). Two women had >1 STI pathogen. No TP was detected. Baseline demographic and sexual behavioural characteristics did not differ between women with and without STIs.

Conclusion: Our findings indicate a high prevalence of curable STIs, mostly asymptomatic, among HIV-uninfected women planning for a pregnancy in the next year. Given the impact of asymptomatic curable STIs on maternal and neonatal health, this population should be prioritized for objective STI testing.

HIV testing and associated factors in men who have sex with men by urbanization-level: A cross-sectional study in the Netherlands

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Background. Testing is a key strategy towards elimination of HIV; preferably by regional targeted approaches. Regular HIV testing enables timely care and reduces HIV transmission. We assessed HIV-testing behaviour in men who have sex with men (MSM), and factors associated with never and not recent testing by urbanisation-level.

Methods. The online 'Men & Sexuality' survey was conducted in 3,815 MSM (mean age 36 years; the Netherlands, 2018). HIV-testing was defined as recent (<1year), not recent (≥1year), and never. Testing was evaluated as outcome (recent testing was reference) in multivariable multinomial regression analyses (calculating odds ratio's [ORs]). We evaluated associations with urbanization-level. We also evaluated associations with a range of sociodemographic/behavioral factors in analyses stratified by urbanization-level (high-urban [>2,500 living addresses/km²] and non-high-urban [≤2,500 living addresses/km²]).

Results. In high-urban areas, 68.4% of MSM, and in non-high-urban areas, 54.9%, recently tested; 11.8% in high-urban and 25.2% in non-high-urban areas, never tested (aOR: 1.89; 1.55-2.31, p<0.001).

In high-urban areas: factors associated with never and not recent testing were younger age, fewer new sex partners, never notified for HIV, no condomless anal intercourse, and self-identification as bisexual (versus gay).

In non-high-urban areas: additionally associated were moderate/low perceived HIV severity, moderate/low HIV risk perception, and moderate/low share of MSM among friends (versus 'high'). In non-high-urban areas 27% reported a high share of MSM among friends (high-urban: 38%).

In non-high-urban areas, never tested MSM would prefer self-sampling/self-testing (high-urban: facility-based testing).

Conclusion. The proportion of MSM who never tested was high (25%) in non-high-urban areas in The Netherlands; twofold compared to high-urban areas. In non-high urban areas, MSM who have a more restricted MSM-defined social context, may be less likely to test, and may benefit from targeted outreach and test-barrier-reducing strategies, e.g. by self-testing/self-sampling testing. A regional approach, accounting for urbanization-related factors, to eliminate HIV is warranted.

Incident urogenital and anorectal Chlamydia trachomatis in women: the role of sexual exposure and auto-inoculation; a multicentre observational study (FemCure)

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Background. Anorectal infections with Chlamydia trachomatis (CT) are prevalent in women visiting STI-clinics. In women, azithromycin treatment in anorectal chlamydia is unsuccessful in about 20%, with the potential of subsequent re-infection of the vagina through autoinoculation. We evaluated the risk for incident urogenital CT, by exposure from the own anorectal site and exposure by sex; and similarly evaluated risks for incident anorectal CT.

Methods. Prospective multicenter cohort study, FemCure. At 4, 6, 8, 10, and 12 weeks after azithromycin or doxycycline CT treatment, women self-collected anorectal and urogenital swabs for CT-DNA testing. We calculated the proportion with incident CT, at week 6-12, by 2-week time-periods. Compared to no exposure (A), risk of incident urogenital CT was estimated for sexual exposure (B), anorectal CT exposure (C), and both exposures (D), adjusted for confounders by adjusted odds ratios (OR) and 95% confidence intervals (CI). We similarly assessed incident anorectal CT.

Results. Data comprised 385 participants contributing 1540 two-week periods.

Urogenital incidence was 3.3% (47/1428) [95%CI: 2.4-4.4]; 0.7% (A), 1.9% (B), 13.9% (C), and 25.4 (D). ORs were: 2.7 [95%CI:0.9-8.6] (B), 21.8 [95%CI:6.7-70.7] (C), 49.7 [95%CI:15.4-160.4] (D).

Anorectal incidence was 2.9% (39/1343) [95%CI:1.8-3.6]; 1.3% (A), 1.3% (B), 27.8% (C), and 36.7% (D). ORs were: 0.91 [95%CI:0.32-2.60] (B), 26.0 [95%CI:7.16-94.34] (C), 44.3 [95%CI:14.4-136.2] (D).

Of incident CT, 55% urogenital and 70% anorectal infections persisted (>two weeks).

Conclusion. Between 6-12 weeks after initial treatment, the risk for incident urogenital CT in women increased when women had a recent anorectal CT, especially when also sex was reported. Likewise, the risk for incident anorectal CT increased with urogenital CT and sex exposure. Findings may suggest a key role for auto-inoculation in the re-establishment or persistence of urogenital and anorectal chlamydia infections in treated women, especially in case of suboptimal initial treatment or lack of anorectal testing.

Gini coefficients to quantify heterogeneity in sexual behavior and STI distribution before and after PrEP among MSM in the Netherlands

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Pre-exposure prophylaxis (PrEP) use may influence sexual behavior, and sexually transmitted infections (STI) incidence among men who have sex with men (MSM). Here, we aimed to quantify how STI diagnoses are distributed among MSM in the Netherlands based on their sexual behavior using Gini coefficients, and examined possible changes in these coefficients over time under the influence of PrEP. HIV-negative MSM participating in a prospective cohort study (Amsterdam Cohort Studies) completed questionnaires about sexual behavior and were tested for STI/HIV during biannual visits (2009-2019). A sexual behavior risk score predictive of STI diagnosis was developed, which was used to calculate Gini coefficients for incident gonorrhea, chlamydia, and syphilis diagnoses at ≥ 1 anatomical locations in the period before PrEP (2009-mid 2015) and after PrEP (mid 2015-2019). Gini coefficients close to zero indicate homogeneous distribution of STI over the entire population, and close to one that STI are concentrated in individuals with a higher risk score. The sexual behavior risk score ($n=630$, n visits=10,677) ranged between 0.00 (low risk) to 3.61 (high risk), and the mean risk score increased from 0.70 (SD=0.66) before to 0.93 (SD=0.80) after PrEP. Positivity rates for chlamydia (4%) and syphilis (1%) remained relatively stable, but the positivity rate for gonorrhea increased from 4% before to 6% after PrEP. Gini coefficients increased from 0.37 (95% CI 0.30-0.43) to 0.43 (95% CI 0.36-0.49) for chlamydia, and from 0.37 (95% CI 0.19-0.52) to 0.50 (95% CI 0.32-0.66) for syphilis comparing before to after PrEP. The Gini coefficient for gonorrhea remained stable at 0.46 (95% CI 0.40-0.52) before and after PrEP. PrEP use may have led to more high-risk behavior, more gonorrhea transmission, and the distribution of chlamydia and syphilis diagnoses has become more concentrated in a high-risk subgroup. Improved STI prevention is needed, especially in high-risk MSM.

HIV/STI testing among men who have sex with men in the Netherlands: attitudes towards home-sampling testing during the Covid-19 pandemic

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Background. The Covid-19 pandemic may have affected access to and uptake of HIV/STI testing among men who have sex with men (MSM) in the Netherlands and underpin the importance of remote sexual health care. Remote sexual health care, including home HIV/STI testing and remote consultation is increasingly appreciated as a necessary extension to regular care, to be able to reach out to MSM. While care providers recognize this need, evidence regarding attitudes among MSM towards using remote care is limited. Here, we present STI/HIV testing behaviors, attitudes and preferences, towards home-sampling during the Covid-19 pandemic, in MSM who (pre-pandemic) attended location-based STI clinic care.

Methods. Starting in November 2020, 417 MSM who attended one of several Dutch STI clinics before the Covid-19 pandemic were invited to participate in an online survey, Data collection is on-going. Descriptive statistics regarding testing for HIV/STI testing, of the first 148 participants (35.5%) are presented. Attitude towards home-sampling testing is shown on a scale from negative (0) to positive (100) .

Results. Of participants (mean age 48) in the past 6 months, 66.4 % (97/146) tested for STI and 61.6% (90/146) tested for HIV. A home-sampling test for STI was used by 2.1% and 1.1% performed a home-sampling test for HIV. Participants reported that 1.5% of their male sex partners used home-sampling testing for HIV. Participants were positive towards home-sampling testing (mean=72.0, SD=33.6). When testing for HIV in the future 48.4% (60/124) would consider home-sampling testing. Most of the participants (56.8%) prefer remote consultations combined with a consultation at the STI clinic.

Conclusions. Although home-sampling STI/HIV testing is rarely used by STI clinic visiting MSM, results show that MSM can be positive towards home-sampling testing for STI and HIV. Home-sampling testing and remote consultations might be solutions to extend sexual healthcare to continue reaching MSM.

Applying a novel approach to scoping review incorporating artificial intelligence: Mapping the natural history of gonorrhoea

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Background

This scoping review presents the results of three distinct search strategies combined to identify and map the range of conditions (clinical presentations, complications, coinfections and health problems) associated with gonorrhoea infection. We also report use of a novel artificial-intelligence-(AI)-assisted Medline search tool.

Methods

To fully characterize the range of health outcomes associated with gonorrhoea, we combined a structured preliminary search with a traditional systematic search, then supplemented with the output of a novel AI-assisted Medline search to identify eligible literature.

Results

We identified 189 health conditions associated with gonorrhoea infection from 107 unique references and 21 International Statistical Classification of Diseases and Related Health Problems Ninth and Tenth Revision (ICD 9/10) or Read codes. Pathogenic processes relating to these outcomes were also briefly summarized. The 189 identified health conditions were related to infection of the urogenital tract (n=86), anorectal tract (n=6) oropharyngeal tract (n=5) and the eye (n=14); and other conditions such as systemic (n=61) and neonatal conditions (n=7), psychosocial associations (n=3), and co-infections (n=7). The 107 unique references attained a Scottish Intercollegiate Guidelines Network (SIGN) score of $\geq 2++$ (n=2), 2+ (14 [13%]), 2- (30 [28%]) and 3 (45 [42%]), respectively. Remaining papers (n=16) were reviews.

Conclusions

Through AI screening of Medline, we captured titles, abstracts, case reports and case series related to rare but serious health conditions. These outcomes might otherwise have been missed during a systematic search. The AI-assisted search provided a useful addition to traditional/manual literature searches especially when rapid results were required.

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Intravaginal lactic acid gel versus oral metronidazole for treating women with recurrent bacterial vaginosis: the VITA randomised controlled trial

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Background

Bacterial vaginosis (BV) is a common, embarrassing and distressing condition, with serious comorbidities. The VITA trial assessed the effectiveness of intravaginal lactic acid gel versus oral metronidazole for treating recurrent BV.

Methods

Open-label, multicentre, parallel group, randomised controlled trial. Women aged ≥ 16 years with history of BV within the past 2 years and current symptoms were recruited at one GP practice and 19 sexual health centres in the UK. Participants were randomised to 5ml intravaginal lactic acid gel or oral 400mg twice daily metronidazole tablets, for 7 days. The primary outcome was participant reported resolution of BV symptoms by the end of Week 2, with subsequent follow up over 6 months. Semi-structured interviews explored tolerability and acceptability of the study treatments.

Results

518 participants were randomised (259 to metronidazole, 259 to lactic acid gel). Primary outcome data were available for 204 (79%) participants allocated to metronidazole and 205 (79%) allocated to lactic acid gel. Resolution of BV at Week 2 occurred in 143 (70%) participants in the metronidazole arm versus 97 (47%) participants in the lactic acid gel arm (adjusted risk difference -23.2% (95% CI -32.3 to -14.0%). Symptom resolution with no subsequent recurrences over 6 months occurred in 23% of those who took metronidazole and 16% of those using lactic acid gel. Side effects were more common following metronidazole compared to lactic acid gel. Interviews revealed that many women preferred lactic acid gel despite perceiving antibiotics to be more effective.

Conclusion

Metronidazole is more effective than lactic acid gel in achieving short term resolution of BV symptoms but recurrence is common following both treatments. Lactic acid is associated with fewer reported side effects and is preferred by many women despite its lower efficacy.

Funding

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Increased risk of subsequent chlamydia infection among women not tested at the anorectal anatomical location

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Background

Universal anorectal testing for *Chlamydia trachomatis* (chlamydia) among women is not recommended in many countries, while anorectal chlamydia infections are common. Missed anorectal infections might cause sequelae at the genital site if autoinoculation from the anorectum is possible, but evidence is limited. This study investigates the association between potentially missed anorectal infections and subsequent genital chlamydia infections in women, using not being tested at the anorectal site as a proxy for having a potentially missed anorectal infection

Methods

We included all women with a repeat chlamydia test within one year (with at least a genital test) from the Dutch Sexual Health Centre (SHC) surveillance between 2014-2019. Multilevel logistic regression analyses were used to identify determinants of genital chlamydia infection at the repeat test, with anorectal testing at the previous chlamydia test as main determinant.

Results

A total of 40,217 women were included in the analyses, of whom 15.4% tested chlamydia positive genitally at their second test. Not being tested anorectally at the first test was an independent risk factor of genital chlamydia infection at the repeat test (aOR 1.24 [95%CI 1.15-1.33]). This effect was in the same range as most other significant risk factors in the model: low education level, no condom use, STI symptoms and previous STI diagnosis. Young age (<20 years 2.67, [2.39-2.98]) and received partner notification (3.11, [2.91-3.31]) showed stronger effects. The findings were robust: correcting for interactions and a sensitivity analysis stratifying by chlamydia infection at first visit did not show significant differences in the aOR of not being tested anorectally at first test.

Conclusion

The results are suggestive of an autoinoculation process from the anorectal to the genital anatomical site in women. To enhance chlamydia control, future studies on the role of extragenital testing and autoinoculation in chlamydia transmission are needed.

The impact of COVID-19 and associated response measures on STI transmission among MSM: a mathematical modelling study

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Background: Fear of COVID-19 infection and the response measures have affected sexual behaviours of men who have sex with men (MSM) and access to care for sexually transmitted infections (STI). We investigated whether these changes resulted in increased or decreased STI transmission among MSM.

Methods: We developed a mathematical transmission model for chlamydia and gonorrhoea among MSM. We accounted for 15-35% reduction in the number of casual partners and 50-80% reduction in STI testing during lockdowns (March-May 2020; October 2020 to February 2021); these reductions were 0-10% and 20-35%, respectively, in periods with less restrictive COVID-19 measures (June-September 2020, March-August 2021). Reductions until August 2020 were estimated from Dutch data; other reductions were based on expert opinion. We assumed no changes after August 2021. Two scenarios were examined: with home-testing (in 25% of cases not tested at healthcare facilities) and without home-testing. We calculated the percentage change in prevalence due to COVID-19 associated changes, compared to prevalence in the same year without changes due to COVID-19.

Results: From the model, we estimated an increase of 8.4% (interquartile range (IQR), 7.6-9.4%) in chlamydia prevalence and an increase of 7.5% (IQR, 6.0-8.9%) in gonorrhoea prevalence at the end of 2020 without home-testing, compared to the prevalence without COVID-19 associated changes. The increase subsided in 2021, but chlamydia and gonorrhoea prevalence remained higher than without COVID-19 until 2025. With home-testing, the percentage increase in 2020, compared to the scenario without COVID-19, was 5.3% (IQR, 4.6-5.9%) for chlamydia and 3.5% (IQR, 2.6-4.4%) for gonorrhoea prevalence.

Conclusion: The COVID-19 pandemic may have resulted in an increase in chlamydia and gonorrhoea prevalence in 2020. The increase can be smaller after 2020, if STI testing at healthcare facilities and/or at home increases. The findings emphasize the importance of facilitating STI (self) care in times of crisis.

Prevalence and Epidemiological Factors Associated with *Trichomonas vaginalis* Infection in a US Multicenter STI Clinical Study

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Trichomonas vaginalis (TV) is the most common, curable non-viral sexually transmitted infection (STI) in the world, yet the epidemiology of the infection in the United States is not well defined. The infection is often associated with preterm birth, low-birthweight infants, infertility, as well as a facilitator for increasing the risk for acquisition and transmission of human immunodeficiency virus (HIV). Risk factors for TV in women include older age, race, impoverished socioeconomic status, and multiple sexual partners. The epidemiology of TV in men is less delineated, as men are not routinely tested, and most infections are asymptomatic.

In this work, we present TV prevalence in conjunction with *Mycoplasma genitalium*, *Chlamydia trachomatis*, and *Neisseria gonorrhoeae* prevalence with socio-demographic epidemiological data associated with patients enrolled in a multicenter STI study. Prevalence data was generated using the automated multiplex qualitative CE marked assay, Alinity m STI. The study included symptomatic and asymptomatic patients including a cohort of individuals who have been previously diagnosed with an STI seeking treatment at public health clinics and primary care offices within the United States.

The prevalence of TV in women was determined to be 12.3% and 0.6% in men. When stratified by ethnicity and prior STI history in this cohort, the positivity rate of TV in African American women was 22.3% compared to 1.6% in White women. Furthermore, in this data set, African American women 40 and older had the highest TV positivity rate at 26.5% compared to 22.9% for those 30-39, and 21.1% for those less than 29 years old. Those who reported not being diagnosed with a prior STI had a TV prevalence of 16.7% for African American women compared to 1.3% of White women. In this study, the overall prevalence of *Chlamydia trachomatis* was 9.8%, *Neisseria gonorrhoeae* was 2.4%, and *Mycoplasma genitalium* was 11.6%.

Young Women Rising: Connecting Young Women Living with HIV in the UK

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Background/purpose

In the UK, young women living with HIV can fall into a gap between provision for adolescents living with HIV and services for those ageing with HIV. Consequently, they can become isolated and excluded from sources of knowledge and empowerment, with negative consequences for health and wellbeing. We aimed to create a new space for young women living with HIV to connect and develop the skills to advocate for better HIV care for themselves and others.

Approach

We developed Young Women Rising, an innovative weekend workshop targeted at UK women aged 18-27, held in January 2020. The workshop was designed and led by a young woman living with HIV and closely tailored to young women's needs. Topics covered included identity, advocacy, and sexual health. The workshop took a participatory approach, focussing on creative activities to explore challenging areas. It was designed to be inclusive and accessible to participants with different needs and abilities.

Outcomes/Impact

Over 70% of workshop participants said they had not attended similar events before. Participants built new connections over the weekend, describing it as a place "to bond and talk freely", that they "left with new friends". Moreover, 86% of participants reported feeling more empowered, with 57% recording improved self-confidence. After the workshop, many participants have stayed in-touch and expressed interest in leading sessions at future face-to-face events, when possible.

Innovation/Significance

In the effective treatment era, achieving good quality-of-life among people living with HIV in the UK is a policy priority. The unique, tailored programme of Young Women Rising allowed young women living with HIV to build support networks, learn new health information and develop vital skills, all of which can reinforce wellbeing. As a result, Young Women Rising is an important template for engagement with young women living with HIV focusing on support and empowerment.

High incidence of antimicrobial use and overuse in cisgender men who have sex with men at risk of bacterial STIs

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Introduction

Antimicrobial use may be driving antimicrobial resistance in bacterial STIs. We determined individual level incidence of antibiotic receipt and empiric antibiotic therapy in cisgender men who have sex with men (MSM) attending a sexual health clinic.

Methods

We included all visits by cisgender MSM to the Public Health Seattle-King County Sexual Health Clinic between 2011-2018, using the number of MSM with ≥ 1 clinic visit annually as the denominator for incidence calculations. We enumerated the number of visits at which azithromycin, doxycycline, a penicillin drug, cephalosporins, fluoroquinolones, or any other systemic antibiotic was prescribed. We calculated the incidence of visits at which ≥ 1 antibiotic was prescribed and incidence of total distinct antibiotics prescribed; we also examined incidence of empiric therapy for exposure to *Neisseria gonorrhoeae* (NG) and/or *Chlamydia trachomatis* (CT) exposure and the incidence of overtreatment episodes, defined as empiric therapy in those later confirmed to not have either infection.

Results

There were 38,483 clinic visits by MSM, 14,577 (37.9%) of which resulted in ≥ 1 antibiotic prescribed (incidence rate [IR] 60.8/100 person-years) for a total of 21,472 distinct antibiotics prescribed (IR 89.6/100 person-years). Individual patients received an average of 0.90 distinct antibiotics annually; 8% received 3+ distinct antibiotics. Azithromycin was the most prescribed antibiotic (IR 42.7/100 person-years), followed by cephalosporins (IR 27.0/100 person-years). Empiric therapy for CT/NG was common (IR 13.4/100 person-years), most of which was overtreatment (IR 8.7/100 person-years). Of 12,675 CT/NG treatment episodes, 3,221 (25.4%) were empiric therapy in asymptomatic contacts, of which 2,076 (64.4%) were later confirmed to be negative for both infections.

Conclusions

Antibiotic use and overtreatment are high in a population at elevated risk for antibiotic resistant infections; these results should prompt reexamination of indications for empiric antibiotic treatment, particularly among contacts to bacterial STIs, and the effects of empiric STI treatment on antimicrobial resistance.

Characteristics of People with Gonorrhea with Reduced Azithromycin Antimicrobial Susceptibility in 8 Jurisdictions in the United States, 2018–2019

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Background: In the USA, reduced azithromycin susceptibility (AZM-RS) gonococci have been observed in men who have sex with men (MSM), women, and men who have sex with women only (MSW). However AZM-RS prevalence and epidemiological characteristics among women and MSW are not well-described. We examined epidemiological characteristics of MSM and a combined group of women and MSW with susceptible and AZM-RS gonorrhea to investigate differences between groups.

Methods: We analyzed epidemiological and susceptibility data from people attending STD and community clinics in eight jurisdictions participating in CDC's Strengthening U.S. Response to Resistant Gonorrhea project during 2018–2019. We defined people with AZM-RS gonorrhea as those with ≥ 1 gonococcal isolate demonstrating a minimum inhibitory concentration of AZM $\geq 2.0\mu\text{g/mL}$. We used inverse variance weighting to account for heterogeneity in sample size across jurisdictions to estimate pooled AZM-RS prevalences and 95% confidence intervals.

Results: Across eight sites, 8,859 people (4,521 MSM, 758 women, and 3,580 MSW) provided at least one isolate for susceptibility testing; 1,052 people (10.4% [95% CI: 6.4%–14.4%]) had gonorrhea demonstrating AZM-RS. AZM-RS prevalence was markedly high among MSM (15.1% [95% CI: 10.2%–20.0%]), and lower yet elevated among women and MSW combined (5.3% [95% CI: 2.9%–7.7%]). Among MSM with AZM-RS gonorrhea, 16.2% (95% CI: 10.9%–21.4%) reported having 3+ sexual partners in the last 2-3 months and 16.7% (95% CI: 12.6%–20.9%) reported previous gonococcal infections. Among women/MSW with AZM-RS, 6.2% (95% CI: 3.7%–8.7%) reported 3+ recent sexual partners, and 4.8% (95% CI: 2.4%–7.3%) reported previous gonococcal infections.

Conclusions: AZM-RS prevalence among women/MSW was lower than among MSM but still elevated, and a lower proportion of women/MSW reported multiple recent sexual partners and previous gonococcal infections. These data highlight differences in the epidemiology of reduced gonococcal susceptibility and the need to tailor resistant gonorrhea control approaches to affected populations.

Removing Barriers to HIV Screening in a Community-based Pediatric Emergency Department

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Background: Memorial University Medical Center conducts opt-out HIV screening in the Emergency Department (ED) for patients aged ≥ 13 . After gaining consent, an electronic algorithm automatically orders an HIV test with the diagnostic evaluation for patients who meet CDC guidelines for HIV screening. Unfortunately, no pediatric patient aged 13-18 received HIV screening despite our out-opt testing protocol being in place since 2016.

Approach: Through a systematic analysis, implicit bias to gain consent was repeatedly identified as the most common barrier to HIV screening in this population. Pediatric leadership developed strategies to improve HIV screening, including education of parents and staff, on-site support for staff and parents/guardians, pediatric patient counseling, and adding HIV screening to syphilis tests. Despite these interventions, HIV screening in the pediatric population only improved about 37% from January 2017 through November 2020. As a final strategy HIV screening was added to the sexually transmitted infection (STI) order set for patients who met CDC guidelines for STI. Pediatric ED HIV education to clinical staff continued, specifically emphasizing the high prevalence of HIV in our community.

Outcomes: Persistence to drive change increased HIV screening by 61% from July 2020 to December 2020. Strategies producing the greatest impact were the inclusion of HIV testing in the standard STI panel and focused pediatric ED nurse education/support. As a result, current HIV screening in our pediatric patients aged 13-18 is now 88% of those who meet CDC guidelines to be screened.

Significance: Up to 20% of HIV diagnoses occur during adolescence making screening in this age group imperative. Removing implicit bias from HIV screening is difficult. However, continued persistence and automated testing protocols can lead to increases in pediatric ED HIV screening. Because of our high HIV screening rate, many pediatric patients will have early identification of HIV and linkage to care.

Acceptability and Preferences for Using a Novel Device to Self-Collect Blood Specimens for HIV Pre-Exposure Prophylaxis (PrEP) Laboratory Monitoring

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Home-based PrEP monitoring (HBPM) has the potential to improve PrEP access and retention but is hampered by difficulties collecting blood, which typically involves painful fingersticks that yield insufficient specimen for quantitative syphilis serologies. We evaluated the use of the Tasso OnDemand™, a device that facilitates relatively painless self-collection of enough blood for HIV, creatinine, and quantitative rapid plasma reagin testing.

From May 2020 – January 2021, we recruited subjects for two studies of the Tasso device and HBPM preferences. First, we sent invitations to English-speaking clients enrolled in an online messaging platform and receiving PrEP through the Sexual Health Clinic (SHC) in Seattle, WA, asking them to view a Tasso device video and complete a survey. In a second study, we recruited SHC PrEP clients and persons with known/suspected syphilis or living with HIV. After brief instruction in clinic, clients used the Tasso device and completed a survey about their experience.

Of 509 clients offered participation online and 46 in clinic, 102 (20%) and 46 (100%), respectively, completed surveys. Most participants were cisgender men (132, 90%) of median age 34 years who identified as non-Hispanic White (78, 52.7%). Thirty-seven (45%) reported a history of syphilis. Given current COVID restrictions, 124 (89.2%) participants were interested in self-collecting PrEP laboratory samples at home. Many felt home sampling kits would increase their likelihood of staying on PrEP (61/135, 45.2%). Of the 46 participants who self-collected blood specimens in clinic, 42 (93.3%) felt the process was easy and 35/36 (97.2%) PrEP-eligible participants felt they could similarly self-collect blood at home.

Self-collection of blood specimens using the Tasso device is feasible and acceptable to persons using PrEP. Future studies will assess how often individuals will use this device rather than come to the SHC for PrEP care and the impact of HBPM on PrEP retention.

A New Method for Self-Collection of Blood Specimens for HIV Pre-Exposure Prophylaxis (PrEP) Laboratory Monitoring

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Sexually transmitted infection (STI) testing is an important component of PrEP care. Home-based PrEP monitoring (HBPM), consisting of STI sample self-collection and remote follow-up, could improve PrEP access and retention rates, particularly in the context of the COVID-19 epidemic. However, existing fingerstick methods for collecting blood often result in too little specimen for quantitative rapid plasma reagin (RPR) testing, limiting the ability to distinguish between old and new syphilis infections. We evaluated the Tasso OnDemand™ device, designed to collect 300 µg of capillary blood, for self-collecting blood specimens for PrEP monitoring, including quantitative syphilis testing.

From July 2020 – January 2021, we enrolled 46 clients who were either on PrEP, had known/suspected new syphilis infection or were living with HIV and seeking STI care at a sexual health clinic in Seattle, WA, USA. After brief instruction, clients used the Tasso device in the clinic to self-collect blood from the upper arm. We compared HIV antigen/antibody, quantitative RPR and creatinine assay results using paired Tasso and venipuncture serum specimens.

Most clients were cisgender men (42/46, 91%) and currently using PrEP (33/37, 89%). Of 46 participants, 40 (87%) collected a blood sample sufficient to complete ≥1 test. Percent positive agreement and negative percent agreement (PPA and NPA, respectively) for 34 HIV specimens was 100% (7/7 HIV positive). Of 30 paired qualitative RPR specimens, PPA was 100% (10/10 samples) and NPA was 95% (19/20 samples). Differences between 9 paired quantitative RPR titers were all ≤1 dilution. Paired creatinine results (n=9) were strongly and positively correlated ($r^2=0.84$, $p=0.008$) with a median difference of 0.05 mg/dL (range: -0.01-0.20).

Self-collection of blood specimens adequate for recommended PrEP laboratory testing is feasible and results show high levels of agreement with venipuncture samples. The Tasso device shows promise for use in mailed sampling kits for HBPM.

Associations between vaginal bacteria and bacterial vaginosis signs and symptoms: a comparative study of Kenyan and American cisgender women

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Background: Vaginal colonization with specific bacterial vaginosis (BV)-associated bacteria has been associated with individual BV signs and symptoms (Amsel criteria). Bacterial colonization and associations with Amsel criteria may vary between populations. We assessed relationships between vaginal bacteria and Amsel criteria among two distinct cohorts.

Methods: Kenyan participants from the placebo arm of the Preventing Vaginal Infections (PVI) trial and participants from a Seattle-based cross-sectional BV study were included. At PVI trial enrollment and bi-monthly follow-up visits and the Seattle study visit, Amsel criteria were recorded, and the vaginal microbiota was characterized using 16S rRNA gene sequencing. For each cohort, logistic regression models were fit to evaluate associations between vaginal bacterial relative abundance and each Amsel criterion (PVI cohort models used generalized estimating equations).

Results: Among 84 PVI participants (contributing 496 observations), the prevalence of amine odor was 25%, clue cells 16%, vaginal discharge 10%, elevated vaginal pH 69%, and BV 13%. Among 220 Seattle participants, the prevalence of amine odor was 40%, clue cells 37%, vaginal discharge 52%, elevated vaginal pH 67%, and BV 44%. BV-associated bacterium 1 (BVAB1) was positively associated with each Amsel criterion in both cohorts. *Atopobium vaginae*, *Eggerthella* type 1, *Gardnerella*, *Sneathia amnii*, and *Sneathia sanguinegens* were positively associated with each criterion in the Seattle cohort, and all but discharge in the PVI cohort. *Prevotella amnii* was positively associated with each criterion except discharge in the PVI cohort. *Megasphaera* type 1 and *Prevotella timonensis* were positively associated with each criterion in the Seattle cohort. *Lactobacilli* were negatively associated with individual criteria in both cohorts.

Conclusions: A set of core vaginal bacteria were positively associated with Amsel criteria in both cohorts, suggesting their importance in the manifestation of BV signs and symptoms, regardless of population differences. These results may have implications for future BV treatment studies.

Factors associated with exchange sex among women and men who inject drugs – 23 US cities, 2018

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Background: People who inject drugs (PWID) and exchange sex face disproportionate burdens of HIV and sexually transmitted infections (STIs). Studies examining risk factors for exchange sex are limited among PWID, especially men, and could help tailor prevention efforts.

Methods: We used 2018 National HIV Behavioral Surveillance data to assess prevalence of exchange sex among PWID, specifically women and men with a history of sex with men (MSM). Exchange sex included receiving money/drugs for sex from ≥ 1 male partner(s) during the past year. We conducted bivariate analyses that accounted for each respondent's city and network size to examine associations between exchange sex and sociodemographic characteristics, risk behaviors, and HIV/STI diagnoses.

Results: Among 4,657 PWID (3,391 women; 1,266 MSM), over one-third reported exchange sex (women: 36.2%; MSM: 34.8%). Women who exchanged sex (WES) tested HIV-positive more frequently (8.0% vs. 4.8%, $P=0.005$) and reported more frequent recent bacterial STIs (13.4% vs. 5.1%, $P<0.001$) than other women. Men who exchanged sex with men (MESM) showed similar trends (HIV: 17.5% vs. 14.6%, $P=0.181$; STIs: 12.7% vs. 6.1%, $P<0.001$). WES and MESM were more likely to be uninsured (women: 45.7% vs. 33.3%, $P<0.001$; MSM: 43.3% vs. 31.6%, $P=0.002$) and recently homeless (women: 41.8.4% vs. 25.2%, $P<0.001$; MSM: 39.6% vs. 17.2%, $P<0.001$). WES also reported higher frequencies of unemployment (37.2% vs. 29.2%, $P=0.001$) and incarceration (42.5% vs. 33.4%, $P<0.001$) than other women. WES and MESM were more likely to engage in polydrug use and risky sexual behaviors (e.g. number of condomless anal sex partners).

Conclusion: Men are often overlooked in interventions for PWID who exchange sex; however, we found women and MSM had similar frequencies of and risk factors for exchange sex among PWID. Interventions for PWID should be available for women and men who report exchange sex, while integrating opportunities for HIV/STI testing and preventative care.

Disseminated gonococcal infection case series: clinical presentations, microbiology findings and whole genome sequencing results

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Background

Disseminated gonococcal infection (DGI) is a rare complication of *Neisseria gonorrhoeae* (NG) infection arising from bacteraemia. It classically manifests as one or more of acute arthritis, tenosynovitis and dermatitis, more commonly in females. Anecdotally, DGI is increasing. We describe eight cases of DGI; seven presented within 13 months.

Methods

All cases presented/referred, to STI/ID at a large teaching hospital, in England and diagnosed with proven/probable DGI.

Demographic, clinical and microbiological data were prospectively collected.

Whole genome sequencing (WGS) of positive cultures was undertaken

Results

Three proven (synovial fluid/skin NG culture positive) and five probable cases were identified, all males (7/8 MSM), and most (7/8) with no genital symptoms. Hip and wrist were the most commonly affected joints. Dermatitis featured in 5/8. All were NG NAAT-positive at an extra-genital site (pharynx or rectum); only 3/8 were urine NAAT-positive. Five cultured isolates from five patients underwent WGS: 2/5 had no linkage to other DGI or database isolates, 3/5 were 8-20 single nucleotide polymorphisms apart and from ST-7822, one of commonly circulating lineages in England. 6/8 presented initially to non-STI specialties, and experienced a delay in diagnosis and initiation of appropriate antibiotic therapy (mean 10.7 versus 4 days). Five required hospital admission (mean stay 14.4 days).

Conclusion

This is the first study of WGS in DGI. DGI cases were not all associated with a single clone or outbreak, but several were from the same lineage, consistent with ST-7822 possibly causing more invasive infection. Our series supports an increased rate of DGI (our department saw <1 case/year historically). This may be related to host factors combined with increased NG prevalence in MSM worldwide. The cases demonstrate the lack of genital symptoms, which may contribute to delay in management and highlights the importance of extra-genital NAAT testing and awareness outside of STI services.

Strengthening the U.S. Response to Resistant Gonorrhea (SURRG): A program to enhance local antibiotic resistant gonorrhea preparedness capacity

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Background/Purpose: In 2016 the U.S. Centers for Disease Control and Prevention (CDC) initiated Strengthening the U.S. Response to Resistant Gonorrhea (SURRG) in local jurisdictions to enhance antibiotic resistant gonorrhea (ARGC) rapid detection and response infrastructure and evaluate the impact of key strategies.

Approach: Eight jurisdictions were funded for five years to establish or enhance local specimen collection for gonococcal cultures in STD and community clinics, conduct rapid antibiotic susceptibility testing (AST) using Etest® in local public health laboratories, modify surveillance systems for enhanced data collection and rapid communication of AST results, and initiate partner services and investigations among patients with GC demonstrating reduced susceptibility (RS) to ceftriaxone, cefixime or azithromycin.

Outcomes/Impact: SURRG grantees incorporated robust genital, pharyngeal, and rectal gonococcal culture collection from all genders at participating clinics. During 2018-2019, grantees performed AST on >10,700 isolates with a five-day median turnaround time from specimen collection to reporting AST results to providers. Fifty-nine percent of patients with RS GC returned for a test-of-cure; no resistance-related treatment failures were detected. Among 4,511 isolates, we found ≥95% concordance (within one doubling dilution) between AST performed locally using Etest® compared to agar dilution (reference method) for ceftriaxone, cefixime and azithromycin. We conducted investigations among cases and partners, identifying >100 new GC cases. Finally, we merged epidemiologic and partner data with isolate genomic data to further explore sexual networks with GC transmission and identify opportunities for local interventions.

Innovation and significance: SURRG successfully built clinic, laboratory, and epidemiological capacity for local ARGC rapid detection and response. Notable outcomes/innovations include establishing best practices for collecting and transporting gonococcal culture specimens, implementing Etest® in local jurisdictions, and measuring the value of containing ARGC spread through partner services. Lessons learned and project-informed identification of additional ARGC control needs at the local and national level are being used to inform CDC's ongoing ARGC control efforts.

Community-directed Bacterial Sexually Transmitted Infection (STI) Testing Interventions Among Men Who Have Sex With Men (MSM): An E-Delphi Study

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Background: Canadian clinical guidelines recommend at least annual and quarterly sexually transmitted infection (STI) testing among sexually active men who have sex with men (MSM), including those on HIV PrEP or in HIV care. We built consensus around interventions to improve local STI testing services for MSM using a web-based “e-Delphi” process.

Methods: We recruited Experts for a Community Panel (MSM who sought/underwent STI testing in the preceding 18 months, conducted 09/2019-11/2019) and a Provider Panel (offered STI testing to MSM in the past 12 months, conducted 02/2020-05/2020). Experts prioritized 6-8 potential interventions, generated from a literature review, on a 7-point Likert scale of ‘Definitely not a priority’ to ‘Definitely a priority’ over 3 survey rounds. Consensus was defined as ≥60% within a ±1 response point. Summaries of panel responses were given in successive rounds. We report the percentage of ‘a priority’ at the final round of survey.

Results: Among Community Experts, 43/51 (84%) completed all rounds; 19% HIV-positive, 37% HIV-negative on PrEP, 42% HIV-negative not on PrEP. We reached consensus on 6 interventions – Client Reminders (95%), Express testing (88%), Routine testing (84%), Online booking app (84%), Online testing (77%) and Nurse-led testing (72%). Experts favoured interventions that were convenient while also maintaining a relationship with their provider. Among Provider Experts, 37/48 (77%) completed all rounds; 59% were physicians. Consensus was reached on the aforementioned interventions (range 68%-100%) but not reached for Provider Alerts (19%) and Provider Audit and Feedback (16%). Express, Online and Nurse-led testing were prioritized by >95% of Experts because of streamlined processes and decreased need to see a provider.

Conclusions: Both panels were enthusiastic about innovations that make STI testing more efficient.

However, Community Experts preferred convenient interventions that involved their provider while Provider Experts favoured interventions that prioritized patient independence and reduced patient-provider time.

Incarceration and Subsequent Pregnancy Loss among Black and White Women: Exploration of Sexually Transmitted Infections as a Mediating Pathway

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Background: Incarceration is linked to risk of sexually transmitted infection (STI) post-release among women in the United States. There has been little examination of incarceration's association with related sexual and reproductive outcomes such as pelvic inflammatory disease (PID) and pregnancy loss, or the role of STI in this relationship and whether these relationships differ between Black and white women.

Methods: Using data from the National Longitudinal Study of Adolescent to Adult Health, we examined cross-sectional associations between incarceration (Wave IV; 2007-08; ages 24-34) and history of STI and PID (n=5968), and longitudinal associations between incarceration and later pregnancy loss in mid-adulthood (Wave V; 2016-18; ages 34-43) among women who had ever been pregnant (n=2353); we estimated racial differences. Using causal mediation, we explored whether STI and PID mediated associations with pregnancy loss.

Results: Incarceration was associated with a history of STI (white adjusted prevalence ratio [APR]: 1.54, 95% CI 1.14, 2.06; Black APR: 1.26, 95% CI 1.02, 1.56); the association between incarceration and PID was null among white women (APR: 0.99, 95% CI 0.47, 2.09) and elevated among Black women (APR: 2.82, 95% CI 1.36, 5.83). Prior incarceration did not appear associated with pregnancy loss among white women (APR: 1.01, 95%CI 0.70, 1.45), but was associated among Black women (APR: 1.38, 95% CI: 0.97, 1.97), with STI appearing to partially mediate.

Conclusion: Pregnancy loss may be elevated among Black women who have been incarcerated, and incarceration-related increases in STI may account for some of this association. Sexual and reproductive health care providers may want to assess history of incarceration among patients and, given the stronger associations among Black women and the higher prevalence of incarceration in this group, incarceration may have particularly deleterious consequences for their reproductive health, underscoring the need to consider alternatives to incarceration to address racial inequities.

Pyrococcus furiosus thioredoxin as a platform to express extracellular loops of Treponema pallidum outer membrane proteins

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Background: Development of a vaccine is a necessary step towards curtailing the global syphilis epidemic. Towards this end, our group has utilized bioinformatic and biophysical methods to characterize *T. pallidum*'s repertoire of outer membrane proteins (OMPs): the two 'stand-alones', BamA and LptD, and the *T. pallidum* repeat (Tpr), 8-stranded β -barrel, outer membrane factor (OMF) for efflux pump, and FadL paralogous families. We have hypothesized that antibodies against extracellular loops (ECLs) of OMPs are responsible for the opsonic and protective activities of immune rabbit serum (IRS). We used *Pyrococcus furiosus* thioredoxin (PfTrx) as a scaffold to present ECLs for assessment of reactivity with syphilitic sera and quantitation of circulating ECL-specific B-cells. To develop this system, we focused on BamA/ECL4 which we previously have shown is immunogenic and a target for opsonic antibodies.

Methods: PfTrx was engineered to express BamA-ECL4 (PfTrx-BamA/ECL4) with a N-terminal His6- and C-terminal Avi-tags for Ni-NTA purification and in vivo biotinylation, respectively. Reactivity of IRS and human syphilitic sera (HSS) with PfTrx-BamA/ECL4 was assessed by immunoblotting. To determine the accessibility of the BamA/ECL4 epitope, a pull-down assay was performed by incubating PfTrx-BamA/ECL4 or PfTrx with IgG from IRS or normal rabbit serum (NRS) immobilized on protein G agarose beads. BamA/ECL4-specific IgG+ B-cells were identified by flow cytometry using PfTrx-BamA/ECL4 conjugated with streptavidin (SP)-Alexa Fluor 647 and SP-Brilliant Violet-421. PfTrx was conjugated to SP-APC-Cy7 to exclude non-specific binding to scaffold.

Results: IRS and HSS recognized PfTrx-BamA/ECL4 but not PfTrx. PfTrx-BamA/ECL4 was pulled down by IgG from IRS but not NRS, while PfTrx was not pulled down by either. 1.66% of circulating IgG+ B-cells were PfTrx-BamA/ECL4-specific.

Conclusion: When used in conjunction with OMP structural models, PfTrx-ECL is a promising platform for identification of antigenic ECLs and isolation of ECL-specific B-cells for the generation of anti-ECL monoclonal antibodies with opsonic activity.

Vaginal washing behavior and fecundability in Kenyan women planning pregnancies

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Background: Vaginal washing is associated with acquisition of HIV, sexually transmitted infections, and bacterial vaginosis (BV). One study of US women found that vaginal washing was associated with a 30% reduction in fecundability, the per-menstrual cycle probability of pregnancy. We examined the association between vaginal washing and fecundability among Kenyan women.

Methods: HIV-negative Kenyan women who were trying to conceive and reported no history of infertility care-seeking were followed prospectively for incident pregnancy for up to six months. At monthly visits, participants reported the first day of last menstrual period, sexual behavior, vaginal washing behavior, underwent pregnancy testing, and provided vaginal swabs for detection of BV by Gram stain (Nugent score ≥ 7). Discrete time proportional probabilities models were used to estimate fecundability ratios (FR) and 95% confidence intervals (CI) comparing menstrual cycles when women reported vaginal washing to menstrual cycles when no vaginal washing was reported.

Results: 458 women contributed 1,376 menstrual cycles and 255 pregnancies. At enrollment, 7.5% (n=34/454) women had Chlamydia trachomatis detected, 0.7% (n=3/454) had Neisseria gonorrhoeae, 0.9% (n=4/453) had Trichomonas vaginalis, 35.8% (n=164/458) had BV, and 10% (n=46/458) reported abnormal vaginal discharge. A third (35.4%, n=162/458) of participants reported vaginal washing at enrollment with the majority using water only (72.8%, 118/162). After adjustment for age, frequency of condomless sex, and study site, vaginal washing in the prior four weeks was associated with a significant 29% lower fecundability (adjusted FR (aFR) 0.71, 95%CI 0.53-0.94), which did not change after further adjustment for BV at the visit prior to each pregnancy test (aFR 0.71, 95%CI 0.54-0.97).

Conclusions: Periconceptual vaginal washing may reduce fecundability. Potential mechanisms include vaginal washing-associated changes in the vaginal microbiota, inflammation, disruption of cervical mucus, and effects on sperm function. Vaginal washing has no known health benefits, and cessation may improve women's likelihood of conceiving.

Lack of association between azithromycin-resistant *Neisseria gonorrhoeae* infection and prior exposure to azithromycin among persons attending a Sexual Health Clinic

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Background

There is conflicting evidence on whether azithromycin (AZM) exposure is associated with subsequent AZM-resistance in persons with *Neisseria gonorrhoeae* (NG) infection.

Methods

We included all patients from the Public Health-Seattle & King County Sexual Health Clinic (SHC) with culture-positive NG at ≥ 1 anatomic site whose isolates were tested for AZM resistance 2011-2019. We examined association of 1) any prescription of AZM from the SHC in ≤ 3 , 6, and 12 months prior to NG diagnosis with AZM resistance (minimum inhibitory concentration [MIC] ≥ 2.0 $\mu\text{g/ml}$) using logistic regression and 2) the number of AZM prescriptions of either 1 or 2g in ≤ 3 , 6, and 12 months and AZM MIC using linear regression. Both analyses controlled for race, age, HIV status, sex assigned at birth, gender of sex partner(s), anatomic site of infection, year/season of NG diagnosis, number of sexual partners in ≤ 12 months, and number of clinic visits in ≤ 3 , 6, and 12 months.

Results

Among 1,845 unique patients with 2,400 incident NG infections, 145 (6%) were resistant to AZM. In logistic regression, diagnosis with resistant NG was not associated with receipt of any AZM in ≤ 12 months (adjusted Odds Ratio [aOR] 0.69, 95% CI 0.43-1.12), ≤ 6 months (aOR 0.66, 95% CI 0.36-1.12) or ≤ 3 months (aOR 3.10, 95% CI 0.61-15.69). AZM MIC was not associated with the number of AZM prescriptions in ≤ 12 months (adjusted coefficient 0.06, 95% CI -0.07-0.18), ≤ 6 months (0.16, 95% -0.10-0.41) or ≤ 3 months (2.47, 95% CI -1.79, 6.7).

Conclusion

Although our exposure variable is limited to receipt of AZM at a single clinic, we found no significant association between AZM exposure in ≤ 3 , 6, or 12 months and subsequent AZM resistance among MSM with recurrent NG. These data suggest that individual-level AZM use for STI does not explain most cases of AZM resistant NG among MSM.

Substance Abuse, Violence, and Sexual Risk Among Adolescent Cis-Gender Women Who Are at High-Risk for Human Immunodeficiency Virus

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Background:

The substance abuse, violence, and AIDS (SAVA) syndemic framework offers a holistic approach to analyze these mutually reinforcing epidemics among women with or at-risk for HIV/AIDS. We investigated the relationship between SAVA conditions and sexual risk behavior among adolescent cis-gender women.

Methods:

We recruited high-risk adolescents into a large prospective Adolescent Trials Network Study between May 2017- 2018 in Los Angeles and New Orleans. Participants self-reported risky sexual behaviors in the past four months including condomless sex, number of sex partners, and substance use before sex. We categorized participants into having 0–3 SAVA condition(s) based on the presence or absence of self-reported substance abuse in the past 4 months, including marijuana, crack, heroine, ecstasy, and methamphetamine, childhood sexual abuse (CSA), and intimate partner violence (IPV) at baseline. We used logistic regression models to examine the association between the number of SAVA conditions and sexual risk behavior.

Results:

Our study included 204 cis-gender women, median age of 20 years (IQR 19-22). Overall, 80.4% reported recent substance use, 24.5% reported recent IPV, and 39.7% reported CSA. Among all participants, 47.6%, 32.4%, and 10.8% reported occurrence of one, two, and all three SAVA condition(s), respectively. The majority of participants (77.5%) reported condomless sex, 42.7% had more than one sex partner, and 36.8% reported substance use before sex. Each additional SAVA condition experienced by women was associated with having more than one sex partners (adjusted OR = 1.67; 95% confidence interval [CI] = 1.17, 2.40) and substance use before sex (OR = 1.41; 95% CI = 0.99, 2.02).

Conclusions:

In our study SAVA conditions were common. We found an association between the increased number of SAVA conditions and sexual risk behavior. How to mitigate the impact of SAVA conditions on sexual risk behavior needs further study.

Biological Outcome Measurement Through Mail-Based Testing for HIV, STIs, and Substance Use Among Adolescents

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Background:

COVID-19 disrupted in-person clinical research activities. In response, the Adolescent Medicine Trials Network (ATN) CARES study instituted mail-based testing for human immunodeficiency virus (HIV), sexually transmitted infections (STIs), and substance use screening. We assessed the acceptability and feasibility of the ATN CARES mail-based testing program.

Methods:

From September 2020- December 2020, trained study staff sent myLAB Box© mail-based test kits and written instructions to gay, bisexual, and transgender study participants between the ages of 16-26 years. The test kits included a dried blood spot collection card for HIV (4th generation antigen/antibody EIA) and syphilis (TP-EIA) testing, swabs and a urine collection kit for the detection of extragenital and genital Chlamydia trachomatis and Neisseria gonorrhoeae infection, and a urine collection kit for the screening of six substances. Staff tracked shipment status, and when delivery was identified, contacted participants to assist them with self-collection and test kit return.

Results:

Of the 65 youth who participated to date, 49.2% (32/65) returned their kit and completed at least one test. Those 32 participants had a median age of 23.5 years (IQR 22-25). The median number of days from test kit ordered to results was 18.5 days (IQR 15-23.5); median number of days from collection to results was 10 days (IQR 8.5-12). MyLAB Box© reported a total of 219 test results: 30 HIV, 22 syphilis, 56 chlamydia, 56 gonorrhea, and 55 drug tests processed. Of the 219 tests, 7.3% (16) were rejected due to specimen inadequacy (6 dried blood spot cards, 2 anal swabs, 8 urine specimens).

Conclusions:

Mail-based testing is a promising way to monitor a variety of biological study outcomes among adolescent study participants. Future studies should further investigate how to strengthen utilization and fidelity of mail-based testing.

Bacterial Vaginosis and Behavioral Factors Associated with Incident Pelvic Inflammatory Disease in the Longitudinal Study of Vaginal Flora

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Background: Pelvic inflammatory disease (PID) leads to long-term reproductive consequences for cisgender women. Bacterial vaginosis (BV) and behavioral factors may play a role in PID pathogenesis. We assessed associations between BV, behavioral factors and incident PID in a large prospective cohort.

Methods: We analyzed data (n=2,956) from the NIH Longitudinal Study of Vaginal Flora, a cohort of non-pregnant cisgender women followed quarterly for 12 months. PID was defined by at least one of the following: cervical motion tenderness, uterine tenderness, or adnexal tenderness (160 cases). We tested associations between BV (measured using Nugent's and Amsel's criteria) and PID at the subsequent visit using Cox proportional hazards models. Baseline sociodemographic factors (age, race, highest education level, marital status, monthly household income), time-varying sexual behaviors (condom use frequency, number of sexual partners, sexual partner concurrence), vaginal douching, and Chlamydia trachomatis (CT), untreated at baseline and concurrent with BV, were covariates. Adjusting for the few Neisseria gonorrhea and Trichomonas vaginalis cases did not alter results.

Results: The 2,956 participants contributed a total 2516.2 person-years, with a median 349 days per participant. In multivariable modeling, Nugent-BV (aHR=1.53, 95% CI:1.05-2.21), symptomatic Amsel-BV (aHR=2.15, 95% CI:1.23-3.75) and vaginal douching (aHR=1.47, 95% CI:1.03-2.09) were associated with greater risk of incident PID. Other factors associated with incident PID included baseline untreated CT, douching, and being married.

Conclusions: BV was associated with incident PID in a large prospective cohort, controlling for behavioral factors and sexually transmitted infections (STIs). Larger studies on how BV, STIs, behaviors, and host responses interactively affect PID risk are needed.

Pathways between intersectional stigma, gender equitable norms, and condom outcomes among urban refugee and displaced youth in Kampala, Uganda

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Background: Social inequities elevate HIV vulnerabilities among youth in humanitarian contexts. Condom efficacy—knowledge, intention, and relationship dynamics that facilitate condom negotiation—is understudied among refugee youth. We examined social-ecological factors (stigma, gender equitable norms [GEN], depression) associated with condom efficacy and use among urban refugee youth in Kampala, Uganda.

Methods: We conducted a cross-sectional survey with refugee youth aged 16-24 in Kampala's informal settlements. In multivariable regression analyses we examined associations between adolescent sexual and reproductive health (SRH)-related stigma, HIV-related stigma, and GEN with condom efficacy and recent (past 3-month) consistent condom use among sexually active participants. In path analyses we tested: direct effects of stigma (adolescent SRH-related, HIV-related) and GEN on condom efficacy, and indirect effects via depression; and direct effects of stigma (adolescent SRH-related, HIV-related) and GEN on recent consistent condom use, and indirect effects via condom efficacy.

Results: Among participants (mean age: 19.59, SD: 2.59; women: n=333, men: n=112), 62.5% were sexually active. Of these, only 53.3% reported consistent condom use. In multivariable analyses, lower adolescent SRH-related ($\beta = -0.18$, $p < 0.001$) and HIV-related ($\beta = -0.18$, $p < 0.001$) stigma and higher GEN ($\beta = 0.15$, $p < 0.001$) were associated with condom efficacy. Among sexually active participants, GEN was associated with increased (AOR: 1.07, 95%CI: 1.01-1.13), and adolescent SRH-related stigma with reduced (AOR: 0.92, 95%CI: 0.84-0.99), odds of recent consistent condom use. There were direct pathways from lower stigma (adolescent SRH-related, HIV-related) and higher GEN to condom efficacy. Depression partially mediated the pathway from HIV-related stigma to condom efficacy. Condom efficacy mediated pathways from stigma (HIV-related, adolescent SRH-related) and GEN to consistent condom use.

Conclusion: Consistent condom use was low and associated with community (lower stigma, gender equity), interpersonal (condom efficacy), and intrapersonal (reduced depression) factors. Gender transformative and intersectional stigma reduction interventions are needed to advance HIV/STI prevention among urban refugee youth in Kampala.

Contextual approaches to understanding HIV testing and prevention engagement among urban refugee adolescents and youth in Kampala, Uganda

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Background: HIV prevention needs are understudied with urban refugee youth. We explored experiences, preferences and engagement with HIV testing and prevention among urban refugee adolescents and youth in Kampala, Uganda, with a focus on the role of contextual factors in shaping access and uptake.

Methods: This qualitative community-based study with urban refugee youth aged 16-24 living in Kampala's informal settlements involved five focus groups (FG), including two with women, two with men, and one with sex workers. We also conducted five in-depth key informant interviews. We conducted thematic analysis informed by Campbell and Cornish's conceptualization of material and symbolic contexts.

Results: Refugee youth participants (n=44; mean age: 20.25, SD: 2.19; men: n=17; women: n=27) were from the Democratic Republic of Congo (n=29), Rwanda (n=11), Burundi (n=3), and Sudan (n=1). Participant narratives reflected material, symbolic and relational contexts that shaped HIV testing awareness, preferences and uptake. Material contextual factors that presented barriers to HIV testing and prevention engagement included: transportation costs to clinics, overcrowded living conditions that limited access to private spaces, low literacy, and language barriers. Symbolic contexts that constrained HIV testing engagement included medical mistrust of HIV testing, and inequitable gender norms. Religion emerged as an opportunity to connect with refugee communities and to address conservative religious positions on HIV and sexual health. Relational contexts connected with HIV prevention and testing engagement included linkages with professional support, family, friends, and intimate partners. Many participants suggested the need for mental health support alongside HIV care, particularly for HIV testing.

Conclusion: Efforts to increase access and uptake along the HIV testing and prevention cascade can meaningfully engage urban refugee adolescents and youth to develop culturally and contextually relevant services to optimize HIV and sexual health outcomes. Integrated mental health and HIV services may be warranted for urban refugee adolescents and youth.

Trends in PrEP awareness and uptake among Gay, Bisexual and other Men who have Sex with Men (GBM) in Canada

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Background

Availability and public funding of pre-exposure prophylaxis (PrEP) varies by jurisdiction in Canada. We conducted a multi-site prospective-longitudinal study to assess trends and correlates of PrEP awareness and use among gay, bisexual and other men who have sex with men (GBM) in Vancouver, Toronto and Montreal.

Methods

Sexually-active GBM, aged ≥ 16 years, were recruited through respondent-driven sampling (RDS) from February 2017 with follow-up data collected to March 2020. Participants completed a Computer-Assisted Self-Interview to assess PrEP awareness and use. Analyses were limited to HIV-negative GBM. We used generalized estimating equations accounting for two levels of clustering (RDS recruitment chain; participant) to evaluate temporal trends (monthly prevalence) of awareness and past six-month usage of PrEP. Multivariable models were built using backward selection to minimize QIC to identify correlates for two outcomes 1) PrEP awareness, and 2) PrEP use.

Results

We recruited 2008 HIV-negative GBM (N=622 from Vancouver, N=418 from Toronto, and N=968 from Montreal). Awareness of PrEP increased significantly in all three sites: Montreal, 81.2% during the first 6-month period to 91.4% during the last 6-month period ($p < 0.001$); Toronto, 94.2% to 96.6% ($p = 0.036$); Vancouver, 90.2% to 98.3% ($p < 0.001$). Use of PrEP also increased significantly in all three sites: Montreal, 14.2% during the first 6-month period to 39.3% during the last 6-month period ($p < 0.001$); Toronto, 21.4% to 31.4% ($p < 0.001$); Vancouver, 21.7% to 59.5% ($p < 0.001$). Multivariable models identified that Vancouver GBM had greater odds of PrEP awareness (aOR=1.94 95%CI=1.32-2.87) and PrEP use (aOR=2.05, 95%CI=1.60-2.63) compared with Montreal GBM; Toronto GBM were not significantly different from Montreal GBM.

Conclusions

PrEP awareness was very high among GBM in all three cities. Uptake was highest in Vancouver where full public funding and active health promotion began in 2018 for those clinically eligible. Health policy and public health intervention can remove key barriers to PrEP implementation.

Tackling antimicrobial resistance using Bioinformatics approach in superbug *Neisseria gonorrhoeae* by targeting Glutamate racemase (Murl)

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Background:

Neisseria gonorrhoeae, a causative agent of gonorrhea, has developed resistance for most of the drugs and hence recently declared as 'Superbug'. Glutamate racemase (Murl) which is considered as an important drug target because it has shown an integral role in bacterial cell wall synthesis. Therefore, there is an intense need for identification of novel drugs for the treatment of gonorrhea.

Methods:

Based on the amino acid sequence of *Neisseria gonorrhoeae* Murl (YP_208550; Strain FA1090), a homology model was generated to perform homology modeling based on the PDB BLAST results and their validation based on DOPE score and PDF energy score which was further verified by Verify-3D protocol and Ramachandran Plot. co-crystallized ligand of the template was docked into the modeled Murl structure, after superimposition of template structure and modelled structure. Based on docking score, best pose was selected and receptor-ligand pharmacophore model was generated. Virtual screening of potent inhibitors against the pharmacophore model was performed, best hits were selected based on ADMET profile and further refined.

Results:

The best homology model generated was selected based on the verify score of 107.93 using Discovery Studio 4.0. Ramachandran plot showed 214 residues (91.8%) fall in most favored region. Quality factor of 84% for the protein models was obtained using ERRAT. Six pharmacophores were generated using best docking pose between D-glutamate and Murl. These were subjected to virtual screening with ZINC database. 2214 hits were filtered by fit value of 1.5 which has resulted in 594 filtered hits. Further refinement done by subjecting these 594 hits to Lipinski and veber filter followed by ADMET, which finally gave 378 hits.

Conclusions:

The study identifies potential compounds that interact with active site of Murl protein, opening new avenues for the treatment option against multi-drug resistant strains of this pathogen.

Chlamydia trachomatis induces ferroptosis to promote its own dissemination by inhibiting SLC7A11/GPx4 signaling

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Background: Chlamydia trachomatis (C. trachomatis), an obligate intracellular bacterium, exits the host through lysis to reinitiate its life cycle in new hosts. However, the mechanism underlying lytic egress is not well understood.

Methods: Propidium iodide staining and lactate dehydrogenase release assays were utilized to evaluate cell death during C. trachomatis infection. Lipid peroxide production, a hallmark of ferroptosis, was evaluated using the lipophilic fluorescent dye C11-BODIPY 581/591. Western blot and was employed for quantifying the ferroptosis-associated factors in the late stage of C. trachomatis infection. Ferroptosis inhibitors ferrostatin-1 and liproxstatin-1 were used to investigate the role of ferroptosis in C. trachomatis infection.

Results: We found that lysis of C. trachomatis-infected cells in the late stage of infection did not involve apoptosis/necroptosis but occurred via ferroptosis, a recently described form of programmed cell death. Reduced levels of solute carrier family 7 member 11 (SLC7A11), glutathione, and glutathione peroxidase 4 (GPx4), as well as accumulation of lipid peroxidation products, dysregulated cellular redox homeostasis in the late of C. trachomatis infectious cycle. Inhibiting lipid peroxidation using ferrostatin-1 and liproxstatin-1 not only abolished C. trachomatis-induced cell death, but also blocked C. trachomatis egress. Three C. trachomatis biovars were found to disseminate via ferroptosis, indicating that it is a conserved process.

Conclusion: C. trachomatis hijacks host cell machinery of ferroptosis in the late stage of infection for dissemination.

A novel PCR-CRISPR based diagnosis for *Treponema pallidum* detection, genotyping, and drug-resistance mutation identification in real-time

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Background: The sexually transmitted disease syphilis caused by *Treponema pallidum* subsp. *pallidum* (TPA), is resurging worldwide, particularly in developing countries. Nucleic acid amplification tests (NAATs) possess highly sensitive and specific capabilities, which have been largely utilized for pathogen detection, e. g. virus, bacteria, and fungus. However, the traditional NAATs applied to diagnose TPA are insufficiently sensitive.

Methods: We established a novel PCR-CRISPR based syphilis molecular diagnosis with multiple excellent utilities.

Results: The new approach retains the advantage of the high specificity of NAATs and allows detecting TPA with low concentrations at the single molecular level, which is more sensitive than the classical PCR assay. We also adapt this method to analyze the TPA by Nichols-/SS14-like cluster genotyping and macrolide resistance-associated mutations detection in real-time, providing a powerful tool for improving syphilis surveillance and clinical decisions/treatment selections. We further applied these assays to evaluate a panel of 42 TPA strains circulating in Southern China and find that the prevalent TPA strains consist of 83.33% SS14- and 16.67 % Nichols-like TPA strains, with 97.67 % of strains harboring 23s rRNA mutations (A2058G or A2059G).

Conclusion: We developed a novel PCR-CRISPR-based syphilis molecular assay, which exhibits robust capabilities and prospects in the diagnosis and molecular epidemiology of TPA.

Assessing within-host genetic variation in *Neisseria gonorrhoeae* at different anatomical locations and over time

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Background

Recent trials focus on novel antibiotic treatment options for *Neisseria gonorrhoeae* (Ng), since resistance against currently used cephalosporins is emerging. To assess antibiotic potential, patients with mixed infections or those who are reinfectd after treatment should be identified. Comparing levels of within-host genetic variation in Ng isolates at different anatomical locations and over time could identify those patients and could inform thresholds for similarity.

Methods

Isolates from the New AntiBiotic treatment Options for uncomplicated GOnorrhoea (NABOGO) trial were used in this study. Whole-genome sequences were obtained from paired isolates from 86 patients with multiple isolates from different anatomical locations (n pairs=59) or from different time points (n pairs=48). All isolates were typed according to the typing schemes: NG-Multi-Antigen Sequence Typing (NG-MAST), NG-Sequence Typing for Antimicrobial Resistance (NG-STAR), Multi-Locus Sequence Typing (MLST) and core genome MLST (cgMLST).

Results

Identical NG-MAST/NG-STAR/MLST profiles were identified within 93/107 (87%) isolate pairs. Different strains were found in 8/59 (14%) paired isolates from different anatomical locations, according to completely different NG-MAST/NG-STAR/MLST profiles. Five other isolate pairs from multiple anatomical locations differed in NG-MAST but were similar in NG-STAR/MLST. One case of reinfection was identified (1/48, 2%) according to a completely different NG-MAST/NG-STAR/MLST profile in an isolate pair from different time points. One other isolate pair from multiple time points differed only in NG-MAST, suggesting a potential case of reinfection. However, the level of similarity between typed cgMLST alleles was still >99% within the 5 isolate pairs with varying NG-MAST, which was only 4-87% within isolate pairs with completely different NG-MAST/NG-STAR/MLST profiles.

Conclusion

Isolates with completely different NG-MAST/NG-STAR/MLST profiles can be considered as different strains, according to the low similarity in cgMLST alleles. Isolates with variable NG-MAST still had high similarity in cgMLST alleles, suggesting that NG-MAST might be too variable for identifying mixed- and re-infections.

High prevalence of curable sexually transmitted infections among 14-19 year old adolescents at risk of HIV infection in Kampala, Uganda.

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Background

Sexually transmitted infections (STIs) are of public health significance; they have adverse reproductive health consequences and yet are preventable and curable. We studied STI prevalence and associated factors among adolescents in Kampala, Uganda.

Methods

We conducted a cross-sectional study among 14–19-year-old high-risk adolescents from March 2019 to March 2020. An interviewer-administered questionnaire was used to collect socio-demographic and behaviour data. STI tests were performed on urine using geneXpert for *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG), and serum using the Rapid plasma reagin/*Treponema Pallidum* Particle Agglutination Assay for syphilis. Outcomes were positive tests for CT, NG, and/or active syphilis (titre $\geq 1:8$). Statistical analysis was conducted using logistic regression.

Results

We enrolled 490 volunteers with a median age of 18 years (Interquartile range 17-18 years). Most were female (60.6%), ≥ 18 years (50.8%), had only primary school education (91.0%) and had their sexual debut at <15 years (48.4%). Females reported a higher prevalence of paid sex than males both at the last sexual encounter (96.4% vs 3.6%, $p<0.001$) and in the past 3 months (94.8% vs. 5.2%, $p<0.001$); 128 (26.1%) individuals reported change of residence in the past year with the frequency being higher in females than in males (82% vs 18%, $p<0.001$). STI prevalence was 39% [CT (21.4%), NG (5.9%), active syphilis (1.4%), multiple infections (10.3%)] and higher among females than males (75% vs 25%; $p<0.001$). Prevalent STIs were associated with paid sex at the last encounter (aOR 1.78; 95% CI 1.02-3.16) and change of residence in the past year. The effect of changing residence was modified by sex; being significant for female (aOR 2.17; 95% CI 1.29-3.67) but not male (aOR 0.26; 95% CI 0.33-2.00) participants.

Conclusions

Curable STIs are highly prevalent in this adolescent population. Interventions should increase access to STI prevention and treatment in sex work hotspots.

The global *Treponema pallidum* OMPeome: a structural platform for deciphering stealth pathogenicity and developing a syphilis vaccine with worldwide efficacy

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Background:

The outer membrane (OM) of *Treponema pallidum* (Tp) serves as the interface between the syphilis spirochete and its obligate human host and also is key to developing a vaccine with worldwide efficacy. We used structural modeling and bioinformatics to delineate the repertoire of OM proteins (OMPs) in the Tp Nichols strain. The Tp 'OMPeome' consists of two 'stand-alone' proteins (BamA and LptD) involved in OM biogenesis and four paralogous families involved in influx/efflux of small molecules: 8-stranded β -barrels, long-chain fatty acid transporters (FadLs), OM factors (OMFs) for efflux pumps, and Tp repeat protein (Tprs).

Design/Methods:

Three-dimensional structural OMP models were generated with I-TASSER, Phyre2, and trRosetta. SAXS was used to solve solution structures for TprK and T. denticola MOSP, the Tpr family parental ortholog.

Results:

Tp's BamA (TP0326) is the central component of a hybrid BAM system in which POTRA1-5 interacts with the DUF domain of TamB (TP0325). Although Tp lacks lipopolysaccharide, its genome encodes a nearly complete LPS transporter apparatus. The LptD ortholog (TP0515) contains a large unstructured C-terminal domain, which models LptE-like inside the β -barrel. Tp encodes four 8-stranded β -barrels, each containing positively charged extracellular loops that could contribute to pathogenesis. Surprisingly, Tp encodes five FadL orthologs, all of which display features (i.e., hatch domain and NPA motifs) that are characteristic of Gram-negative FadLs. Three (TP0548, TP0859 and TP0865) have α -helical extensions that could interact with periplasmic components. The Tp genome encodes Mac and RND efflux pumps that presumably achieve combinatorial diversity via co-expression of four paralogous OMFs. Lastly, we confirmed the bipartite membrane topology of Tprs using SAXS to solve solution structures for MOSPN domains of TprK and MOSP.

Conclusions:

The Tp Nichols OMPeome provides a structural framework to (i) elucidate Tp's enigmatic parasitic strategies, (ii) identify targets of natural immunity, and (iii) interrogate candidate vaccinogens.

Viral hepatitis prevalence among men who have sex with men recruited in an HIV PrEP demonstration study in Cotonou, Benin

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Background: Men who have sex with men (MSM) are disproportionately affected by hepatitis worldwide despite the availability of safe and effective vaccines for hepatitis A and B. The aim of this analysis was to estimate the prevalence and risk factors for current and lifetime hepatitis B, and HCV antibodies among MSM in Cotonou.

Methods: A two-stage cluster sampling procedure was used to recruit 204 MSM in the community-based PrEP demonstration study. First, 7 out of the 13 boroughs in Cotonou were selected using a probability proportional to size method and a fixed number of MSM were then randomly selected from each borough using a random route sampling procedure. A rapid immuno-chromatographic test was used for detecting HBV surface antigen (HBsAg, active infection) and HCV antibodies in whole blood. Enzyme immunoassays were used for detecting HBV core (anti-HBc) and surface (anti-HBs) antibodies (lifetime infection: HBsAg or anti-HBc positivity without anti-HBs). Risk factors analyses controlled for potential confounders using log-binomial regression.

Results: The prevalence of active and lifetime HBV were 8.8% and 37.7%, respectively. Only two men were HCV-positive (0.98%). Both current (16.7% versus 6.4%, $p < 0.0001$) and lifetime (66.7% versus 28.8%, $p < 0.0001$) HBV infection were more prevalent among MSM aged ≥ 30 years compared to younger subjects. Sexual intercourse under the effect of drug or alcohol, and living in couple were also associated with both current and lifetime HBV.

Conclusion: HBV is frequent in this population, especially in older MSM who are more likely to have started their sexual life before the initiation of MSM-specific interventions in Benin (2008). HCV prevalence was low, likely because of the absence of injectable drug use and the fact that all participants were HIV-negative. HBV vaccination, offered free of charge to children in Benin since 2005, should also be systematically offered to MSM susceptible to this infection.

Evaluating Opt-Out STI Testing at Admission within a Short-Term Correctional Facility Located in Alberta, Canada.

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Background

Incarcerated Canadians entering into correctional facilities experience higher rates of sexually transmitted infections (STI) than the general population. Yet, testing across correctional facilities remains inconsistent and symptom- or risk-based. Thus, STI prevalence is likely underestimated, and the number of undiagnosed individuals remains high. In response, Alberta implemented universal opt-out STI (chlamydia, gonorrhea, syphilis)/HIV screening at admission in a short-term correctional facility for all individuals ≤ 35 years.

This study evaluates opt-out screening at admission to provide Canadian-specific data as a comparative to current opt-in (symptom/risk-based) testing strategies. Specific outcomes were determined: (1) the uptake of opt-out screening, (2) reasons for opt-out screening non-completion, (3) STI/HIV positivity rates and (4) treatment completion rates.

Methods

A cross-sectional, retrospective analysis of opt-out screening outcomes between March 2018 and February 2020 was completed. Test data was extracted from admission line-lists, laboratory data and communicable disease treatment data. Descriptive statistics were used to stratify test data by STI, gender, age group, and date for univariate analysis.

Results

Opt-out screening was offered to the majority (96.7%) of admissions, while opt-out screening non-completion was largely attributed to patient decline (67.4%). Despite low testing uptake (31.2%), opt-out screening achieved high positivity rates (14.9% chlamydia, 10.8% gonorrhea, 29.5% syphilis and 0.3% HIV) and treatment completion rates (94.1% overall). Furthermore, 52.6% of opt-out cases were asymptomatic.

Conclusions

Although limited by retrospective analysis, opt-out screening at admission is a feasible strategy to increase STI/HIV testing and detect asymptomatic cases in a correctional setting. Communicative strategies within the facility will be critical to increase testing uptake among patients. Intensified screening and subsequent treatment can impact community transmission while reducing healthcare accessibility barriers for a vulnerable population.

Further, implementing opt-out STI/HIV screening in other high-risk settings, such as mental health and addictions, can be an effective case-finding strategy for outbreak management.

A Phylogenomic Survey of Disseminated Gonococcal Infection Isolates in the United States (2019-2020)

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Background: In December 2019, Centers for Disease Control and Prevention (CDC) released a Dear Colleagues Letter describing best practices for investigation of Disseminated Gonococcal Infection (DGI) cases which stressed the importance of culture from sterile and mucosal sites for additional analysis including genomic sequencing. The objective of sequencing was to understand the diversity of DGI isolates and explore the extent of genetically related isolate clusters in the US.

Methods: Between 2019 and 2020, CDC conducted sequencing on submitted DGI isolates using the Illumina MiSeq platform. Separately, the Michigan Department of Health and Human Services sequenced isolates submitted by laboratories in Michigan. Core genome Single Nucleotide Polymorphism (SNP) analysis was performed using snippy and the FA19 strain as a reference sequence. Detection of selected antibiotic resistance markers and multilocus sequencing typing (MLST) alleles was conducted using the Gonorrhea AMR Profiler and Typing Tool.

Results: We analyzed 45 isolates submitted by 7 states representing a total of 12 MLST sequence types (ST). The majority (66.7%) of these STs are among the top 25 STs found in a representative dataset of isolates sequenced from the Gonococcal Isolate Surveillance Program in 2018. We also identified 3 clusters of genetically related DGI isolates including 14 isolates from Michigan with a mean difference of 22 SNPs (range: 4-32), 5 isolates from North Carolina with a mean difference of 12 SNPs (range:8-28), and 2 isolates from North Carolina differing by 11 SNPs. All genomes examined contained wild type 23S rRNA markers (positions 2059 and 2611) and non-mosaic penA alleles. Notably, >85% of the sequences contained the porB1a allele, previously associated with serum resistance.

Conclusion: Isolates recovered from DGI cases are genetically diverse and frequently share STs associated with circulating isolates recovered from uncomplicated gonorrhea. The detection of DGI isolate clusters highlights the need for further epidemiological investigation.

Prevalence, risk factors and association with delivery outcome of curable sexually transmitted infections among pregnant women in Southern Ethiopia

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BACKGROUND: Curable sexually transmitted infections (STIs) such as infection with *Chlamydia trachomatis* (C. trachomatis), *Neisseria gonorrhoeae* (N. gonorrhoeae), and *Trichomonas vaginalis* (T. vaginalis) can lead to adverse pregnancy. There are limited data on the prevalence and correlate of STI in Ethiopia, yet pregnant women are not screened for curable STI. Hence in this study, the prevalence of STIs and associated risk factors were assessed.

METHODOLOGY: A cross-sectional study was conducted on consecutive women attending the delivery ward at the Hawassa comprehensive and specialized hospital. Vaginal swabs collected at the time of labor and delivery were tested for C. trachomatis, N. gonorrhoeae and T. vaginalis using GeneXpert. Study participants responded to a questionnaire about their previous and current obstetric history and socio-demographic characteristics. Possible independent factors for curable STIs were assessed by chi-square, bivariable, and multivariable logistic regression.

RESULTS: Of the 350 vaginal swabs tested, 51 (14.6%, 95% CI: 10.9-18.3) were positive for one or more curable STIs. The prevalence of C. trachomatis, N. gonorrhoeae and T. vaginalis were 8.3%, 4.3%, and 3.1%, respectively. STIs was associated ($p < 0.005$) with the birth weight and gestational age. A 3-fold increase in odds of acquisition STIs was documented in currently unmarried women (AOR, 3.5; 95% CI: 1.2-10.6; $p = 0.028$), and in younger pregnant women (AOR, 3.2; 95% CI 1.3-7.9; $p = 0.01$). Moreover, women reporting for presence of vaginal discharge (AOR, 8.3; 95% CI: 3.4- 20.5; $p < 0.001$) and reporting pain during urination (AOR, 6.4; 95% CI: 2.5- 16.4; $p < 0.001$) found significant associate with curable STIs.

CONCLUSION: The higher magnitude of STIs found in this population, and the absence of symptoms in many illustrate the need for systematic follow-up during routine antenatal care primarily history taking and asking for signs and symptoms to provide early management and avoid long term sequelae.

Uncovering Risky Networks: Risk Behaviors, Sexual Partnerships, and Provider Discussions Among Men Who Have Sex with Men and Women (MSMW)

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BACKGROUND: Differences in sexual networks and risk behaviors between MSM and MSMW have important implications for HIV/STI transmission networks and bridging to other populations. As most HIV/STI programming is directed toward MSM, understanding risk behaviors, healthcare provider discussions, and network factors differentially experienced by MSMW are critical toward developing targeted, efficacious HIV/STI prevention paradigms.

METHODS: This is an analysis of a longitudinal cohort of predominantly Black/Latinx MSM in Los Angeles, California, half with substance use and half with HIV. Every 6 months from 8/2014-1/2019, respondents completed surveys evaluating the following: discussion of sexual orientation/behavior with healthcare provider in last 6 months, transactional sex, and last partnership characteristics (type, gender of partner's sexual partners, HIV serostatus). MSMW was defined as self-reported sexual intercourse with a woman during last 6 months on two separate visits. Generalized estimating equations evaluated differences between MSM and MSMW associated with healthcare provider discussions, transactional sex, and last partnership characteristics, controlling for HIV and demographics.

RESULTS: Among 431 participants across 1,258 visits, 9.3% (40/431) of participants were MSMW and 90.7% MSM. 30% of MSMW were living with HIV (12/40) compared to 52.4% (205/391) of MSM ($p=0.007$). In adjusted analysis, MSMW had higher odds of: not discussing sexual orientation/behavior with healthcare providers (AOR 2.19; 95% CI 1.10-4.35), unknown last partner HIV serostatus (2.19; 1.23-3.89), transactional sex (4.35; 2.27-8.36) and last partner also being MSMW (2.10; 1.10-4.02), compared to MSM.

CONCLUSION: Despite riskier behaviors for HIV/STI transmission, MSMW had lower odds of discussing these behaviors with their healthcare providers, representing potentially missed opportunities for HIV/STI screening and prevention. Additionally, MSMW had higher odds of having MSMW sexual partners, suggestive of high-risk MSMW sexual networks that may not be uncovered in routine patient-provider discussions and should be prioritized in HIV/STI interventions designed to reduce barriers and facilitate linkages to care.

Low retesting and high reinfection rates among young people treated for chlamydia in Australian general practices

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Background: Reinfection after treatment for chlamydia is common and increases the risk of reproductive complications, particularly for women. Australian guidelines recommend retesting at 3 months after chlamydia treatment to identify reinfection. There are limited data about chlamydia retesting in Australia's mainstream primary care setting, general practice. We investigated retesting patterns among young people treated for chlamydia infection in regional Australian general practice clinics during 2010-2015.

Methods: Chlamydia testing and attendance data for 16-29-year-olds attending 128 regional general practices were collected for a chlamydia testing intervention trial. Rates of retesting within recommended timeframes (defined as 6-weeks-6-months after an individual's first positive chlamydia test) were calculated. We examined factors associated with retesting using logistic regression models adjusting for patient sex and age-group and clustered by clinic.

Results: A total of 2357 individuals (68.7% female) with a first positive chlamydia result formed the study population. In the following 6-weeks-6-months, 26.5% (95% CI 24.3-28.7) re-attended and were retested; 11.9% had a positive retest and positivity at retest was higher for males (19.2%, 95%CI 14.1-25.6) than females (10%, 95%CI 9.3-15.0). A further 39.1% (95% CI 36.1-42.2) re-attended but were not retested and 34.4% (95% CI 31.7-37.2) did not re-attend. Multivariable analysis showed that retesting was more likely for women (adjusted odds ratio (AOR) 2.23, 95% CI 1.79-2.79) and in intervention clinics (AOR 1.33; 95%CI 1.07-1.64,) and that individuals aged 20-24 years were less likely (AOR 0.73; 95%CI 0.59-0.92) to be retested than 16-19-year-olds.

Conclusions: Rates of retesting within recommended timeframes were low and there were missed opportunities for retesting. Age and sex differences in retesting and clinics highlight the need for processes within clinics and patient focused strategies to promote reattendance and retesting. High reinfection rates further highlight the importance of retesting for timely reinfection detection and treatment.

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.

Men's perception of HIV-positive status disclosure in rural South Africa

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Background: Disclosure of an HIV-positive status has significant implications for public health outcomes, social relationships, and individual psychological and emotional well-being. The response to the disclosure is critical for future treatment adherence, feelings of stigma, future disclosure, and overall health behaviours. There is paucity of data on the impact of the reaction of the person disclosed to on men's willingness to disclose. We report on men's perception of HIV-positive status disclosure in rural KwaZulu-Natal, South Africa.

Methods: Following informed consent and COVID-19 regulations, 12 telephonic in-depth interviews and 3 face-to-face group discussions (October-November 2020) were conducted with a purposive sample of men aged 23-65 years from rural KwaZulu-Natal. Themes were identified from the interview transcripts, manually coded, and analysed thematically. The study was approved by the University of KwaZulu-Natal, University of Johannesburg, and Africa Health Research Institute research ethics committee.

Results: Personal characteristics, gender, HIV knowledge and HIV identity were key factors for study participants to disclose their HIV-positive status to another person. Participants reported that if that person is popular, friendly, and talkative, they will be reluctant to disclose to them fearing that they might tell others. Some were wary of disclosing to female nurses from their community. It is also difficult for men to reveal their HIV-positive status to their partners fearing that they will be viewed as a cheater or someone with a promiscuous past. Knowing that the person disclosed to is also HIV positive makes it easier for the men in our study to disclose their HIV status.

Conclusion: Our findings show that men often weigh up the costs and benefits of disclosing their HIV-positive status depending on who they are disclosing to. Further research is needed to understand different ways in which men can disclose their HIV-positive status without fear of stigmatization.

A qualitative study on sexualised drug use among male and transgender women sex workers in Amsterdam, the Netherlands

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Background

The objective of this study was to provide insight into the motives of drug use during work among male sex workers (MSW) and transgender women sex workers (TSW) and its possible effect on sexual behaviour that may increase the chance of STIs and/or HIV acquisition.

Methods

From March to June 2018, we conducted semi-structured in-depth interviews among MSW and TSW visiting the Prostitution and Health Center in Amsterdam. Transcribed interviews were analysed by two researchers with an open-coding process, after which similar codes were categorized into themes.

Results

We conducted 23 interviews among 15 MSW and 8 TSW. Almost all sex workers (n=21) reported any sexualised drug use (irrespective of work or private situation) and the majority (n=14) reported illicit drug use during work. The initiative of using drugs most often comes from the clients.

Motives for using or not using drugs during work were categorized into self-oriented and client-oriented motives. Self-oriented motives to use drugs included receiving more money, increasing pleasure during sex and the ability to work more hours. Self-oriented motives for NOT using drugs included to keep track of time, to control safe sex and to maintain professional distance. Client-oriented motives to use drugs included client asks for it and to make client happy. Client-oriented motives to NOT use drugs included preserving sexual functioning.

Participants reported that due to drug use they forget/stop/skip using condoms during oral or anal sex. A self-applied prevention strategy that was described was staying away from actual sex acts when using drugs because the judgment over condom use could get influenced.

Conclusions

Future prevention should take into account that the initiative of using drugs most often comes from the clients and provides work-related added value. Assertively training and harm-reduction strategies described by the sex workers can be used by developing interventions.

Which psychosocial interventions improve sex worker wellbeing? A systematic review of evidence from resource rich countries.

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Background:

Sex worker support has traditionally taken a narrow disease prevention focus within sexual health. However, the stigma, labour and complex routes within sex work places unique demands on the coping resources of sex workers highlighting additional wellbeing needs. The aim of this systematic review is to establish the state of the evidence-base around psychosocial interventions that support sex worker wellbeing in order to inform healthcare policy and practice within a resource rich geographical context.

Methods:

Published and unpublished studies were identified through electronic databases (PsychINFO, CINAHL PLUS, MEDLINE, EMBASE, The Cochrane Library and Open Grey), hand searching and contacting relevant organisations and experts in the field. Studies were included if they were conducted in high income settings with sex workers or people engaging in exchange or transactional sex; evaluated the effect of a psychosocial intervention with validated psychological or wellbeing measures or through qualitative evaluation.

Results:

19,202 studies were identified of which 10 studies met the eligibility criteria. The heterogeneity found dictated a narrative synthesis across studies. Overall, there was very little evidence of good quality to make clear evidence-based recommendations. Despite methodological limitations, current evidence suggests that peer health initiatives improve wellbeing in female street-based sex workers. Use of Ecological Momentary Assessment (EMA) increases self-esteem and behaviour change intentions.

Conclusion:

An identifiable gap exists in the evidence-base for the effectiveness of psychosocial interventions to support the wellbeing of sex workers. Available studies are weak in their design and lack generalisability beyond female street-based sex workers. Future intervention and research should better represent the diversity of workers and types of work within the sex industry. Sex workers should be engaged in the design of interventions/research in a 'by and with' rather than 'to and for' approach so that findings adequately address and respond to their actual needs.

Factors Related to Hepatitis C Virus (HCV) Testing Among Persons Who Inject Drugs in the Memphis Metropolitan Area

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Background:

Hepatitis C virus (HCV) infection is both underdiagnosed and underreported. Every three years, the National HIV Behavioral Surveillance (NHBS) project, led by the Tennessee Department of Health (TDH) monitors HIV and HCV risk behaviors and outcomes among people who inject drugs (PWID) in the Memphis metropolitan area. The objective of this study was to understand characteristics associated with HCV testing history.

Methods:

During August–December 2018, TDH interviewed residents from the Memphis metropolitan area who self-reported injection drug use in the past 12 months utilizing respondent-driven sampling. We assessed independent correlation of self-reported HCV testing history with various demographic and risk behaviors using Chi-square tests. Multivariate logistic regression was performed on covariates with statistically significant differences ($p < 0.05$) to determine odds ratios (OR) and 95% confidence intervals (CI).

Results:

Among 530 participants, daily injection was common ($N=439$, 83%). Approximately half ($N=297$, 56%) reported ever being tested for HCV. Non-Hispanic white race/ethnicity, history of overdose, polydrug use (reporting multiple drug types), long-term drug use (first injecting drugs ≥ 15 years prior), and visiting a healthcare provider within the past 12 months were independently associated with HCV testing ($p < 0.05$). HCV testing was more likely in participants who had visited a healthcare provider within the past 12 months (OR: 2.3, 95% CI: 1.6–3.4), were non-Hispanic white (OR: 2.2, 95% CI: 1.5–3.3), reported long-term drug use (OR: 1.7, 95% CI: 1.1–2.7), and polydrug use (OR: 1.7, 95% CI: 1.0–3.9).

Conclusion:

Nearly half of participants in the 2018 NHBS IDU cycle had never been tested for HCV despite ongoing high-risk behaviors. Participants who reported long-term drug use or visiting a healthcare provider within the past 12 months were more likely to report HCV testing. These findings underscore the need to integrate HCV testing into and improve access to routine care for PWID in the Memphis area.

Prevalence and correlates of sexting and cybersex use among adults before and during COVID-19 social distancing measures in Panama

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Background: Lockdown and other COVID-19 social distancing measures (COVID-19-measures) may influence virtual sex behaviour due to increased screen time and decreased in-person sexual activity. This analysis describes the prevalence and factors associated with virtual sex before and during COVID-19 measures in Panama.

Methods: An online survey conducted among ≥18 years individuals residing in Panama using social media recruitment, from August 8-September 12, 2020, at the end of strict lockdown measures. Questions included demographics, virtual sex (sexting [sharing/receiving nude/semi-nude photos/video] and cybersex [sexual acts in front of a camera] three months before and during COVID-19-measures. Logistic regression was used to identify associations with increased use of virtual sex.

Results: Overall, 960 individuals participated; 526 (54.8%) identified as cis-women, 366 (31.1%) as cis-men, and 68 (7.1%) as non-binary/another gender; median age was 28y(IQR:23-37y). Before COVID-19-measures, 44.1% (369/837) reported sexting, 20.4% (172/842) cybersex, 46.4% (392/485) virtual sex. During COVID-19-measures, sexting, cybersex and virtual sex increased for 17.4%(139/797), 9.4%(74/790), and 19.9%(159/800) of participants, respectively. More cis-men reported virtual sex increase than cis-women (25.7% vs 17.2% [rural/urban adjusted]AOR=1.69, 95%CI:1.18-2.43). Bisexual (38.7% [gender and urban/rural adjusted]AOR=2.08, 95%CI:1.09-3.95) and lesbian/gay participants (42.4%,AOR=2.64, 95%CI:1.47-4.73) reported virtual sex increase more frequently compared to heterosexual participants (16.1%). Increase in casual sex was associated with increase in virtual sex (45.0% vs less casual sex 25.3%, AOR=4.06, 95%CI:1.24-13.35). Increased pornography use was associated with increased virtual sex (52.0% vs 7.8% decreased pornography, AOR=5.68, 95%CI:2.40-13.44). Among participants with a long-term partner, virtual sex increased among those who reported more partnership conflicts during than before COVID-19-measures (27.8% vs 12.8% among those who reported fewer conflicts, AOR=2.88, 95%CI:1.45-5.72).

Conclusions: Virtual sex was common before COVID-19-measures in Panama. During COVID-19-measures, virtual sex increased among cis-men, lesbian/gay and bisexual participants. Virtual sex was associated with increased pornography use, casual sex, and increased conflicts with long-term partners.

Implementing targeted molecular resistance testing for gonorrhoea in a large urban UK clinic

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BACKGROUND

Sandyford Sexual Health serves a population of ca. 1 million residents of Greater Glasgow and Clyde, UK. We use RealTime CT/NG assay (Abbott Molecular) to exclude gonorrhoea, all positive results are centrally notified and managed. We report our experience implementing 'resistance-guided' treatment for gonorrhoea using the SpeedX ResistancePlus® GC test. The objective was to measure the proportion of patients successfully managed with oral rather than injectable treatment.

METHODS

Resistance testing was targeted at patients who might benefit, excluding patients who had empirical treatment. This was determined by our laboratory scientist who reviewed the electronic prescribing record. Tests were run twice weekly. Meaningful test name and results messages were designed to address anticipated human factors in assimilating the information.

RESULTS

Between 16th October and 24th December 2020, 93 patients had a positive gonorrhoea test meriting treatment, of which 20 (22%) had infection at more than one anatomical site. Empirical treatment was given to 36 patients and so did not undergo resistance testing; 3 had insufficient residual sample. In the remaining 54 patients, 3 were gonorrhoea negative via SpeedX ResistancePlus® testing and 2 were gyrA indeterminate. Ultimately, 33 had predicted ciprofloxacin sensitivity; 16 had predicted ciprofloxacin resistance.

Of the 33 patients identified as ciprofloxacin sensitive, 16 received oral ciprofloxacin and 17 received alternative standard-of-care. Reasons for not using ciprofloxacin included: clinician preference for injectable, resistance results not being available in time and quinolone contraindication.

No patients had discordant resistance predictions at different anatomical sites.

CONCLUSIONS

Targeted molecular resistance testing for gonorrhoea averted injectable treatment in 17% of this cohort with around only half being eligible for testing due to immediate or prior treatment. We also averted some injections amongst contacts. Future work will focus on building clinician confidence and improving turnaround time in a production environment.

Characterization of pharyngeal gonorrhea in Ugandan men with urethral discharge syndrome

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Background: Multi-drug resistant *Neisseria gonorrhoeae* (NG) threatens the effectiveness of gonorrhea treatment and control globally. Pharyngeal NG (pNG) infections are hypothesized to play a role in the emergence of antimicrobial resistance (AMR) in NG, yet the epidemiology of pNG infections is poorly understood, especially in resource-limited settings (RLS). We report on pNG in men with concurrent urogenital NG infections in Kampala, Uganda.

Methods: Penile-meatal and pharyngeal samples were collected from Ugandan men with urethral discharge syndrome (UDS), cultured for NG, and tested by nucleic acid amplification tests (NAATs) for NG and other STIs. Antimicrobial susceptibility testing was performed on all NG isolates.

Results: Of the 83 participants (mean age 29.5 years) who provided urogenital and pharyngeal samples, 22.9% (19/83) were living with HIV, and 57.8% (48/83) were positive for urogenital gonorrhea. NG was detected in 8.6% (7/81) of pharyngeal samples by NAAT; 57.1% (4/7) were also positive by culture. Participants with pNG had concurrent urogenital NG, were HIV-negative, heterosexual (71.4%), reported transactional sex (85.7%), did not report oral sex (85.7%), and were younger (median – 24 years, IQR=21-28; $p=0.013$) than pNG-negative participants (median – 29 years, IQR=27-32). The paired ($n = 4$) urogenital-pharyngeal isolates displayed the same antimicrobial susceptibility profile: ciprofloxacin-, tetracycline-, and penicillin-resistant and ceftriaxone- and cefixime-susceptible. None of the pharyngeal samples were positive for *Chlamydia trachomatis* and one sample was positive for *Mycoplasma genitalium*.

Conclusions: To our knowledge, this is the first report of pNG in Ugandan men. NAATs were more sensitive than cultures for detection of pNG. In this pilot study, there was no difference in the susceptibility profiles of paired pharyngeal and urogenital NG isolates. Differences by age might be explained by differences in sexual behaviors or mucosal immunity. Additional studies are warranted to better define the epidemiology and microbiology of pNG infections in RLS.

Systematic literature review and quantitative analysis of health problems associated with sexually transmitted *Neisseria gonorrhoeae* infection

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Background

Neisseria gonorrhoeae (Ng) is the second most common sexually transmitted bacterial infection (STI), leading to serious health problems in men, women and newborns. While early antibiotic treatment is effective, infections are increasingly antibiotic-resistant. No systematic reviews present health problems associated with Ng infections or their likelihood of occurrence. The objective, therefore, was to conduct a systematic literature review to address these gaps.

Methods

A systematic literature review was conducted of all studies with an English abstract published since 1950 (Pubmed)/ 1966 (Embase). The search included patients with a history of/ current sexually transmitted Ng infection. Expected outcomes were defined from published reviews of gonorrhoea health problems. Observational studies with a control group were included. A decision tree determined the best quality studies for each outcome, prioritising generalisable populations, lab-confirmed diagnosis, clearly defined outcomes, no STI co-infections, adjusted analyses, and risk estimates. Where feasible, a meta-analysis was performed, otherwise the best quality study estimates were identified.

Results

In total, 46 studies were included, and 22 health problems were identified. Of these problems, Ng infection was statistically significantly associated with preterm premature ruptures of membranes, preterm birth, low birth weight, stillbirth, infant death, neonatal ophthalmia, schizophrenia in offspring, pelvic inflammatory disease and subsequent tubal infertility, human immunodeficiency virus, and prostate cancer/problems. High-quality evidence was generally lacking, with high heterogeneity across studies, and limited or inconclusive data on other health problems.

Conclusion

Ng infection is associated with severe health problems in women, men and newborns. More high-quality comparative studies are needed to address the limitations in current knowledge.

Community-based HIV testing in the Netherlands: experiences of lay providers and end users at a rapid HIV test Checkpoint

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Background

The AIDS Healthcare Foundation (AHF-Checkpoint) in the Netherlands provides free ‘walk-in’, rapid HIV testing for key populations at onsite and pop-up locations. We explored the perspectives, experiences, and needs of lay providers and end users of this HIV test service, taking into account the WHO 5Cs (consent, confidentiality, counselling, correct results, connection-to-care) performance criteria for HIV test services.

Methods

A qualitative evaluation with 15 semi-structured in-depth interviews (April-June 2020) by telephone or video calling with ten lay providers and five end users from AHF-Checkpoint. Recorded interviews were transcribed verbatim and thematically analysed.

Results

Data analysis identified four domains: 1) accessibility of HIV testing, 2) quality of test procedures, 3) bridging (transitional care), and 4) future strategies for service delivery. AHF-Checkpoint fills a gap for key populations, including LGBTQ and refugees, who experience barriers to HIV testing at sexual health centres or GPs by providing anonymous, rapid testing. The level of trust between lay providers and end users was highly valued by end users. They also appreciated the low threshold to test, no waiting lists, no test costs or triaging that could include referral to another test location. Needs expressed by lay providers included more preparedness for emotionally charged situations and extra training to improve knowledge on STIs. Some end users expressed a need for a full STI test package at AHF-Checkpoint. Of the 5Cs, consent, counselling, and correct results were realised, but confidentiality was sometimes difficult to achieve at pop-up locations, and referral barriers for confirmation testing (connection-to-care) were occasionally experienced by lay providers during weekends.

Conclusion

AHF-Checkpoint was described as a convenient and easily accessible service by end users and lay providers. Of the WHO 5Cs, connection-to-care could be optimised to ensure HIV confirmation -and STI testing through a liaison approach with professionals from the regular healthcare sector.

Persistent racial and ethnic disparities amid declining HIV incidence among men who have sex with men, New York City, 2010–2018

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Background:

Despite declining HIV rates among men-who-have-sex-with-men (MSM) in the United States, certain subgroups continue to have disproportionately higher risk of acquiring HIV. MSM attending sexual health clinics (SHC) that provide comprehensive HIV prevention interventions (e.g., pre- and post-exposure prophylaxis) can serve as sentinel populations for tracking the epidemic.

Methods:

We matched eight annual cohorts of MSM with negative HIV-1 nucleic acid amplification tests at New York City SHCs (2010-2017) to the citywide HIV surveillance registry. We measured HIV incidence for each cohort by examining diagnoses within one year after last negative test. Among MSM who seroconverted, person-time was measured between SHC test date and HIV diagnosis date; other MSM were censored at 365 days of follow-up. We calculated: 1) annual incidence rates by race/ethnicity, age (<30 vs ≥30 years), and recent STI diagnosis in SHC (chlamydia/gonorrhea/early syphilis in 3 months before SHC visit), 2) incidence trends (Cochrane-Armitage test p-values), and 3) age and race/ethnicity-specific incidence rate ratios for early (2010-2011) vs later (2016-2017) periods.

Results:

HIV incidence declined overall, from 2.8/100 person-years in 2010 (64 diagnoses/2,272 person-years) to 1.1/100 in 2017 (61 diagnoses/5,348 person-years) ($p<0.001$), and across all race/ethnicity, age, and STI subgroups. Incidence decreased among White MSM in both age groups but did not significantly change over time among older MSM of color. While incidence decreased over time among younger White MSM ($p<0.001$), younger Black MSM ($p=0.004$), and younger Latino MSM ($p=0.011$), the rate ratio for younger Black vs White MSM increased between early and later time periods, from 4.4 (95% CI, 2.5-8.0) to 8.3 (95% CI, 3.9-20.1).

Conclusions:

We observed promising decreases in overall HIV incidence among a key at-risk population. However, racial/ethnic disparities were exacerbated over time, highlighting the need to eliminate inequities by addressing persistent barriers to HIV biomedical prevention strategies for MSM of color.

SYPHILIS NOT ASSOCIATED WITH NEUROCOGNITIVE OUTCOMES IN PEOPLE LIVING WITH HIV IN ONTARIO CANADA

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BACKGROUND

About 40-60% of people living with HIV (PLWH) experience neurocognitive impairments, irrespective of antiretroviral status. We hypothesized that a history of syphilis would be associated with worse neurocognitive outcomes in this population.

METHODS

We conducted a retrospective study of PLWH enrolled between 2008-2017 in an Ontarian HIV cohort. Cognitive outcomes were the most recent measurements of: 1) self-reported MOS-HIV 4-item cognitive scale; 2) average T-score (ATS) based on formal neuropsychological testing of complex attention, speed of processing, and learning/memory; and 3) global deficit score (GDS) dichotomized into impaired/unimpaired. Syphilis history was based on chart review or lab data. We compared median MOS-HIV and ATS using Wilcoxon rank-sum tests, and proportion impaired on GDS using Chi-square/Fisher test. Multivariable models were fitted to estimate the association between syphilis and each outcome, adjusted for age, education, race, income, years of HIV, nadir and most recent CD4 count, most recent viral load, methamphetamine use, depression, and number of prior neurocognitive tests.

RESULTS

Of 1434 participants, 76.4% were male at birth and 50.6% were white. At the time of the most recent MOS-HIV, median age was 47 (IQR: 37,54), median CD4 count was 517.5 (IQR: 360,678) cells/mm³ and 80.2% had HIV viral load <50 copies/mL. 228 had prior syphilis, of which 7.5% had neurosyphilis. There was no significant difference in median MOS-HIV (85 vs 80, $p=0.58$), ATS (45.8 vs 45.8, $p=0.52$) or the proportion with neurocognitive impairment (53.1% vs 51.9%, $p=0.87$) between syphilis and non-syphilis groups. Multivariable models found no statistically significant relationship between syphilis and the primary outcomes MOS-HIV ($\beta=-0.18$; 95%CI=-3.1,2.7, $p=0.90$), ATS ($\beta=-0.30$; 95%CI=-1.1,1.7, $p=0.69$), or GDS (aOR=1.23; 95%CI=0.81,1.88, $p=0.33$).

CONCLUSION

Among PLWH in care in Ontario, prior syphilis was not associated with worse neurocognitive outcomes according to self-reported scales or formal neuropsychological testing. Continued study into the etiology of neurocognitive impairments in PLWH is required.

Clinical presentation of incident syphilis among men who have sex with men taking HIV Pre-Exposure Prophylaxis in Melbourne, Australia.

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Background

Current international guidelines on HIV Pre-Exposure Prophylaxis (PrEP) recommend serological screening for syphilis at routine three-monthly PrEP appointments. The aim of our study was to describe the pattern of clinical presentation of syphilis among men who have sex with men (MSM) taking PrEP. We were interested in whether syphilis is detected through screening at scheduled three-monthly PrEP clinic appointments or whether primary or secondary syphilis presented at unscheduled interval visits.

Methods

This was a retrospective study of MSM attending the PrEP clinic at the Melbourne Sexual Health Centre between February 2016 and March 2019. Serological screening for syphilis was routinely undertaken at three-monthly PrEP clinic appointments. Diagnoses of early syphilis were identified from PrEP clinic visits and from interim walk-in STI clinic attendances.

Results

There were 69 cases of early syphilis among 61 MSM taking PrEP during the study period. There were 24 (35%) primary, 16 (23%) secondary and 29 (42%) early latent infections. The incidence of early syphilis was 8.6 per 100 person-years. A substantial proportion of primary (58%) and secondary (44%) syphilis diagnoses were made at interim STI clinic attendances, between PrEP appointments.

Conclusions

Syphilis screening at routine three-monthly PrEP visits alone fails to detect a proportion of primary and secondary syphilis infections and may be insufficient in preventing onward transmission. Education of MSM taking PrEP regarding the risk of syphilis and symptom recognition is necessary together with access to syphilis testing between PrEP visits.

An Integrative Omics Approach to Understanding Host Cellular Responses to *Treponema pallidum*

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Background:

Treponema pallidum ssp. *pallidum* (Tp), the causative agent of syphilis, is a highly invasive pathogen that moves throughout the body via the bloodstream and invades organs and tissues to cause the serious sequelae associated with sexually transmitted and congenitally acquired syphilis infections. The endothelium represents a crucial barrier for Tp dissemination, and we hypothesized that Tp alters endothelial structure and signalling. In this study, we apply an integrative omics approach to characterize transcriptomic, proteomic, and immune secretomic responses of endothelial cells to Tp.

Methods

Endothelial cells were grown in vitro and exposed to viable Tp or a background control lacking the pathogen. For transcriptomic analysis, RNA was harvested from the endothelial cells and sequenced via RNAseq. For proteomic analysis, experimental and control samples grown using stable isotope labeling by amino acids in cell culture (SILAC), total protein was harvested and analyzed via orbitrap fusion tandem mass-spectrometry (LC-MS/MS). For immune secretomic analysis, supernatant from endothelial cells co-incubated with Tp was harvested and analyzed for cytokine content via cytometric bead arrays (CBA) using flow-cytometry.

Results:

RNAseq studies identified genes within immune signalling pathways that are differentially regulated in response to Tp. Proteomic analysis identified several pathways involved in cellular structure and modulation, interleukin signalling, and intracellular signalling. Data from CBA experiments further indicate the ability of Tp to alter endothelial cytokine production and secretion. These data give a novel multi-faceted look into the role and response of the endothelium during Tp infection.

Conclusion

These studies represent a novel systems-level approach to understanding the molecular mechanisms behind the establishment and persistence of Tp infection. Further, they provide insight into how Tp may induce host cellular changes to enable barrier traversal and immune cell recruitment, and in this way provide information that is relevant to syphilis vaccine design.

Women commonly use sexual enrichment aids and rarely receive information from medical practitioners on hygiene and safety

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Sexual enrichment aids (i.e. sex toys) are devices used to enhance the sexual experience of individuals. However, our hypothesis is that transmission of STIs could also occur via fomites, like sexual enrichment aids (SEAs, i.e. vaginally insertable sex toys). The aim of this research is to understand women's sexual behaviors associated with SEA use.

Methods: Utilizing mix methodology, we investigated the prevalence of SEA use among women, evaluated behaviors associated with SEA use, and examined if medical practitioners have counseled women on safe SEA use. We recruited 800 sexually active women between the ages of 18-35 years old to participate in a cross-sectional study. These women were also invited to participate in a qualitative interview to further explore their sexual behaviors.

Results: We found that SEA use is common, with 79.8% of all women reporting SEA use. When women were stratified based on sexual orientation, we found that SEA use is even more common among WSW and WSWM, at 89.7% and 92%, respectively. We also found that at least of subset of women engage in behaviors that may transmit infection, including sharing SEAs with partners, infrequent barrier protection use, and inconsistent cleaning practices. Additionally, the majority of women are not counseled on SEA use and hygiene by medical practitioners. Among women who report having received counsel from medical practitioners on SEA use and hygiene, WSW and WSWM are not counseled as extensively as their WSM counterparts.

Conclusions: We found that SEA use is common among women and that at least a subset of women engage in behaviors that may have the potential to transmit infection. This study provides insight to a common sexual behavior among women and points to the need for more studies to provide evidence-based medical counseling to women.

Refreshing the British Columbia Syphilis Control Strategy: Thematic Analysis of a Multi-Stakeholder Consultation Process

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Background: A provincial syphilis control strategy for British Columbia was developed in 2016 in response to a syphilis epidemic, predominantly among gay, bisexual and other men who have sex with men (gbMSM). Current data shows significant increases among women of childbearing age and congenital syphilis has recurred. Given these epidemiologic changes, a stakeholder engagement process aimed at understanding priorities and gaps was initiated to inform a refresh of the strategy.

Methods: A provincial committee was developed to oversee the refresh and engage key stakeholder groups including public health, clinicians, laboratory leads, researchers, Indigenous communities, community organizations, and people affected by syphilis. The socio-ecological model was used to guide discussions about contributing factors and leverage points. Thematic analysis of responses was performed to develop a conceptual framework and identify priority areas for inclusion into a refreshed syphilis control strategy.

Results: A total of nineteen consultations were held with the various stakeholder groups. Themes were mapped to the socio-ecological model and included: 1) individual level: syphilis knowledge (e.g. risk awareness, pre- and post-exposure prevention options), 2) behavioural/biological level: substance use (e.g. in the context of party-and-play, as a coping mechanism) and syphilis testing (e.g. accessibility, opportunity to shift to an opt-out testing strategy), 3) community/relationship level: sexual networks (e.g. bridging between the gbMSM and heterosexual populations), relationships between clients and care providers (e.g. cultural safety and humility, outreach services), and relationships between public health and primary care (e.g. increasing capacity for syphilis care, integration of public health with primary care), and 4) societal/structural level: social determinants (e.g. housing), relationships with Indigenous communities (e.g. building trust, support for Indigenous-led land-based activities), and importance of using a sexual health framework (e.g. sex-positive messaging).

Conclusion: Based on these identified themes, eight goals with supporting actions were prioritized in a refreshed syphilis control strategy.

Increased use of internet-based testing for sexually-transmitted and bloodborne infections during the COVID-19 pandemic in British Columbia, Canada

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Background:

GetCheckedOnline is a publicly-funded internet-based testing service for sexually-transmitted and blood borne infections (STBBI) offered in British Columbia (BC), Canada since 2014. GetCheckedOnline has remained accessible since the beginning of the COVID-19 pandemic response, despite many in-person sexual healthcare services having been reduced or stopped. GetCheckedOnline users complete an online risk assessment to inform STBBI test recommendations, auto-generating a lab requisition which can be used at any participating laboratory location, with results available online or by phone. Our objective was to describe GetCheckedOnline program utilization and selected risk factors before and during the COVID-19 pandemic.

Approach:

We used linked GetCheckedOnline program and laboratory testing data for this analysis. We compared the mean of selected monthly program measures during the COVID-19 pandemic (March 2020 – December 2020) to the same time period the previous year, defined as pre-pandemic (March 2019 – December 2019). Descriptive statistics are presented.

Outcomes:

The median number of monthly test episodes completed was higher during the pandemic (median=1088; n=9470 total episodes completed), compared to pre-pandemic (median=824, n=8237 total episodes completed), despite a sharp decline and rapid recovery in March-May 2020. During the pandemic, the mean proportion of test episodes completed by those using GetCheckedOnline for the first time was 57%; an increase from pre-pandemic (51%). We observed an increase in the percent positivity during the pandemic compared to pre-pandemic (6.44% vs. 5.72%), as well as in the mean proportion of those reporting symptoms (20.3% vs 19.4%) or being a contact to someone with an STBBI (11.0% vs 9.3%).

Innovation and significance:

The increase in first time GetCheckedOnline testers, percent positivity, and those reporting symptoms or being a contact to an STBBI during the COVID-19 pandemic suggest the program has filled a gap in STBBI testing services, and remains a critical service for accessing sexual healthcare.

Treatment efficacy of 1g azithromycin versus 100mg doxycycline bi-daily for seven days for asymptomatic rectal *Chlamydia trachomatis*

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Background

Rectal chlamydia is the most commonly diagnosed bacterial sexually transmissible infection among men who have sex with men (MSM) and there is increasing concern about rectal chlamydia in women. The absence of randomised controlled trial (RCT) evidence means there is ongoing debate about the most efficacious treatment.

Methods

We conducted a double-blind double-dummy RCT to compare the efficacy of azithromycin 1g singledose with 7-days doxycycline 100mg twice daily for the treatment of asymptomatic rectal chlamydia. MSM diagnosed with asymptomatic rectal chlamydia infection at five sexual health clinics in Australia were randomly assigned to receive either doxycycline or azithromycin. Primary outcome was rectal chlamydia microbiological cure defined as a negative nucleic acid amplification test at four weeks. Logistic regression was used to calculate the difference in microbial cure within a modified intention to treat population that excluded L2 serovar diagnoses post-recruitment.

Results

We enrolled 625 men and randomly assigned 314 to doxycycline and 311 to azithromycin between August 2016 and August 2019. Primary outcome data were available for 290 (92%) assigned to doxycycline and 297 (96%) assigned to azithromycin. In the modified intention to treat population, the observed microbiological cure was 281/290 (96.9%; 95%CI: 94.9, 98.9) for doxycycline and 227/297 (76.4%; 95%CI: 73.8, 79.1) for azithromycin, with an adjusted risk difference of 19.9% (95% CI: 14.6, 25.3; p<0.001) in favour of doxycycline. Adverse events including nausea, diarrhoea and vomiting were reported by 33.8% (98/290) receiving doxycycline and 45.1% (134/297) azithromycin (risk difference=-11.3%; 95%CI: -19.5, -3.2). Chlamydial load at baseline was greater for those in the azithromycin arm who failed treatment compared to those who did not.

Conclusions

The efficacy of doxycycline was found to be substantially superior to azithromycin in the treatment of asymptomatic rectal chlamydia infection among MSM. Doxycycline must replace azithromycin as firstline treatment for symptomatic rectal chlamydia.

Anal Cancer Screening Practices: Current Expert Opinions

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Background

Anal cancer incidence is high among people with HIV (PWH), men who have sex with men (MSM), and women with lower genital tract disease (LGTD). Anal cancer is preceded by persistent high-risk human papillomavirus infection and subsequent high-grade squamous intraepithelial lesions (HSIL). Emerging screening practices may reduce anal cancer incidence. However, no national or international screening guidance exists. The International Anal Neoplasia Society (IANS) solicited expert opinion to understand preferred current anal screening practices.

Methods

IANS members and meeting attendees were invited to complete an online survey of screening practices. Screening initiation age, screening tool, and high resolution anoscopy (HRA) referral threshold were assessed. Recommendations for age and tool were delineated for PWH, sub-grouped female/non-MSM-male/MSM; and for women with LGTD, sub-grouped by disease (HSIL/cancer) and anatomic site (vulvar/cervico-vaginal). HRA referral threshold compared immunocompetent versus immunocompromised patients.

Results

Of 1150 individuals contacted, 140 (12%) participated and were included; 113 (81%) were HRA providers. Similar proportions of respondents specified a screening initiation age in all PWH (range 61-64%); however, there was no consensus for the specific age to begin screening for any PWH sub-group. More respondents preferred "no age restriction" for MSM (36%) compared to non-MSM-male counterparts (22%). Among LGTD groups, "no age restriction" was more commonly preferred (range 44-55%). Of tools, across all PWH and LGTD groups, cytology (79-89%) and digital anorectal exam (DARE) (73-83%) were most frequently recommended. For HRA referral threshold, "any abnormality" was more often selected for both immunocompromised (56%) and immunocompetent (46%) patients than a specific cytology result (29%,36%). Among those who specified cytology, consensus was lacking and did not vary by immune status.

Conclusion

Respondents concurred cytology and DARE were preferred screening modalities. Screening initiation age and HRA referral threshold showed less consensus. Evidence-based guidance is needed and may lead to more consistent screening practices.

Increasing trends of infectious syphilis in women of childbearing age in Australia.

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Background:

Syphilis in pregnancy can have devastating consequences with over half of untreated infections leading to serious complications. In Australia, an outbreak was detected in remote Indigenous communities in 2011, with recent increases in non-Indigenous heterosexuals. To understand the distribution and impact of these increases, we analysed notification trends in women of childbearing age.

Methods:

National infectious syphilis notification data (2011-2018) for women aged 15-44 years were used to calculate notification rates per 100,000 by Indigenous status, age, remoteness and year, and congenital syphilis cases per 100,000 live births by Indigenous status and year. We determined trends in notification rates using Poisson regression.

Results:

Between 2011-2018, there were 1391 and 909 notifications in Indigenous vs non-Indigenous women, with the rate 31 times higher (188 vs 6 per 100,000) in 2018, respectively. For Indigenous women, the highest rate was among women living in remote areas (522 per 100,000 in 2018) with increases in remote (174%), regional (808%) and urban areas (475%), $p < 0.001$; and by age group the highest rate was in 15-24 year olds (214 per 100,000 in 2018), with increases in all age groups (130%-971%) $p < 0.001$. For non-Indigenous women, the highest rate was in urban areas (6 per 100,000 in 2018) with increases in urban (474%), and regional areas (475%) ($p < 0.001$); and by age group the highest rate was in 25-34 year olds (7 per 100,000 in 2018), with increases in all age groups (383-541%) ($p < 0.001$). In 2018, congenital syphilis rates were 14 times higher (19.6 vs 1.4 per 100,000 live births) in Indigenous women vs non-Indigenous women, respectively.

Conclusion:

Rates of infectious syphilis are increasing for Indigenous and non-Indigenous women of child-bearing age, with the greatest burden of disease in Indigenous women living in remote areas. Responses need to be delivered with further potency to control syphilis in Australia.

The impact of concurrent partner treatment for bacterial vaginosis on the genital microbiota of heterosexual couples: a pilot study

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Background: Approximately 40% of women receiving first-line antibiotics for bacterial vaginosis (BV) experience recurrence within 3-months. Reinfection from an untreated regular sexual partner (RSP) likely contributes to BV-recurrence. We investigated the impact of concurrent partner treatment for BV on the genital microbiota of heterosexual couples.

Methods: Women with symptomatic BV (≥ 3 Amsel criteria and Nugent Score[NS]=4-10) were recruited between March 2018-March 2019 with their RSP. Couples received oral metronidazole 400mg BID 7-days, and men additionally applied 2% clindamycin cream topically to penile skin BID for 7-days. Participants self-collected genital samples (women: vaginal; men: cutaneous penile, first-void urine [representing the urethra]) pre-treatment (day-0), post-treatment (day-8) and then 4-weekly until endpoint (week-12 or BV-recurrence). We characterised the genital microbiota using 16S-rRNA gene sequencing. Differential abundance testing was performed using ALDEX2. Changes in microbiota composition post-treatment were assessed using ANOSIM.

Results: Data from 29 couples were analysed. Women had a high prevalence of risk factors for BV-recurrence; 79% had a history of BV, 83% had an uncircumcised RSP, all reported condomless sex during the study and 38% had an intrauterine device. Only 4/27 (15%) women completing clinical follow-up experienced BV-recurrence (≥ 3 Amsel criteria, NS=4-10). BV-associated bacteria, including *Atopobium*, *Prevotella* and *Dialister*, significantly decreased in abundance at all three genital sites immediately post-treatment (false discovery rate (FDR)-corrected p-value<0.05). BV-associated bacteria remained decreased at endpoint at all sites, but following FDR-correction this was only significant for the vaginal site. Overall, partner treatment significantly and immediately changed the composition of the female and male genital microbiota (ANOSIM; p-value=0.001).

Conclusion: In a cohort of women at high risk for BV-recurrence, only 15% experienced recurrence within 3-months of concurrent partner treatment. Treatment reduced the abundance of BV-associated bacteria and altered the genital microbiota composition of both partners; although only changes at the vaginal site remained significant at endpoint.

The epidemiology of herpes simplex virus type 2 in Asia: a systematic review, meta-analyses, and meta-regressions

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Background: Herpes simplex virus type 2 (HSV-2) infection is a prevalent sexually transmitted infection worldwide. This systematic review aimed at characterizing HSV-2 epidemiology in Asia.

Methods: HSV-2 publications were systematically reviewed. Findings were reported according to PRIMA guidelines. Pooled measures and associations were assessed using random-effect meta-analyses and meta-regressions.

Results: From 173 relevant publications, 340 overall outcome measures and 729 stratified measures were extracted. Pooled mean HSV-2 seroprevalence was 12.1% (95% confidence interval (CI): 11.0-13.2%) among general populations, 23.6% (95% CI: 20.9-26.3%) among men who have sex with men and transgender people, 46.0% (95% CI: 39.2-52.9%) among HIV positive individuals and individuals in HIV discordant couples, and 62.2% (95% CI: 58.9-65.6%) among female sex workers. Among general populations, pooled mean seroprevalence increased gradually from 4.7% (95% CI: 3.3-6.3%) in <20 years-old individuals to reach 26.6% (95% CI: 19.2-34.7%) in >60 years-old individuals. Compared to women, men had a 0.60 (95% CI: 54.0-67.0) lower seroprevalence. Seroprevalence declined by 0.98-fold (95% CI: 0.97-0.99) per year in the last three decades. Pooled mean proportions of HSV-2 detection in genital ulcer disease (GUD) and in genital herpes were 48.2% (95% CI: 34.9-61.6%) and 75.9% (95% CI: 68.3-82.8%), respectively.

Conclusion: In Asia, approximately 1 in 10 individuals is infected with HSV-2, but seroprevalence is declining by 2% per year. HSV-2 persists as the cause of nearly 50% of GUD cases and 75% of genital herpes cases.

Evaluation of Novel *Treponema pallidum* Recombinant Antigens for Syphilis Diagnosis

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Background: Syphilis, caused by the spirochete *Treponema pallidum* subsp. *pallidum* (*T. pallidum*), continues to be a significant global health concern. The diagnosis of syphilis mainly relies on assessing clinical manifestations and performing serologic testing to detect treponemal and non-treponemal antibodies to discriminate between past and present infection and to evaluate response to treatment. Limitations, however, include that no test can discriminate among syphilis stages, and sensitivity is low during the very early stages of infection. New diagnostics could circumvent some of these deficiencies.

Methods: To this end, we developed a novel array of *T. pallidum* recombinant proteins to identify seroreactive proteins and compare their performance to that of antigens commonly used in treponemal tests such as the 17 and 47 kDa lipoproteins (Tp0435 and Tp0574, respectively). Antigens were applied to the array, then reactivity was assessed via indirect enzyme-linked immunosorbent assay (ELISA). For this analysis, we used sera samples from 124 patients collected at various timepoints (0 months, 3 months, and 6 months). Samples from all three timepoints were available from 29 patients.

Results: The control antigens demonstrated the highest reactivity against the sera. Among the antigens tested so far Tp0954, a putative adhesin of the syphilis agent, exhibited seroreactivity similar to that of the controls.

Conclusion: Our data support Tp0954 as a possible candidate to improve the performance of currently available treponemal tests.

Prevalence of Chlamydia among Pregnant Women, Gynecology Clinic Attendees, and Subfertile Women in Guangdong, China: A Cross-sectional Survey

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Background: Chlamydia is a major cause of infertility, but its epidemiology among women of reproductive age remains unclear in China. This study investigated the prevalence of chlamydia and associated factors among Chinese women aged 18-44 years who were either 1) pregnant; 2) attending gynaecology clinics; or 3) subfertile.

Methods: We conducted a cross-sectional survey and recruited participants from obstetrics, gynaecology, and infertility clinics in Guangdong, between March to December, 2019. We collected information on individuals' socio-demographic characteristics, previous medical conditions, and sexual behaviours. First-pass urine and cervical swabs were tested using nucleic acid amplification testing. We calculated the prevalence in each population and subgroup by age, education, and age at first sex. Multivariable binomial regression models were used to identify factors associated with chlamydia prevalence.

Results: We recruited 1730 participants, including 881 pregnant women, 595 gynaecology clinic attendees, and 254 subfertile women. The overall prevalence was 6.7% (95% Confidence Interval (CI): 5.2%-8.5%), 8.2% (95%CI:6.2%-10.7%), 5.9%(95%CI: 3.5%- 9.3%) for the above three populations, respectively. The subgroup-specific prevalence was highest among those who first had sex before 25 years and older pregnant women (>35 years). The proportion of asymptomatic chlamydia was 85%, 40%, and 60% among pregnant women, gynaecology clinic attendees, and subfertile women, respectively. Age at first sex (<25 years), multipara, and ever having more than one partner increased the risk of chlamydia.

Conclusion: Women of reproductive age in China have a high prevalence of chlamydia. As most women with chlamydia were asymptomatic, routine chlamydia screening is urgently needed in China.

Impact of COVID-19 on adolescent girls and young women in a community-based HIV PrEP programme in South Africa

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Background: The coronavirus (COVID-19) pandemic has severely impacted healthcare service delivery, including pre-exposure prophylaxis (PrEP) worldwide. COVID-19 may increase the vulnerability of adolescent girls and young women (AGYW). We investigated the impact of COVID-19 on HIV, STIs and pregnancy in a community-based PrEP programme for AGYW in South Africa.

Methods: We used data from an ongoing study of strategies to improve the prevention-effective use of PrEP among AGYW living in a peri-urban and a rural community in the Eastern Cape, South Africa. PrEP services have been provided since October 2018; AGYW are expected to attend monthly PrEP service activities with Xpert® testing for STIs at the 6-, 12- and 24-months visits. PrEP services were partially impacted during the South African lockdown (March-April 2020). An observational analysis of PrEP service utilization and HIV, STI and pregnancy results was conducted comparing data from before COVID-19 introduction and during the COVID-19 epidemic in South Africa.

Results: A total of 546 AGYW attending PrEP services for ≥ 3 months were included in our analysis. The number of AGYW visits for PrEP and HIV testing dropped by 29% ($p < 0.001$) during the COVID-19 epidemic in South Africa. HIV test positivity increased from 0.54% to 1.94% during the COVID-19 epidemic ($p = 0.03$). STI test positivity increased from 23 to 30% ($p = 0.20$) for *Chlamydia trachomatis*, 7% to 14% for *Neisseria gonorrhoeae* ($p = 0.08$), and 8 to 12% for *Trichomonas vaginalis* ($p = 0.32$). Pregnancy test positivity increased from 1.2% before to 4.1% during the COVID-19 epidemic ($p = 0.002$).

Conclusion: South African AGYW substantially decreased their visits for PrEP in a community-based PrEP study during the COVID-19 epidemic, while rates of new HIV infection, STIs, and pregnancy increased, indicating unprotected sex. The impact of COVID-19 on healthcare services, the economy and social interactions has enhanced the vulnerability and health risks of AGYW in our setting.

Trends and regional differences of *Neisseria gonorrhoeae* antimicrobial resistance in the Netherlands, 2013-2019

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Gonococcal antimicrobial resistance is emerging worldwide, and is monitored in the Netherlands in 18 out of 24 Sexual Health Centres (SHC) that perform culture and susceptibility testing for patients with gonorrhoea. This study describes trends, determinants and regional differences in azithromycin resistance and ceftriaxone decreased susceptibility in 2013-2019.

Data on person characteristics, STI diagnoses and MIC values (Minimum Inhibitory Concentration, measured by E-test) for gonorrhoea were reported by participating SHC. We describe azithromycin resistance (AZI-R, MIC >1 mg/L) and ceftriaxone decreased susceptibility (CEF-DS, MIC >0.032 mg/L) over time and per SHC. We use multilevel logistic regression analysis to describe determinants of AZI-R/CEF-DS among MSM and heterosexuals, correcting for SHC region. A separate multilevel model was made to quantify the effect of population differences on the regional variance of AZI-R and CEF-DS.

A total of 13,000 isolates were included from 2013-2019. AZI-R significantly increased from 2.8% (95% Confidence Interval 2.1-3.9%) to 9.3% (8.2-10.5%). CEF-DS significantly decreased from 7.0% (5.7-8.5%) to 2.9% (2.3-3.6%). Overall, regional differences were seen between SHC: AZI-R varied from 0.0% to 16.9%, CEF-DS from 0.0% to 7.0%. Regional variance could not be explained by population characteristics. Regression analyses found pharyngeal strain origin and year of consultation significantly associated with AZI-R and CEF-DS among MSM and heterosexuals. Among heterosexuals also a high number of partners was associated with AZI-R and CEF-DS.

No resistance or decreasing susceptibility was found for ceftriaxone, the first line gonorrhoea treatment in the Netherlands. However, azithromycin resistance is increasing, similar to trends worldwide. Differing levels of resistance/decreased susceptibility per SHC could not be explained by differences in population characteristics. This indicates the need for nationwide surveillance and reporting of results on a regional level. The association of pharyngeal strain origin with resistance/decreased susceptibility underlines the importance of including extragenital infections in gonococcal antimicrobial resistance surveillance.

Unmet health needs and their associations with gender minority stress among Chinese transgender individuals

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Introduction

Transgender individuals faced health disparities. Stigma is a fundamental cause of health inequities. Yet, studies on the associations between transgender stigma and Chinese transgender women's health needs are sparse. This study examined the association between gender minority stress and healthcare utilizations in mainland China.

Methods

Eligibility criteria for this multicenter cross-sectional study included 18 years or older, assigned male at birth, and currently not identified as men. Healthcare utilizations included transgender women's engagements in gender affirming interventions, HIV and STI testing, and PrEP and PEP use. Multivariate regression was used to measure the associations between gender minority stress and healthcare utilizations.

Results

From December 2019 to June 2020, 277 eligible participants were recruited. A small portion of the participants have engaged in gender affirming surgery (9.4%), PrEP use (8.6%), and PEP use (10.5%). Higher levels of discrimination (aOR 1.53, 95%CI: 1.13-1.97), victimization (aOR 1.30, 95%CI: 1.08-1.57), and non-disclosure of gender identity (aOR 1.16, 95%CI: 1.02-1.33) are associated with higher likelihood of receiving hormone intervention. Discrimination is also associated with higher likelihood of receiving gender affirming surgery (aOR 1.62, 95%CI: 1.11-2.38). Non-disclosure of gender identity is associated with higher likelihood of using PEP (aOR 1.21, 95%CI: 1.05-1.39). Internalized transphobia is associated with lower likelihood of STI testing (aOR 0.91, 95%CI: 0.84-0.98). Rejection is associated with lower likelihoods of PrEP use (aOR 0.85, 95%CI: 0.68-1.08) or willingness to use PrEP (aOR 0.84, 95%CI: 0.74-0.97).

Conclusions

Gender minority stress impacted transgender people's healthcare utilizations through different pathways. Transgender related stigma can jeopardize transgender people's engagements in gender affirming medical services and sexual health care services in China. Future research should further investigate the casual relationships and the mediators of such pathways to inform stigma interventions, while future policy is needed to prioritize providing gender-affirming medical supports to Chinese transgender individuals.

Expanding syphilis test uptake using rapid dual self-testing for syphilis and HIV among MSM: a randomized controlled trial in China

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Background: We evaluated the effectiveness and costs of providing syphilis self-testing on increasing syphilis testing uptake among MSM in China.

Methods :An open label three-arm randomized controlled trial was conducted between 7 January 2020 and 17 July 2020. Men who were at least 18 years of age, had condomless anal sex with men in the past year, reported not testing for syphilis in the last six months, and had a stable residence with mailing addresses were recruited from 124 cities in Chinese 26 provinces. Enrolled participants were randomly assigned (1:1:1) into three arms using block randomization with a block size of 12: standard of care arm; standard syphilis self-testing arm; and lottery incentivized syphilis self-testing arm (1 in 10 chance to win \$15 if they tested for syphilis). The primary outcome was the proportion of participants who tested for syphilis.

Results: A total of 451 men were enrolled. 136 (90.7%) in the standard of care arm, 142 (94.0%) in the standard of SST arm, 137 (91.3%) in the lottery incentivized SST arm were included in final analysis. The proportion of men who had at least one syphilis test during the trial period was 63.4% (95% CI:54.9-71.3) in the standard SST arm, 65.7% (95% CI: 57.1-73.6) in the lottery-incentivized SST arm, and 14.7% (95% CI: 9.2-21.8) in the standard of care arm. The estimated difference in the proportion between the standard SST and standard of care arm was 48.7% (95% CI: 38.8-58.6, P<0.05). The cost per person tested was \$66.19 for the standard-of-care arm, \$26.55 for standard SST and \$28.09 for the lottery incentivized SST arm.

Conclusion: Compared to standard of care, providing syphilis self-testing significantly increased the proportion of MSM testing for syphilis in China— particularly among men who had never tested for syphilis, and was cheaper (per person tested).

From trial to program: TTANGO2 scale-up and implementation sustains STI point-of-care testing in regional and remote Australian Aboriginal health services

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Background: Young people living in remote Aboriginal communities experience some of the highest rates of chlamydia (CT) and gonorrhoea (NG) infection globally. A cluster-randomised controlled trial (TTANGO) in 11 remote primary health services demonstrated point-of-care (POC) testing for CT/NG was acceptable, accurate, improved the uptake and timeliness of treatment, and was cost-saving. Subsequently, POC testing was scaled-up and implemented in a further 20 remote health services (TTANGO2 program) across four jurisdictions (31 in total). We determine whether the uptake of POC testing observed in the trial was also achieved and sustained during the long-term program.

Methods: We conducted descriptive, interrupted time series and trajectory analyses to compare POC testing patterns over two time periods (trial: 2013-15 and program: 2016-19). For the trajectory analysis, we applied a Poisson model to identify and fit health services to testing groups.

Results: Among the 11 services who participated in both the trial and program, 7871 tests were conducted in total. The median number of tests per month in the trial was 241(IQR:178-305) and 408(IQR:294-538) in the program, with no significant trend in the trial (5.6 tests per month, $p=0.190$) but a significant increasing trend in the program (10.52 tests per month, $p<0.001$). Among the 31 program services ($n=20,622$ tests), three trajectory group were identified (low, medium, high). There was a significant upward trend in mean monthly testing in the “high” trajectory group (model-predicted linear regression coefficient:0.03, $p=0.002$).

Conclusions: Our findings suggest POC testing can be scaled-up and sustained as part of a routinely implemented program, achieving greater than expected testing numbers to support the clinical and public health benefits of more timely treatment. Further research is underway to investigate barriers among the “low” testing sites. These findings support the proposed transition from syndromic management towards aetiological diagnosis and treatment in low- and middle-income countries.

The mosaic mtr locus as major genetic determinant of azithromycin resistance of *Neisseria gonorrhoeae*, Germany, 2018

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Background

Azithromycin resistant *Neisseria gonorrhoeae* (NG) isolates increased from 4.3% in 2016 to 9.2% in 2018 within the German Gonococcal Resistance Network (GORENET) NG sample collection. Using whole genome sequencing (WGS) of NG isolates in combination with clinical and epidemiological data, we aim to understand this observed increase.

Methods

GORENET was set up in 2013 as a laboratory network to monitor NG infections in Germany by collection of NG isolates, epidemiological and clinical data. In 2018, isolates with reduced susceptibility to azithromycin (MIC \geq 0.25 mg/L) were analyzed by WGS followed by assignment of sequence types based on NG multiantigen sequence typing (NG-MAST) and multilocus sequence typing (MLST), detection of antimicrobial resistance determinants and generation of a core SNP distance-based neighbor-joining phylogenetic tree. Comparison with published isolates was performed based on a custom ad-hoc cgMLST scheme and calculation of a minimum spanning tree.

Results

Whole genome phylogenetic analyses resulted in 4 major clades corresponding to NG-MAST genogroups G2400, G3779 (G1407), G5441 and G12302. The clade comprising G12302 accounted for the majority of isolates with azithromycin resistance (MIC $>$ 0.5 mg/L) and was characterized by the presence of the recently described *Neisseria lactamica*-like mosaic mtr locus. In addition, strains in this clade were significantly associated with rectal infection site and younger age. Comparison with published isolates revealed similarity between a US and a German isolate of MLST ST9363 (12 nucleotides difference) and between a US and a German isolate of MLST ST11422 (21 nucleotides difference).

Conclusion

Our data indicate the recently observed increase in isolates resistant to azithromycin in Germany coincides with clonal expansion of NG-MAST genogroup G12302 and suggest that, together with horizontal gene transfer of resistance determinants and well-established point mutations, international spread of resistant lineages plays a major role regarding azithromycin resistance in Germany.

Sexually transmitted infection diagnoses among HIV pre-exposure prophylaxis users largely explained by partner numbers and testing frequency

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Background

There are conflicting data on the impact of increasing HIV Pre-exposure prophylaxis (PrEP) use on transmission and diagnosis of other sexually transmitted infections (STI) such as syphilis, gonorrhoea and chlamydia infection. We used observational data from German HIV/STI checkpoints on visits of PrEP users and non-users in 2019 and 2020 to analyse determinants for STI diagnosis.

Methods

Checkpoint clients fill out an online questionnaire at each visit. Demographic and behavioural data of the online questionnaire are linked to laboratory results. We analysed data of client-subgroups with relevant PrEP use (at least 1% of visits in the group by people using PrEP) for determinants of STI diagnoses using univariate and multivariate logistic regression models. PrEP use was categorized as never; intended; former; on demand, and regular.

Results

Data from 12,235 checkpoint visits including blood testing and 10,131 checkpoint visits including additional swab-testing for gonorrhoea and chlamydia could be included in the analysis. Active syphilis was diagnosed 2-3 times more frequently in visits of PrEP users compared to visits of non-users, gonorrhoea and/or chlamydia was diagnosed in 20% of PrEP user visits and 12% of non-PrEP-user visits. Three of four regular PrEP users had last been checked for STI within the last 3 months, but only one of nine non-PrEP-users. The number of sex partners and condomless sex partners was higher for PrEP users than for non-PrEP-users. In multivariate regression models, number of sex partners, number of condomless sex partners, and recency of STI testing explained the probability of STI diagnosis, the type of PrEP use was not significant.

Conclusions

Differences regarding STI diagnoses between PrEP users and non-users are largely explained by partner numbers and testing frequency. Due to the cross-sectional nature of our data we cannot determine whether initiating PrEP leads to higher partner numbers and/or reduced condom use.

A novel nomogram to identify MSM at high risk of syphilis infection in China: Results from a Serial Cross-Sectional Study

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Background: The purpose of this study was to develop a nomogram to identify men who have sex with men (MSM) at high risk of syphilis infection using a relatively large dataset in Southern China.

Methods: A serial cross-sectional dataset of 2184 MSM from 2017 to 2019 was used to develop and validate the nomogram. All eligible MSM were randomly assigned into the training and validation datasets. Factors included in the nomogram were determined by multivariate logistic regression analysis. We used the receiver operating characteristic (ROC) curves to assess the accuracy and discriminative ability of the nomogram.

Results: A total of 2184 MSM were recruited in this study. The overall syphilis prevalence was 18.1% (396/2184). The multivariate logistic regression found that MSM who were older age, sought sexual partners through non-internet route, had not consistently used condom in the last 6 months, had commercial sex with men in the last 6 months and had infected STD in the past year were more likely infected with syphilis.

We generated the nomogram to identify MSM at high risk of syphilis infection in the training cohort (C-index 0.80 [95% CI 0.76-0.84], sensitivity 86.9%, specificity 64.0%); in validation cohort (0.79 [0.75-0.84], 86.0%, 63.8%). When the total score is >46.5, MSM should be considered at high risk of syphilis infection. **Conclusions:** A nomogram for early risk assessment of syphilis infection among MSM has been developed and validated, which is easy to use and identifies MSM who are at higher risk. The proposed nomogram shows good assessment performance.

When resistance tests fail: DNA negative *Mycoplasma genitalium* detected by RNA assays

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The clinical significance DNA negative *Mycoplasma genitalium* (MG) detected by RNA assay is unknown. Macrolide resistance rates in the UK are high. When using resistance guided therapy, in the absence of a resistance result, empirical therapy of DNA negative MG is usually Moxifloxacin based therapy.

A retrospective case notes review for all patients tested for MG between January-December 2019 at a large London sexual health service was carried out. Hologic™ Aptima® transcription mediated amplification (TMA) MG positive samples were confirmed at Public Health England an in-house multiplex real-time PCR incorporating 2 targets (MgPa and gap). DNA negative samples were identified. Information on demographics, rationale for testing, treatment and outcome was collected.

2346 patients were tested for MG during the period. 536/2346 (23%) patients tested RNA positive. 125/536 (23%) were macrolide sensitive, 227/536 (42%) were macrolide resistant. Insufficient DNA for resistance test was reported in 184/536 (34%). 114/184 (62%) were DNA negative on two targets.

The majority of DNA negative samples were urine (81/114, 71%); from heterosexuals (92/114, 81%); who were symptomatic (76/114, 67%). 29/114 (25%) did not have a valid indication for testing. The majority of patients (71/114, 62%) had Moxifloxacin based therapy of whom 45/71 (63%) had a negative test of cure (TOC) by TMA. 25/71 (35%) had no TOC, 1/71 (1%) had a persistent DNA negative result.

When using RNA assays for MG testing, DNA negative MG is common and may represent cleared infection, cross reactivity with other *Mycoplasma* spp., or clinically insignificant/non-pathogenic carriage and the risks outweigh the benefits for treatment with Moxifloxacin. Clinico-pathological outcome data on DNA negative MG is required to inform interpretation of these results.

Heterogeneity of *Mycoplasma genitalium* resistance to macrolides and fluoroquinolones among men who have sex with men initiating PrEP in West-Africa

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Background: An alarming high prevalence of antimicrobial resistance in *Mycoplasma genitalium* (MG) has been reported among men who have sex with men (MSM) in many parts of the world. However, data on West-Africa are lacking. Our aim was to assess the prevalence of macrolide and fluoroquinolone resistance-associated mutations (RAMs) of MG among MSM initiating PrEP in Burkina Faso, Côte d'Ivoire, Mali, and Togo.

Methods: At the baseline visit 594 MSM were screened for MG in the urethra, anorectum, and pharynx using the S-DiagMGTV multiplex assay. Positive MG samples were genotyped via Sanger sequencing of the 23S rRNA. Moreover, RAMs in the quinolone resistance determining region (QRDR) of the *parC* and *gyrA* gene were detected by Sanger sequencing.

Results: MG was detected in 115/594 participants (19.4%). Country-specific prevalence of MG was, in descending order: Togo (25.7%, 26/101), Burkina Faso (23.9%, 27/113), Mali (18.3%, 48/263) and Côte d'Ivoire (12.0%, 14/117). Of 107 samples with available resistance data, none had RAMs to macrolides and 27 (25.2%) had RAMs to fluoroquinolones. QRDR mutations were more frequent in Mali (38.6%, 17/44) than in Togo (25.0%, 6/24) and Côte d'Ivoire (21.4%, 3/14). All except one sample collected in Burkina Faso were of wild type (96.0%, 24/25). RAMs at 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.

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.

Respecting donors protecting recipients: introducing the FAIR approach to MSM blood donor selection policy

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Background: People may not be eligible to donate for many reasons including groups at higher risk of acquiring transfusion transmissible infections through sex. Men who have sex with men (MSM) are one such group. In the UK, various lobbyists challenged this, citing discrimination and asking for an individualised approach. Here we describe the latest review of donor selection criteria, For the Assessment of Individualised Risk (FAIR), that the blood services engaged with stakeholders to complete, and discuss progress towards implementation.

Methods: We triangulated evidence from epidemiology of HIV and STIs, behavioural science and practice using surveillance data, literature reviews, focus groups and surveys to report to the Advisory Committee on the Safety of Blood, Tissues and Organs.

Results: Current risk of releasing an HIV infectious donation is less than 1 in a million. The literature showed that a previous bacterial STI within 12 months, chemsex, multiple or new sexual partners and anal sex carried increased risk of acquiring bloodborne infections through sex. Questions about these behaviours have high reliability but are open to impression management bias which needs to be managed. Questions about condom use did not give such reliable responses and more detailed questioning is currently difficult in our donation environment due to limited privacy.

Conclusions: It was proposed that donors who have had one sexual partner, who was not new, in the last 3 months are eligible to donate irrespective of gender, gender of partner or type of sex. Therefore, MSM in long-term partnerships would be eligible to donate. Ministers accepted the recommendations in December 2020 and the UK blood services are working towards implementation in Summer 2021. Reframing the message from donor risk to recipient safety and communicating the rationale for our selection criteria will be crucial to success. Timely monitoring will check blood safety is maintained.

Access to, and usage of, online postal sexually transmitted infection self-sampling services: a scoping review

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Background: Increasing service user demand and rising incidence of key sexually transmitted infections (STIs), alongside developments in diagnostics and digital health provision, at a time when services have faced fragmentation and reduction in funding, have resulted in a huge expansion in online postal sexually transmitted infection (STI) self-sampling services across some parts of the UK. This review aimed to explore who is accessing and using online postal self-sampling services in the UK, the acceptability of these services and whether they are exacerbating sexual health inequalities.

Methods: Following the PICO (Population Intervention Comparators Outcome) framework, a systematic search was conducted in nine databases in June 2020. Included studies were published between 01/2010-06/2020, in the English language, based on pre-agreed inclusion/exclusion criteria. A second reviewer carried out abstract and full text screening. 15 studies were included. Extracted data were analysed using descriptive statistics and thematic analysis.

Results: Study designs were heterogeneous, including quantitative, qualitative and mixed method analysis, and were therefore appraised using the Mixed Methods Appraisal Tool. Overall, studies were of good quality. However, the majority were either evaluating a single site/testing provider, were exploratory or observational. Few studies collected comprehensive demographic data. Individuals accessing online postal STI self-sampling services tended to be asymptomatic, white, women, over 20s, and from less deprived areas. These services tended to increase overall STI testing demand and access. There were varied results on whether services reduced time to treatment. Services were deemed highly acceptable if they were trustworthy, reliable, convenient, and improved patient choice.

Conclusion: Existing and new services must complete comprehensive evaluations to establish whether services are inclusive, accessible and address, rather than exacerbate, sexual health inequalities. Now is a critical time to identify the effectiveness of these digital health interventions given the wave of service expansions across the UK.

Self-sampling demonstrates comparable sensitivity and specificity to clinician-sampling for HPV testing among MSM in China

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Human papillomavirus (HPV) can cause genital warts and cervical, anal, and penile cancers. HPV self-sampling is an acceptable and feasible approach for HPV testing among women. Despite emerging research stated a higher risk of HPV infection among men who have sex with men (MSM), few guidelines are available for HPV self-sampling among MSM. Adding HPV self-sampling as a complement may benefit MSM and improve STI testing services among key populations. This study aimed to evaluate the feasibility and accuracy of HPV self-sampling among MSM.

MSM who were aged 18 or above, had sex with men in the past year were recruited. Eligible participants followed the instruction to self-collect specimens using oral fluid, penile, and rectal swab. Then a clinician or trained staff collected specimens from same areas. All specimens were processed using PCR test for 14 high-risk subtypes and 2 low-risk subtypes. PCR results were defined as the gold standard when assessing the performance of self-sampling and clinician-sampling. Sensitivity and specificity were calculated for each approach independently, and then chi-square test was used to compare two approaches.

A total of 211 MSM were recruited and tested from April to October 2020 in Zhuhai, China. The mean age of MSM was 31 years old (SD = 7.9). The overall prevalence of HPV among participants was 49% (103/211). Clinician-sampled specimens detected 91 of 103 MSM infected with HPV, with a sensitivity of 88.3% (95% CI: 80.2-93.6), and specificity of 100.0% (95% CI: 95.7-100.0), respectively. Self-sampled specimens detected 81 of 103 MSM infected with HPV, with a sensitivity of 78.6% (95% CI: 69.2-85.9), and a specificity of 100.0% (95% CI: 95.7-100.0), respectively. The sensitivity was comparable between the clinician-sampling and self-sampling among MSM (P=0.09).

HPV self-sampling is feasible among MSM and it holds the potential in scaling-up HPV testing services among key populations.

Public health decision-makers' perspectives on approaches to economic evaluation for sexually transmitted infection control programmes

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Background: Economic evaluations aim to inform decision-makers about the cost-effectiveness of health interventions. However, currently economic evaluations may be underutilised by local public health decision-makers.

Whilst research has been conducted with public health decision-makers, the needs and priorities of those primarily concerned with sexual health services (SHS) have not been fully considered. This research aimed to gain an insight into how decision-makers based in England, responsible for SHS use economic evidence to inform decision-making.

Methods: In-depth semi-structured interviews with participants who were purposefully sampled through a snowballing approach until saturation was reached. The interviews were transcribed ad-verbatim and analysed using the framework analysis method.

Results: Fifteen qualitative interviews with 17 participants were conducted. Eight participants were local commissioners, four were national commissioners, and three were responsible for service provision. Three main themes were identified:

Context/ commissioning – Decision-making processes around SHS were reported as complex and involving multiple stakeholders. Different services are commissioned by a wide-range of decision-makers, and the different types of contracting SHS, affect the comparability of provision.

Costs and budgets – Decision-makers described pressures on budgets due to increasing demand for SHS and funding limitations. Nearly all stated that the fragmentation of commissioning created issues around budget flow. Another significant issue was that savings were realised by different parts of the system to those who pay for them.

Using economic evidence – Participants mainly focussed on economic evidence in terms of return on investment. Although broader outcomes such as impacts on inequalities were seen as relevant, this was often overshadowed by cost and cost-saving concerns. Helpful evidence was described as being adaptable to the local population and including costs relevant to local areas.

Conclusions: Future economic evaluations of SHS need to be tailored to ensure that they provide economic evidence that meets the needs of decision-makers.

Identifying the PrEP Gap: A systematic review exploring equity in the HIV-PrEP care continuum in high income countries

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Background

Equitable implementation of HIV Pre-Exposure Prophylaxis (PrEP) is not well defined, particularly for populations already experiencing high levels of health inequity (e.g. people experiencing poverty or other social disadvantages). The five stages of the PrEP care-continuum (PCC) (awareness, acceptability, uptake, adherence, retention) can help evaluate PrEP implementation, but the extent to which key characteristics that are important for health equity are considered throughout the PCC has not been described. This systematic review aims to: 1) identify and collate outcome measure (OM) definitions for the PCC stages; 2) describe how key health equity characteristics are considered in these OM definitions.

Methods

Five databases were searched for quantitative studies published after January 1st, 2012. Data regarding study design, OM definitions, and health equity characteristics were extracted. Data were analysed using narrative synthesis.

Results

11,264 papers were identified and screened; 227 were included. The majority of studies included >1 OM (67%). The most commonly reported OM was awareness (54%), followed by interest (51%) and uptake (50%). Relatively few studies reported on adherence (12%) or retention (17%). No studies described movement through the PCC from awareness to retention. The most commonly reported equity characteristics were age (86%) and race/ethnicity (80%); the least common were social capital (31%) and religion (1%). The majority of studies focused on cis-gender men who have sex with men (MSM) (48%), while other affected groups, such as cis-gender women and trans* people are less well represented (7% and 6%, respectively).

Conclusion

There is an unequal focus on the earlier stages of the PCC. Some key equity characteristics (e.g. age) are commonly considered, however, other important characteristics (e.g. social capital) are overlooked. These findings are relevant to healthcare professionals, policymakers and commissioners in informing how to best implement and evaluate PrEP programmes for potentially vulnerable and less advantaged populations.

Determinants of PrEP uptake, intention and awareness in the Netherlands: a socio-spatial analysis

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Background: Since its formal introduction in 2019, PrEP uptake in the Netherlands is growing, but remains at suboptimal levels. Hence, the analysis of determinants is paramount. Given the initial focus of PrEP provision among men-who-have-sex-with-men (MSM) via a demonstration project, AmPrEP in Amsterdam, and pharmacies in the main urban areas (so called “Randstad”, entailing Amsterdam, Utrecht, Leiden, The Hague and Rotterdam), investigating regional discrepancies is necessary. We seek to unravel regional differences jointly with known predictors of PrEP use, intention and awareness.

Method: This cross-sectional study included 3,232 HIV-negative Dutch MSM recruited via the EMIS survey in late 2017. Prevalence and standardized prevalence ratio (SPR) of PrEP use, awareness and intention were measured on a regional level (Randstad vs. the rest of the country). Multi-level logistic modeling was conducted to identify the association of PrEP use with PrEP awareness and intention, sociodemographic, behavioral, psychological/cognitive determinants, and random effects from regional differences.

Results

MSM from Randstad used more PrEP (SPR=1.4 vs. 0.7) compared to the rest of the country, but there were minor differences for awareness and intention. The regional distinction was estimated to explain 4.6% of the PrEP use variance (adjusted ICC=0.046). Greater influence from intention to use (OR=4.5, 95%CI 2.0-10.1) and knowledge of PrEP (OR=7.0, 95%CI 4.1-12.0), while limited influence from the awareness of PrEP was observed (OR=0.4, 95%CI 0.04-4.4). Lower education (OR=0.4, 95%CI 0.2-0.9) was negatively associated with PrEP use, however, no significant difference was found between middle and high education (OR=1.2, 95%CI 0.7- 2.0).

Conclusion: We showed that regional differences – MSM in non-urban regions – and with a low educational background account for lower PrEP use and intention. Based on these findings more fine-tuned PrEP access with a focus on non-urban regions can be implemented, and tailored campaigns increasing intention/use can be conducted among target populations.

Assessing indicator condition-guided HIV testing in the hospital setting

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Background

Timely diagnosis of HIV is key in the efforts to end the HIV epidemic. Indicator Condition (IC) guided HIV testing is cost-effective in identifying undiagnosed HIV. It is unknown to what extent hospitals are applying this strategy. We assessed baseline findings from an ongoing multicenter interventional study aimed at identifying opportunities for improving IC-guided HIV testing in hospitals in Amsterdam.

Methods

The study involved two university hospitals, two teaching hospitals, and one non-teaching hospital. Seven ICs were selected: tuberculosis (TB), lymphoma, hepatitis B (HBV) and C (HCV), cervical carcinoma or intraepithelial neoplasia grade III (CC/CIN-III), vulvar carcinoma or intraepithelial neoplasia grade III (VC/VIN-III), and peripheral neuropathy (PN). Patients ≥ 18 years not known to have HIV, diagnosed with one of these ICs during 2015–2020 were eligible. We included all eligible patients in one hospital, and screened a sample of ≤ 500 patients per IC in the others. Primary outcome was the proportion of patients with an IC tested for HIV ≤ 3 months around IC diagnosis (i.e. HIV testing ratio). Secondary outcome was the proportion of positive tests.

Results

We included 4,823 patients. HIV testing ratios were highest amongst TB patients (range 74–94%). The testing ratio varied considerably across ICs and locations, ranging between 56%(50/90)–72%(105/145) in lymphoma patients, 33%(5/15)–65%(113/175) in HBV, 29%(2/7)–73%(24/33) in HCV, 0%(0/68)–4%(16/452) in CC/CIN-III, and 4%(4/97)–16%(16/98) in PN. None of the 198 VC/VIN-III patients were tested for HIV. Eleven patients (0.7%) tested HIV positive ≤ 3 months around IC diagnosis. Of these, 6(55%) had lymphoma and 10(91%) had a CD4 count < 350 cells/mm³.

Conclusion

In-hospital IC-guided testing in the selected ICs was variably and often insufficiently practiced, but did identify people with previously undiagnosed HIV. These data show the relevance of tailored interventions to improve IC-guided HIV testing, to contribute to reducing the proportion of people with undiagnosed HIV.

Comparison of Intimate Partner Violence prior to and during the COVID-19 pandemic: Findings from the I-SHARE cross-sectional multi-country study

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Background: Shelter-in-place and related COVID-19 physical distancing measures may influence the risk of intimate partner violence (IPV). The current study aims to (1) describe perceived changes in IPV experienced during and prior to the COVID-19 outbreak, (2) identify social correlates of IPV.

Methods: The International Sexual Health and REproductive Health (I-SHARE) study collected data on sexual and reproductive health during the COVID-19 pandemic (10,717 respondents in 16 countries between July 26th and December 1st 2020). The sample comprises participants in 7 HICs, 5 UMICs, 2 LMICs, and 2 LICs: 6,643 (62.3%) participants identified as women, 3,650 (34.2%) as men, and 178 (1.7%) as another gender. The median age was 30 (IQR 24; 39). Adults (≥18yrs) were recruited online (social media, panel, or population-representative). IPV was a primary outcome measured using an adapted six-item version of the WHO IPV scale. Mixed effects modelling was used to assess participants' experience of IPV in the three months prior to, and during, the COVID-19 physical distancing measures; participants were also asked about informal and formal reporting of IPV.

Results: Preliminary analysis indicated that 1,864 (17.4%) of the 10,717 participants reported experiencing at least one form of IPV before the introduction of COVID-19 control measures; 1,346 (12.6%) participants reported IPV during COVID-19 physical distancing measures. Among participants experiencing IPV when physical distancing measures were in place, 691 (37.1%) told either a friend, the police, social services or other organization. Participants with a reduction in household income during the COVID-19 measures (aOR 1.48, 95% CI 1.29-1.69) and increased consumption of alcohol during COVID-19 (aOR 1.51, 95% CI 1.26-1.81) had higher odds of experiencing IPV.

Conclusion: IPV may have decreased during COVID-19 measures, but remained common overall. Structural interventions are necessary to mitigate the impact of IPV.

Syphilis diagnoses @ Western Sydney Sexual Health Centre 2015-2019

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Background:

Methods:

Results:

Conclusion:

EPIDEMIOLOGICAL AND SOCIODEMOGRAPHIC PROFILE OF HIV+/AIDS PATIENTS AT A REFERENCE CENTER IN THE SOUTH OF MINAS GERAIS, BRAZIL.

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Introduction: The Human Immunodeficiency Virus (HIV), identified in Brazil in the early 1980s, spread across the country, with its risk group and profile being modified over the years. Therefore, it is necessary to study the profile of these patients in order to generate comparisons, preventions and improvements in care. (comparisons and preventions that lead to improvements in care). Along with the dissemination, new drugs are emerging in the treatment of HIV infections, observing the emergence of comorbidities that need to be pre-diagnosed and treated, aiming at improving patients' quality of life and reducing the mortality. Given the lack of knowledge of the epidemiological and clinical profile of these patients in small and medium-sized cities, it is necessary to study and compare them at the national level. **Objective:** To locate the epidemiological and sociodemographic profile of patients treated at the AIDS Care and Prevention Center/STD(CAP) in Brazil/Itajubá. **METHODS:** Of 292 medical records of patients in 2020, 168 were randomly selected and analyzed for information such as sex, age, sexual orientation, viral transmission, housing, race, education, social occupation and other information on the main comorbidities. **RESULTS:** There was a predominance of men (73.8%), white (57.7%) and 51% with incompleting high school. The predominant age groups were 31-40 years (25.6%), 41-50 (23.8%) and 51-60 (22.6%). There was a predominance of heterosexual orientation (42.3%), sexual transmission (81.5%) and residents in the Urban Zone (81%). In addition to Occupations: Unemployment (14.9%), Home (14.3%) and less favored occupants social positions. The main comorbidities were: Oral Candidiasis (35.1%), Persistent Dermatitis (23.2%), Depression (22%), Pneumonia (14.3%), Tuberculosis (13.1%), Syphilis (10.9 %). **CONCLUSION:** The profile differs from common sense, calling attention to age and sexual orientation. Finally, there is a need to improve the filling of medical records, for future comparisons and preventions that lead to improvements in care

Preferences of people living with HIV for injectable and oral antiretroviral treatment in the Netherlands: a discrete choice experiment

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BACKGROUND: Antiretroviral (ARV) therapies are currently orally administered, daily; however, there are long-acting (LA) injectable alternative ARVs in development. Understanding preferences of people living with HIV (PLWH) for different modes of administration, could provide relevant information for clinical and policy decision-making. This study aimed to elicit preferences of PLWH for LA injectable- compared with oral ARV-therapies, in the Netherlands.

METHODS: A discrete-choice experiment (DCE) was conducted among PLWH, which presented 12 choice tasks for two ARV therapies (i.e. oral or LA injectable). PLWH were asked in each task to select their preferred ART. Based on literature reviews, interviews with PLWH and expert consultation, ARV options were characterized by six attributes: location of administration, dosing frequency, risk of having short-term side effects, risk of drug-drug interaction, forgivability, and food and mealtime restrictions. Random parameters logit and latent class models were used to estimate preferences of PLWH.

RESULTS: A total of 76 PLWH completed the survey. Of the 76 respondents, 22 (28.9%) chose oral ARV therapy in all choice tasks, 30 (39.5%) respondents always chose LA injectable ARV therapy, and 24 (31.6%) respondents varied their choice depending on the choice tasks. Respondents always choosing LA injection reported to be more willing to switch their ARV therapy ($p=.006$). On average, PLWH preferred an injectable therapy, a less frequent dosing regimen, lower risks of side effects or drug-drug interactions, therapy administrated at home and therapy without food and mealtime restrictions, compared with alternatives.

CONCLUSION: This study revealed that PLWH have a strong preference for mode of administration. Some people always preferred LA injectable ARV therapy, while others always preferred oral ARVs. This study, therefore, highlights the value and potential marketplace for a LA injectable ARV therapy. Improved medication adherence could result, if patients are actively involved in the decision-making process of their ARV treatment.

Declining trends of syphilis seroprevalence in India: A 10-year-analysis

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Background

World Health Organization (WHO) estimates that each year 11 million new cases of syphilis occur globally. Syphilis remains an important public health challenge in low-income countries like India and has re-emerged in several high-income countries. The present study was undertaken to analyse the trends in prevalence, pattern and clinical presentations of syphilis, over 10 years, at a tertiary-care-hospital in India.

Methods

A retrospective observational study was carried out at the Apex Regional STD Centre, Safdarjung Hospital, New Delhi, India; wherein data from patient records of all the syphilis cases from sexually transmitted infections (STIs) clinic, from January 2007 to December 2016 was analysed. Patients were diagnosed using syphilis serological assays as per classical testing strategy. Epidemiological, clinical and investigational data was analysed statistically for changing epidemiological and clinical trends of syphilis.

Results

Of 373,845 patients tested for syphilis, 1.41% males were VDRL reactive compared to 0.49% females ($\chi^2=874.5, p<0.0001$). VDRL reactivity showed a declining trend with 1.56% prevalence in 2007 and 1.05% in 2016 ($\chi^2_{trend}=87.8, p<0.0001$) with significant fall in reactivity for females. TPHA reactivity also showed a declining trend ($\chi^2_{trend}=32.0, p<0.0001$). Biological false positivity was appreciably more in females ($\chi^2=4.06, p=0.043$) and with VDRL titres $<1:8$ ($\chi^2=44.1, p<0.0001$). TPHA positivity was significantly higher with VDRL titres $\geq 1:8$ ($\chi^2=55.2, p<0.0001$). Latent syphilis comprised 92.7% of total diagnosed cases ($p<0.0001$) and 20-29 years was the most common age-group with 55.8% cases ($p<0.0001$).

Conclusion

Syphilis has features of a disease that could be eliminated; like absence of reservoir, 2-6 week incubation period, availability of inexpensive sero-diagnostic tests and treatable with single dose of penicillin. Since, syphilis has been recommended as a marker of STI prevalence by WHO, the strong and significant decline in seroprevalence of syphilis during 2007-2016, reflects the success of the National STI Prevention and Control Programme whose pillars rest upon education and proper management.

Who is providing HIV testing and diagnosis? Comparing general practitioners and sexual health centres in five regions in the Netherlands

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Background

General practitioners (GPs) and sexual health centres (SHCs) are the main providers of STI and HIV testing in the Netherlands. We compared HIV testing by GPs versus SHCs to gain insight in strategies to improve HIV testing, stimulating timely HIV diagnosis.

Methods

Laboratory data (2011-2018) on HIV testing by GPs and SHCs in five Dutch regions with varying levels of urbanisation were used. Mean regional HIV testing rates per 10,000 residents ≥ 15 years were compared between providers using negative binomial generalised additive models, and additionally stratified by sex and age (15-29y, 30-44y, 45-59y, ≥ 60 y). Chi-squared tests were used to compare percentage positive between providers.

Results

Analysed data included 507,197 HIV tests (GP 36%, SHC 64%). The highest HIV testing rates and positivity were observed in highly urbanised regions, with large variation between regions. The HIV testing rates ranged from 28-178/10,000 residents by GPs and from 30-379/10,000 residents by SHCs. Testing rates by GPs were lower than by SHCs in two regions, while these rates were comparable in the others. In all regions, men were tested less by GPs than by SHCs; for women this varied per region. Among 15-29 year olds, GPs' testing rates were lower than SHCs', while this was reversed in older age categories. The overall mean HIV positivity was 0.5% for GPs and 0.4% for SHCs. In Amsterdam, positivity was higher among individuals tested by GPs, but in the other regions no difference was observed.

Conclusion

This is the first study comparing HIV testing by GPs versus SHCs using laboratory data in the Netherlands. Our results show that besides SHCs, GPs also play a key role, especially in some subgroups, but large

regional variation exists. Regional-specific interventions to improve GPs' HIV testing practices are needed for populations not attending the SHCs to ensure timely HIV diagnosis.

Never tested for HIV: directions for targeted testing interventions among men who have sex with men

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Men who have sex with men (MSM) who are unaware of their HIV-infection contribute to onward HIV transmission and are more likely to progress to symptomatic HIV disease. We assessed determinants of never-testing for HIV among MSM living in the Netherlands. Between April-July 2019, we conducted a nationwide cross-sectional survey among MSM on socio-demographics, HIV-testing behavior and sexual risk taking, which was distributed via gay networking sites/apps. Multivariable logistic regression was used to investigate characteristics associated with never-testing for HIV.

950 HIV-negative tested and 122 never-tested MSM completed the survey. In never-tested MSM, median age was 37 (IQR=22-51) years and 37 (30%) reported recent sexual risk behavior. Never-testing was associated with younger age (adjusted odds ratio [aOR] per year increase=0.98, 95%-confidence interval [CI]=0.97-1.00, $p=0.021$), having sex with men and women (aOR=2.93, 95%-CI=1.61-5.34, $p<0.001$), and not knowing others living with HIV (aOR=3.74, 95%-CI=2.28-6.13, $p<0.001$). A significant interaction effect between education level and residential area was observed ($p=0.001$). Among higher-educated MSM, those living outside a large urban area had higher odds of never-testing compared to those living in an urban area (aOR=6.26, 95%CI=2.42-16.24, $p<0.001$). Lower-educated MSM had higher odds of never-testing irrespective of residential area (urban: aOR=12.06, 95%CI=4.00-36.38; rural: aOR 9.29, 95%CI=3.64-23.76; $p<0.001$ for both). Among MSM with recent sexual risk, never-testing was associated with having sex with men and women (aOR=2.80, 95%-CI=1.09-7.18, $p=0.032$) and not knowing others with HIV (aOR=4.91, 95%-CI=1.97-12.24, $p=0.001$). Based on this online sample of MSM, never-testing for HIV is more common in those who were younger, had lower education level, non-urban residency, had sex with men and women, and did not know someone with HIV. Only the latter two factors were observed among those with recent sexual risk behavior. Testing interventions for those never-tested should be tailored to residential area and education level, and inclusive of bisexuality.

Bactericidal activity of esculetin is associated with impaired cell wall synthesis by targeting glutamate racemase of *Neisseria gonorrhoeae*

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Background:

Antimicrobial resistance in *Neisseria gonorrhoeae* (NG), the causative organism of gonorrhea, has posed a serious threat worldwide. Gonorrhea is a sexually transmitted disease with a high morbidity burden and is an important cause of pelvic inflammatory disease. The failure of recommended dual therapy with ceftriaxone and azithromycin has compromised the general and reproductive health of infected individuals. Thereby, *Neisseria gonorrhoeae* was recently classified as a “Priority 2” microorganism by the World Health Organization. Consequently, persistent attempts are under way to discover novel drug targets as well as new drugs to fight against *Neisseria*. In this direction, considerable number of phytochemicals have been reconnoitred for their remedial intercession via targeting bacterial proteins.

Methods Murl gene is specific to the bacterial kingdom, it can be exploited as a potential drug target for the treatment of bacterial diseases. Accordingly, diverse families of phytochemicals were screened in silico for their binding affinity with NG-Murl protein. Esculetin, one of the shortlisted compounds, was evaluated for its functional, structural and anti-bacterial activity. Murl was cloned, expressed and purified to homogeneity and used for testing the effect of esculetin on its racemase activity under invitro conditions. We further evaluated the effect of esculetin on sensitive and drug resistant strains of NG.

Results:

We screened various classes of natural compounds and found esculetin, a coumarin derivative as a potent compound to target its effect on the growth of *Neisseria gonorrhoeae*. Treatment with esculetin resulted in growth inhibition, cell wall damage and altered permeability as revealed by fluorescence and electron microscopy. Furthermore, esculetin inhibited racemization activity of recombinant, purified Murl protein of NG, an important enzyme required for peptidoglycan biosynthesis.

Conclusions: Our results suggest that esculetin could be further explored as a lead compound for developing new drug molecules against multidrug resistant strains.

Participatory community-based mapping of people who inject drugs (PWID) locations to improve HIV case-finding

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Background

HIV in Ukraine continues to be concentrated among PWID. According to the IBBS, only 58% of HIV-positive PWID are aware of their status, so more than 33.000 PWID living with HIV remain undiagnosed. The mapping of PWID locations makes it possible to optimize the HIV case-finding activities, which include both stationary testing sites and outreach routes.

Methods

We used community-based participatory research (CBPR) approach to mapping the locations of PWID in 12 cities. The study was conducted in collaboration with leading community-based organizations. We identified the locations in each city, the approximate number of PWID in its, and the schedule for visiting each location (peak days and hours). Data on current locations of HIV testing sites and outreach routes were used for additional analysis.

Results

885 PWID locations of 24 different types were identified (from 31 to 223 in each city). Among them are pharmacies, streets/yards/garages, shops, markets, places of drug sale, parks, places of PWID accumulation, pawnshops/banks, hospitals, transport stops, cafes, entertainment points, railway stations, probation, rehabilitation centers, social and psychological assistance points. 63.3% of locations are not associated with medical and social services and were previously unknown to HIV-services. Locations were visited all days of the week from 6.00 am to 0.05 am.

The mapping results were visualized using Google Maps and QGIS and compared with HIV-projects data.

The current location of the sites and outreach routes does not allow the full reach of PWID and relies on the most famous gathering places.

Conclusions

Data on the PWID locations are often incompletely known to HIV testing services, which limits the successful HIV cases-finding among them. Experience with community-based mapping has made it possible to re-plan routes and relocate fixed sites to better reach PWID. Obtaining such comprehensive results would not be impossible without collaboration with PWID-community.

Sexualized drug use among female sex workers from eight cities in China

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Background There is rich literature on sexualized drug use (i.e. drug use before or during sex) for men who have sex with men but less data from female sex workers (FSW) particularly from low- and middle-income countries. We describe the sociodemographic characteristics, sexual behaviors and HIV and sexually transmitted infection (STI) testing behaviors among FSW reporting sexualized drug use, compared with FSW who do not report sexualized drug use.

Methods

This cross-sectional study was conducted in eight cities in China in 2019. We recruited FSW through community organizations working with sex workers. Multivariable logistic regression models were used to evaluate the factors associated with FSW reporting sexualized drug use. We adjusted for current injecting drug use, age, marital status, migration status, income and education in each of the models.

Results

In total, 1287 women participated: average age was 35.1 years (SD 10.3), about half reported a monthly income over 5000 RMB (\$USD 707, 52.4%), and a minority completed high school or above (17.4%). Among participants, 284 (22.1%, 95% CI:19.8-24.4) reported a history of sexualized drug use. Compared to FSW who never reported a history of sexualized drug use or IDU, FSW who reported a history of sexualized drug use had greater odds of: having a manager (adjusted odds ratio (AOR) 2.10, 95% CI:1.47-2.99), reporting inconsistent condom use for vaginal sex (AOR 2.67, 95% CI:1.93-3.69), inconsistent condom use for oral sex (AOR 2.33, 95% CI:1.25-4.37), ever had an unintended pregnancy (AOR 1.43, 95% CI:1.04-1.96), and ever diagnosed with STIs (AOR 5.39, 95% CI:3.92-7.40).

Conclusion

We recommend routinely asking FSW about sexualized drug use as nearly one in five FSW reported a history of sexualized drug use and these women had an elevated risk profile compared with those who reported no sexualized drug use.

Development of Taqman based multiplex qPCR assay for simultaneous detection of *N.gonorrhoeae*, *C.trachomatis* and *T.vaginalis* in the endocervical/vaginal samples

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Background: *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT) and *Trichomonas vaginalis*(TV) are among the major causative agents of sexually transmitted infections (STIs). Huge fraction of patients with NG, CT and TV infections are asymptomatic making syndromic case management(SCM) becomes unreliable. Taqman based triplex qPCR assay for simultaneous detection of NG, CT and TV, besides being dependable diagnostic tool, can effectively differentiate between mono-infections and co-infections of these pathogens.

Methods: Endo-cervical dry swabs were procured from non-pregnant females visiting Department of Obstetrics & Gynaecology, VMMC and Safdarjung Hospital, Delhi, India as per ICMR ethical guidelines. DNA was isolated from the samples and presence of the causative agent, if any, was determined using in-house developed Multiplex qPCR assay by employing specific primer-probe sets targeting each pathogen.

Analytical sensitivities and specificities were determined for each uniplex assay. In-house developed assay was clinically validated in comparison to published NAAT based assays.

Results: A 108 bp region of orf-1 gene of NG, 133 bp region of pld gene of CT and 147 bp region of pfo-B gene of TV genomic DNA were utilized for identification. Analytical sensitivity of NG uniplex assay was determined to be 10ag of recombinant DNA (3-4 DNA equivalents) and for both CT and TV, it was determined to be 100ag of DNA (30 DNA equivalents). 85 clinical samples have been examined so far and the assay detects NG and CT DNA with 83% and 60% sensitivities, 99% and 100% specificities, 83% and 100% PPV and, 99% and 98% NPV respectively. Two clinical samples among them were co-infected with NG and CT.

Conclusion: In-house developed multiplex qPCR assay provides an opportunity for diagnosis of three highly prevalent and curable STIs in only one assay. The results following validation are motivating enough to project it as a potentially reliable diagnostic tool for their detection.

The impact of an HIV cure for people living with HIV and affected populations in the Netherlands: a qualitative study

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Background: When an HIV cure becomes available, it will have consequences for people living with HIV (PLHIV) and affected populations. The aim of this study was to explore the perceived impact of an HIV cure on the expected quality of life (QoL) among PLHIV and affected populations in the Netherlands.

Methods: We conducted in-depth interviews with 28 PLHIV and 12 people of affected populations (i.e., people who inject drugs and men who have sex with men (MSM) living without HIV) in the Netherlands. We explored experienced QoL related to HIV; perceptions towards two potential cure scenarios (i.e., achieving post-treatment control in which HIV is suppressed without medication or complete elimination of HIV from the body), and how these two scenarios may change their QoL. Data were thematically analyzed to identify perceptions related to the impact of an HIV cure.

Results: Interviewees described that their current QoL was, or would be, negatively influenced by HIV due to daily use of medication, fear of obtaining or transmitting HIV, and stigma. Participants perceived the elimination of HIV as a cure and achieving post-treatment control as a next step in the treatment of HIV. PLHIV and affected populations expressed that the elimination of HIV would improve QoL beyond reducing physical discomfort. Noteworthy, PLHIV believed that the fear of obtaining HIV would be reduced due to a cure, and that this may lead to an increase in sexual risk behaviors.

Conclusion: Our study demonstrates the importance of HIV cure research by highlighting the expected positive impact of a cure beyond reducing physical discomfort of living with HIV, in particular among PLHIV. In addition, our results help current cure researchers anticipate the need to align language about an HIV cure with the desires about an HIV cure of PLHIV and affected populations.

Risk factors for STI versus testing rates in a Dutch multicultural area: opportunities for increasing sexual health care accessibility?

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Background

We aimed to compare sexually transmitted infection (STI)-related risk profiles and STI testing rates by geographical area to determine areas for improvement of access to sexual health care (SHC). This could aid in optimizing and targeting interventions or service allocation.

Methods

Five-year (2015-2019) individual population registry data were used (15-45yr), and matched with laboratory-based chlamydia (CT) and gonorrhea (NG) testing data of general practitioners (GPs) and the only sexual health clinic (SH-CLIN) in the multicultural greater Rotterdam area, the Netherlands. CT/NG data were used as proxy for STI consultation. Per four-digit postal code (PC) area we calculated STI-related risk scores (based on age, non-western migratory background, education level and urbanization) and testing rates. Three PC clusters were identified: 1) high risk score with low testing rate; 2) high risk score with high testing rate; 3) low risk score, independently of testing rate. Multivariable logistic regression analysis was used to compare individual and area characteristics in cluster 1 and cluster 2.

Results

The greater Rotterdam area consists of approximately 525,000 residents between 15-45yr. Around 27,000 CT/NG tests per year were reported. The PC area testing rate ranged from 2.2 to 116.1 tests per 1,000 residents. Around 45% of all residents belonged to cluster 1 and 30% to cluster 2. Characteristics associated with individuals in cluster 1 are low education, Turkish, Moroccan, residing outside the dense urban area, living in less ethnic diverse area and more distant from both GP and SH-CLIN.

Conclusion

This study combines individual population data and data of the two main SHC providers. Several determinants are associated with high STI-related risk scores and low testing rates. The next step is to develop strategies to improve SHC access for this group. Opportunities for further exploration include for example GP education, community-based testing and service (re)allocation.

Reaching out: evaluation of community-based HIV testing pilot in a high prevalent multicultural area in Rotterdam, the Netherlands

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Background

We performed a community-based HIV testing (CBHT) pilot in a multicultural area with high HIV prevalence. Here we evaluate our goals of reaching the population, finding HIV-infections and whether this approach helps to normalize HIV testing, decrease HIV-related stigma, and increase knowledge and open conversation about HIV.

Methods

Interviewing 37 residents and 6 key figures of community/health organizations outlined our CBHT strategy main conditions: low-threshold, free-of-charge and a general health check (HIV test included). Based on these conditions, and in consultation with community organizations, test actions were developed offering HIV and other health checks. Demographics, HIV testing history, risk perception and openness concerning HIV was obtained via questionnaires. We piloted seven 4-hours test actions at three community organizations (October 2019-February 2020), who also recruited participants. HIV education was offered by health educators, peers and using a game. Each test action was evaluated among participants, the organization and test team members.

Results

In total, all 140 participants were tested for HIV (74% women, 85% non-western, median age 49yr). For 127 participants HIV testing history was collected; 59% never tested before and 20% tested >1yr ago. With one positive HIV test, the detection rate was 0.7%. 90% of participants perceived no HIV risk. Several participants indicated the test action positively altered their attitude and knowledge about HIV/PLWH. The CBHT was positively evaluated by all parties. The major concerns by test team members were time, language problems and privacy. Participants hardly indicated these concerns.

Conclusion

This CBHT approach (1) is feasible and well-suited for testing not (recently) tested groups and detect new cases, especially in high prevalent neighborhoods with hard-to-reach populations like non-western migrants, (2) positively seems to contribute to attitudes and knowledge about HIV/PLWH. Nevertheless, it is questionable whether this laborious approach, outweighs finding the last fraction of new HIV cases.

HIGH RISK HPV GENOTYPES IN EXTERNAL ANOGENITAL WARTS – SHOULD GENOTYPING BE DONE ROUTINELY?

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BACKGROUND: Anogenital warts (AGW) is one of the most common sexually transmitted disease with incidence of 2-25% in India. It is caused by human papillomavirus (HPV), of which low-risk genotypes (6 and 11) are implicated in most cases. In contrast, HPV high-risk genotypes are strongly associated with anogenital malignancies. This study aims to identify the presence of various HPV genotypes, in external anogenital warts and correlate the presence of high-risk genotypes with patient's profile.

MATERIALS AND METHOD: After ethical clearance an observational cross-sectional study was conducted with consecutive 73 patients having clinical diagnosis of external anogenital warts attending the STD Clinic at a tertiary reference centre. After informed consent, patient's demographic and clinical data was recorded on a preformed performa. During the routine treatment, tissue from the anogenital wart was collected in normal saline, by radiofrequency ablation. Genotyping was performed by real-time PCR test for 2 high risk and 14 low-risk genotypes as per standard protocols. Data analysis was done using (SPSS) version 21.0.

RESULTS: Out of 73 patients, 55 tissue samples were positive for HPV. A total of 16 HPV genotypes were identified (6, 11, 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68), of which the most prevalent genotypes were HPV-11 (61.81%), HPV-6 (47.27%), HPV-16 (16.36%), HPV-59 (12.7%) and HPV-51 (9.09%). Upon analysis, 1, 2-5 and >5 genotypes were identified in 35 (63.6%), 17 (30.9%) and 3 (5.45%) patients respectively. Appreciable greater number of low-risk genotypes were identified as compared to high-risk genotypes ($p=0.0421$). Patients with size of largest wart >2cm were significantly associated with high-risk genotypes ($p=0.0076$).

CONCLUSION: High risk genotypes were isolated in routine patients in the STD Clinic. These patients should be screened for cervical/penile/anal carriage and malignancies on follow-up. HPV-51 and HPV-59 which were commonly isolated, are currently not a part of HPV vaccines. Routine HPV screening of AGW would help in prevention and early detection of malignancies and also in designing appropriate vaccines.

Reaching male sex workers who have sex with men (M\$M) with preventive sexual healthcare services in The Netherlands

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Background

Male sex workers who have sex with men (M\$M) are a hidden high-risk group for sexually transmitted infections (STI) including human immunodeficiency virus (HIV). They are neglected in current care-strategies and hard to reach by regional public health service (GGD), who offer free and anonymous preventive sexual healthcare services e.g. STI testing and hepatitis B (HBV) vaccinations. The aim of this study was to assess M\$M's perceived barriers and facilitators to engage in preventive sexual healthcare services provided by the GGD.

Methods

For this qualitative study semi-structured individual in-depth interviews were conducted with 20 M\$M who worked home-based in the Dutch province of Limburg. Respondents were recruited by convenience sampling until saturation was reached via 1) five websites and smartphone applications commonly used by M\$M 2) GGD's STI clinic 3) two gay saunas. An interview guide was developed including themes such as sexuality, sex work, the GGD's care services, communication and reachability. The interviews' recordings were transcribed verbatim and inductively coded with Atlas.ti 8.

Results

The interviewed M\$M were diverse in age (range: 18 – 66; median: 39.5) and mostly western European (85%). Several barriers and facilitating factors were identified for M\$M to engage in the GGD's preventive sexual healthcare services.

The lack of self-identification as homosexual and as sex worker, self-stigma, the lack of awareness of the GGD's services and a low STI risk perception are identified as barriers.

Online outreach work on websites and smartphone applications commonly used by M\$M, promotion of the GGD's care services and its anonymity, confidentiality and non-judgemental environment and direct online communication between a GGD nurse and M\$M are identified as facilitating factors.

Conclusion

The M\$M population's diversity and identified barriers and facilitating factors should be taken into account in care-strategies in order to optimize future preventive sexual healthcare services for M\$M.

Blood borne viruses screening (BBVS) for temporarily housed rough sleepers in Brighton & Hove during the Covid-19 pandemic

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Background: At the start of the Coronavirus pandemic the UK Government pledged to house all rough-sleepers in temporary accommodation. This provided healthcare workers with a unique opportunity to access this 'hard-to-find' group, offer blood borne viruses screening (BBVS) and link clients testing positive into individualised treatment.

Approach: A collaborative working group (HIV clinicians, HIV prevention specialists, hepatitis C outreach nurses and rough-sleepers health-engagement workers) established comprehensive risk-assessments, PPE supplies and dried blood spot procurement. Two experienced outreach workers worked along-side trusted homeless key-workers to offer BBVS (HIV, hepatitis B&C) in hotels, a hostel and student halls over 13-weeks (Jun-Sep 2020). Clients were offered £5 food-voucher for participating.

Outcomes: 270 clients were housed during this time, 256 (95%) were offered BBVS; 192 (72%) tested. 148 (77%) tested 'mainly due to the incentive'. Of the 192 testers the median age (range) was 40y (18-69). Clients were mainly male 161 (83%); white-British 164 (85%) and heterosexual 179 (93%). 54 (28%) stated previous IVDU; 39 (20%) other drug use and 92 (48%) prison as risk-factors. 70 (36%) had not previously tested. 31 (16%) were hepatitis C antibody positive; 13 (7%) RNA positive. To date 4 have started treatment; 5 deferred; 3 did not engage with services despite being aware of the diagnosis; 1 left the area. No new HIV diagnoses (two clients re-engaged with care). Most clients considered the service good or excellent, and would recommend (99%). Challenges included lab delays due to competing Covid-19 testing and engaging disenfranchised clients.

Innovation and significance: This project brought together a multidisciplinary collaboration, drawing on specialist knowledge to meet complex needs. Despite challenges during a pandemic, we obtained a useful snap-shot of BBV rates. Offering an incentive to a cohort sensitised to BBVS was important. New outreach testing opportunities were identified which will be progressed in 2021.

Sexual risk behaviour and STI testing behaviour of male sex workers who have sex with men (M\$M) in The Netherlands

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Background

Male sex workers who have sex with men (M\$M) are a high-risk group for acquiring sexually transmitted infections (STI) including human immunodeficiency virus (HIV).

An understanding of sexual risk behavior is necessary to successfully develop risk-reduction strategies.

However, limited scientific knowledge is available on sexual risk behaviour of M\$M in the Netherlands.

The aim of this study was to assess M\$M's sexual risk behaviour in the Netherlands, e.g. STI testing behaviour, condom use, drug use before/during sex and hepatitis B (HBV) vaccination.

Methods

For this qualitative study semi-structured individual in-depth interviews were conducted with 20 M\$M who worked home-based in the Dutch province of Limburg. Respondents were recruited by convenience sampling until saturation was reached via 1) five websites and smartphone applications commonly used by M\$M 2) STI clinic 3) two gay sauna's. An interview guide was developed including themes such as sexual health, condom use and STI testing behaviour. The interviews' recordings were transcribed verbatim and inductively coded with Atlas.ti 8.

Results

The majority of the interviewed M\$M would regularly get tested for STI, however some had never or irregularly been tested. Their STI risk perception often determined testing behaviour. Condom use was reported to be high with anal sex, but low with oral sex. Condom use was mostly determined by STI risk perception, trust in clients and sexual pleasure. A third of the respondents was not vaccinated against HBV, mainly due to the lack of information and awareness of HBV vaccination and low risk perception of HBV. Furthermore, almost half of the M\$M had used drugs before/during sex in the past six months.

Conclusion

In this study we were able to assess sexual risk behaviour of 20 M\$M in the Netherlands. The results can be taken into account for the tailoring of future risk-reduction strategies for M\$M.

Comparison of time to syphilis treatment success comparing patients with repeat versus de novo infection

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Background: During syphilis infection, RPR titers are used to assess response to treatment with a 4-fold titer decrease indicating treatment success. To improve understanding of how RPR titers vary after treatment can help improve syphilis care, we evaluated the time to a 4-fold decrease in RPR titer from diagnosis with active syphilis comparing those with repeat and de novo syphilis infection.

Methods: We determined the RPR titers of patients at least 1-month post-diagnosis with active syphilis comparing patients with documented prior syphilis versus those with documented de novo syphilis (syphilis-naïve), these individuals had a negative syphilis rapid test within one year of the current infection. All individuals received appropriate treatment at enrollment. Fisher's exact tests were used to compare the repeat-infection and syphilis-naïve groups and multivariate Cox regression was conducted to explore time to 4-fold titer reduction, adjusting for baseline titer and HIV status.

Results: Among the 106 individuals enrolled with at least one post-baseline visit, by 1-month 45% of individuals had achieved a 4-fold titer reduction, and by 3-months post-treatment this had increased to 91%. At 1-month post-treatment, 43% of those with prior infection and 49% of syphilis naïve patients had achieved a 4-fold titer reduction (p-value 0.684). At 3-months the proportions achieving a 4-fold titer reduction were 88% among those with previous syphilis infection, and 95% among those who were syphilis naïve (p-value 0.488). After adjusting for baseline titer and HIV status, reaching a 4-fold titer decrease was achieved significantly more quickly among syphilis-naïve individuals, with a hazard ratio of 1.75 (95% CI:1.11-2.77) compared to those with repeat infection.

Conclusion: Compared to past reports, the proportion of syphilis patients achieving serological cure within 3-months was higher in this study. The post-treatment reduction in RPR titer was more pronounced and more rapid among syphilis-naïve individuals.

Sexual behaviours of women living with HIV receiving care services at the National STD/AIDS control programme Sri Lanka.

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Introduction: In Sri Lanka nearly one third of people diagnosed with HIV are women. Little is known about sexual health of HIV infected women in Sri Lanka. This study explored sexual relationships, activities and STI prevalence of women living with HIV (WLHIV) in Sri Lanka.

Objective: To describe sexual behaviours of WLHIV receiving care services at the National STD/AIDS control programme Sri Lanka.

Method: This is a descriptive cross sectional study among 335 WLHIV in Sri Lanka being followed up at islandwide Anti Retroviral Treatment (ART) centers for at least 1 year

Results: Mean age of participants was 43.5 years and age range was from 18 years to 69 years. In total, 98.5% were taking anti retro viral and had median CD4 count of 641cells/ μ l.

Almost all women reported having heterosexual orientation. More than half (53.7%) were married and 23.9% were widowed. In total, 67.7% acquired HIV from their marital or long term partner. Nearly quarter (23.6%) mentioned acquisition from a casual partner. 41.2% stated having a sero concordant partner and 16.1% were in a sero discordant relationship.

Nearly half of participants (48.4%) were sexually inactive during last one year and 76.4% stated decrease or complete loss of sexual desire following the diagnosis. Diminished sexual desires showed significant association with ageing. Among sexually active women 92.5% had one sexual partner for last one year and 69.4% of sexually active women used condom at last coitus. Significant low condom usage seen among women with detectable viral load. None were found positive for Gonorrhea and Trichomoniasis. Prevalence of infectious syphilis was 0.3%.

Conclusion: Approximately half of WLHIV reported being sexually inactive despite satisfactory treatment outcomes and existence of a long term relationship. Findings demonstrate high condom use at last coitus, whilst low condom usage among women with detectable viral load need evaluation.

Does the performance and operational superiority of Point of Care test make it the investigation of choice in confirming syphilis?

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Background- According to World Health Organization, 6 million cases of syphilis occur every year, and low-income countries bear a 90% burden of the disease. Serological tests for syphilis form the mainstay of diagnosis for syphilis. Unlike various specific Treponemal tests, Rapid Immunochromatographic Test, also called the point-of-care test (POCT) for syphilis, does not require expert training or equipment. We evaluated the performance of POCT against other specific Treponemal tests for confirming the diagnosis of syphilis.

Methods- Retrospectively data was analyzed of samples from the year 2017 to 2020 at Apex Regional STD centre, Safdarjung Hospital, New Delhi, which were tested by all the three treponemal test for syphilis, namely Treponema Pallidum Hemagglutination (TPHA), fluorescent treponemal antibody absorption test (FTA-ABS) and POCT. Sensitivity, Specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV), Diagnostic Accuracy of POCT, and TPHA were evaluated against the gold standard FTA-ABS.

Result - A total of 599 samples were evaluated, of which 61.76% were positive by FTABS. Upon analysis, the sensitivity of POCT was 91.08% (95%CI: 87.70%-93.78%) and TPHA was 91.89% (95%CI: 88.63%-94.46%), specificity of POCT was 89.08% (95%CI: 84.31%-92.81%) and TPHA was 87.34% (95%CI: 82.32%-91.35%), PPV of POCT was 93.09% (95%CI: 89.97%-95.48%) and TPHA was 92.14% (95%CI: 88.91%-94.67%), NPV of POCT was 86.08% (95%CI: 81%-90.22%) and TPHA was 86.96% (95%CI: 81.91%-91.02%) and Diagnostic accuracy of POCT was 90.32% and TPHA was 90.15%.

Conclusion- Owing to its operational superiority and higher specificity, POCT can replace TPHA for confirming the diagnosis of syphilis. POCT is affordable, equipment-free, has room temperature storage, and yields results within 15 minutes, enabling same-day testing and treatment. It can be used in a limited resource setting, community setup, or even self-testing. Wider patient reach will help improve patient identification and treatment, thereby strengthening STI prevention and control programmes.

Evaluation of Oxford Nanopore MinION sequencing to predict antimicrobial resistance profiles in clinical *N. gonorrhoeae* strains

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Background: Antimicrobial resistance (AMR) in *N. gonorrhoeae* (NG) is a big concern for public health and has an impact on treatment efficiency. Whole genome sequencing (WGS) of clinical strains can be used to predict AMR profiles based on detection of known resistance-associated mutations (RAM) and AMR gene acquisition. While Illumina short read sequencing gives low error rates, third-generation sequencing with Oxford Nanopore Technologies (ONT) has the advantage of generating long reads in real-time. We aimed to evaluate the ability of ONT sequencing to predict AMR in NG.

Methods: WGS was performed on one azithromycin resistant and four ceftriaxone resistant clinical NG strains using ONT (MinION R9.4 flowcell) and Illumina (MiSEQ) sequencing platforms. Assemblies were obtained from: Illumina data (by SPAdes), ONT data (by Flye) and a hybrid assembly of both ONT and Illumina data (by Unicycler). Moreover, we evaluated four different polishing strategies (based on rebase, racon and/or medaka) after Flye. Completeness of the assemblies were visually checked with bandage. AMR profile prediction based on RAM detection and AMR gene acquisition were obtained by using pathogenwatch and compared with phenotypic antimicrobial susceptibility testing.

Results: Hybrid and ONT assemblies showed a complete, closed chromosome, while Illumina assemblies were not able to resolve genome structures. Pathogenwatch could predict AMR profiles (except for CRO) correctly on Illumina and hybrid assemblies, and detected RAM were concordant in both assemblies. RAM detection on ONT assemblies was inconsistent among the different polishing strategies. Moreover, fewer RAMs were detected which resulted in missed resistance in the predicted AMR profiles.

Conclusion: Here, we demonstrate that ONT sequencing reveals the genomic structure of NG isolates, but high error rates leads to it missing RAMs in the consensus assembly. Polishing strategies of MinION based assemblies can reduce the proportion of RAMs missed but remain inferior to Illumina based assemblies.

Exploring the data-sharing ecosystem in HIV care: healthcare professionals' beliefs and practices

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Background: Understanding data-sharing in HIV care is timely given the shift to remote consultations during COVID-19. We describe the 'data-sharing ecosystem' in HIV care by analysing HIV healthcare professional (HCP) beliefs and practices around sharing diverse types of service user and clinic-generated data across multiple contexts.

Methods: During February-October 2020, we conducted 14 semi-structured interviews with HCPs working in a large UK HIV outpatient service. Participants engaged in a card sorting task, sorting 33 data types routinely shared in HIV care into categories (comfortable/not comfortable/not sure) across three data-sharing contexts: (a) service users to HCPs in consultations; (b) HCPs to GPs; (c) HCPs to non-HIV HCPs. Data were analysed thematically.

Results: Over half (57%) of participants were female; 57% were doctors. Participants had worked in HIV for 12 years on average.

HCPs were comfortable with a wide range of data being shared with them by service users. Across all sharing contexts, HCPs were uncomfortable with sharing of service user photographs, perceiving them as not routinely shared, unnecessary, and potentially risking inadvertent sharing of inappropriate content. HCPs were comfortable sharing data with GPs and other non-HIV HCPs in two broad categories: (a) demographic data (e.g. age) and (b) non-sensitive data related to general health (e.g. sleep). HCPs were less comfortable sharing sensitive information about HIV status, sexual health, behaviour and identity. Service user consent and relevance of data to sharing context were key determinants of data-sharing comfort.

Conclusion: Understanding the context of data-sharing in HIV care is increasingly important given the shift to remote consultations and expectations for self-management. We demonstrate the complex interplay of data types, relationship dynamics, and contexts of care provision that shape the data-sharing ecosystem in HIV care. Developing guidance on the sharing of service user and clinic-generated data in HIV care must account for these complexities.

SWITCHING TO DORAVIRINE IN CART EXPERIENCED PATIENTS: EFFECTIVE, HIGHLY TOLERATED, AND COST SAVING.

A retrospective cohort study

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Background

Doravirine is a NNRTI with demonstrated effect as third agent in treatment naive and experienced HIV patients.

Aim

To evaluate outcomes of cART experienced patients switching their therapy to DOR/TDF/3TC or doravirine based regimens, with focus on efficacy, tolerability and costs.

Methods

Baseline characteristics like treatment history, and laboratory values were retrospectively collected with follow up data at 6 months. If patients stopped therapy, reasons were evaluated. Baseline and follow-up data were compared in patients that continued therapy using IBM SPSS. Potential cost savings compared to prior cART were estimated for the cohort that continued DOR/TDF/3TC for follow-up period and extrapolated to the average per year.

Results

A total of 377 patients (91% men) were included that completed outpatient clinic visit or/and laboratory data at 6 months: 97.1% switched to Doravirine/tenofovir/lamivudine (DOR/TDF/3TC) and 2.9% to other doravirine based regimens. Doravirine was prematurely stopped in 58/377 patients (15.4%). Reason to stop was a patient-reported adverse event in 43/377 patients (11.4%); most frequently gastrointestinal (3.8%) or insomnia/sleep disturbances (3.4%). Other reasons were virologic failure (0.8%) with only 1 case demonstrating resistance (V106VA, V108VI), decreased renal function (0.8%), and ALAT grade 2 (0.5%). Within the group that continued doravirine grade 1 ALAT elevation was more frequently observed at 6 months compared to baseline (14.2% vs. 7.9% ($p=0.004$), $n=318$); no grade 2/3/4 increase was observed. A decrease in LDL-c was seen ($3.50 (\pm 1.10)$ mmol/L vs. $2.97 (\pm 0.79)$ mmol/L; $n=42$, $p<0.001$). No change in creatinine levels was observed. The switch in 319 patients that continued therapy saved 33% in costs with an average saving of €3,130 euros per patient/year (€1 million total).

Conclusion

Doravirine is a suitable therapy for maintenance treatment and shows enormous savings. In addition, our data shows that it is also effective and well tolerated by 85% in our patient group.

Limited HIV Pre-exposure Prophylaxis Uptake among Chinese Men Who Have Sex with Men— Qualitative Analysis and Potential for an App

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Background: In China, few gay, bisexual and other men who have sex with men (GBMSM) use HIV pre-exposure prophylaxis (PrEP), and little is known about their views of PrEP and barriers to uptake. We aimed to understand Chinese GBMSM's limited use of PrEP and assess the potential of a new PrEP education app to address barriers.

Methods: We developed and tested a theory-informed, gay-friendly PrEP education app among GBMSM in Guangdong, China. In Phase I qualitative interviews were conducted to understand perceived barriers and facilitators toward PrEP uptake; each participant tested the app for 5 minutes and completed the System Usability Scale (SUS). Phase II included a 4-week pilot study of the app with baseline and follow-up surveys (not presented here) and qualitative exit interviews.

Results: 41 participants completed qualitative interviews (Phase I=31, Phase II=11). GBMSM (mean age=27, SD=7.6) described numerous barriers to starting PrEP including limited access to PrEP care (e.g., few providers, high copays, medical mistrust), misinformation and low awareness about PrEP (e.g., severe side effects, ineffective), no official PrEP endorsement from providers or policymakers, and a thriving unregulated underground PrEP market. Facilitators of using PrEP included fear of HIV, seeking sexual pleasure, and freedom from stigma. 77.4% (24/31) rated the app "above-average" usability on SUS. Aspects of the app enhanced usability included convenient access to gay-friendly PrEP information, a streamlined user-interface, inclusive contents addressing physical and mental health, and an asynchronous chat feature to send questions to study staff.

Conclusion: We found major barriers to PrEP uptake among Chinese GBMSM including unaffordable prices, lack of GBMSM-friendly PrEP campaigns, and insufficient provision of PrEP care. Mobile health may be feasible for increasing PrEP awareness and engaging GBMSM in the health system in China. Other barriers point to the need also for health systems-level interventions to expand PrEP uptake.

Changes in sexual behavior during COVID-19 among men who have sex with men in a sexual network study

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Background: As part of an ongoing sexual network study, we assessed the impact of COVID-19 on sexual behavior of men who have sex with men (MSM).

Methods: The Columbus, Ohio arm of the multi-site Network Epidemiology of Syphilis Transmission (NEST) study is following 241 MSM over two years. Participants attend quarterly visits with behavioral surveys and HIV/STI testing. In April 2020, we implemented an additional survey to measure the impact of COVID-19 on sexual behavior. Our analysis compared participants' reported sexual behavior during two periods: April-July 2020 (T1) and August-December 2020 (T2).

Results: Of the 200 participants who completed at least one COVID-19 survey in either time period, 10 (5%) self-reported a previous COVID-19 diagnosis. We compared behaviors reported by 174 respondents who submitted surveys in both time periods. During T1, about half (46%) said they felt more anxious about sex since COVID-19; anxiety was similar during T2 (43%). Many reported engaging in online sexual activities, though we saw no meaningful differences by time period for starting or increasing chatting on hookup apps (T1=30%, T2=30%), sexting (T1=30%, T2=25%), or video chat sex (T1=16%, T2=14%). Watching pornography was reported more often in T1 than T2 (53% vs. 42%). Nearly a third of respondents (30%) in T1 reported that they were not having sex; this decreased to 17% in T2. Compared to pre-pandemic behavior, in T1 a majority of participants (74%) said they were less likely to have sex with a new partner, compared to 61% during T2.

Conclusion: During COVID-19, nearly half of MSM reported feeling more anxious about sex, and many turned to online activities in lieu of in-person sex. However, when comparing the early months of the pandemic to later months of 2020, more participants are resuming in-person sex, and willingness to have sex with new partners also rose.

Standardising pharyngeal sampling for clinician-taken gonorrhoea culture specimens

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Introduction: The pharynx is an important site with respect to transmission and development of antimicrobial resistance (AMR) to gonorrhoea particularly in men who have sex with men. Maintaining culture-based sensitivity testing is important as part of wider efforts to prevent transmission of high level AMR strains of gonorrhoea. The sensitivity of gonorrhoea culture at the pharynx is low and is dependent on several factors including sampling technique by clinicians. There is no consensus on the length of time taken to sample the pharynx for culture. We aimed to explore knowledge of pharyngeal sampling among sexual health clinicians to gain a consensus on optimal time for pharyngeal sampling for gonorrhoea culture specimens.

Method: An online anonymous survey was sent to clinicians in our local sexual health network. We included pictorial diagrams of the pharynx and asked clinicians which sites in the pharynx they sample and to estimate how long for when taking gonorrhoea culture specimens.

Result: 110 clinicians responded to the survey of whom 98 regularly take pharyngeal gonorrhoea cultures specimens: 54(55%) had more than 10-years of experience in sexual health. 82(84%) sample the tonsils, 75(77%) sample the posterior pharyngeal wall and 94(96%) sample either the tonsils or the posterior pharyngeal wall. 30(31%) always attempt to elicit the gag reflex and 52(53%) do not. The average time taken sampling the pharynx was 4.63(SD±2.04) seconds. There was no significant difference in time taken to sample the pharynx according to years of experience (4.7(SD±2.02)v4.6(SD±2.3),p=0.45).

Conclusion: Experienced sexual health clinicians are mostly appropriately sampling the tonsils and posterior pharyngeal wall for gonorrhoea culture specimens, and the median time taken to sample the pharynx was 4.63 seconds. Standardisation of pharyngeal sampling for the pharynx for gonorrhoea culture specimens could improve the sensitivity of culture and educational tools for clinic staff to support this are needed.

Identification of *Trichomonas vaginalis* 5-nitroimidazole resistance targets to inform future drug development

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Background: *Trichomonas vaginalis* is the most common non-viral sexually transmitted infection. 5-nitroimidazoles (i.e., metronidazole [MTZ] and tinidazole) are the only FDA-approved medications. Resistance to 5-nitroimidazoles has been observed in 5-10% of cases, but may be rising. MTZ was first introduced in the early 1960s to treat *T. vaginalis* infections, and resistance to MTZ developed rapidly within a couple of years. This observation suggests that the potential for MTZ resistance is likely encoded in the genome of *T. vaginalis*. We aimed to analyze gene-expression patterns of MTZ-resistant and MTZ-sensitive *T. vaginalis* isolates to gain insight into resistance mechanisms.

Methods: *T. vaginalis* isolates (4 MTZ-resistant [minimal lethal concentration; MLC > 50µg/ml] and 4 MTZ-sensitive [MLC < 25µg/ml]) were grown in triplicate in Diamond's TYM medium. MTZ susceptibility testing confirmed MTZ MLCs of *T. vaginalis* isolates. RNA sequencing (RNAseq) and bioinformatics analyses were used to identify differentially expressed genes (DEGs) in MTZ-resistant vs. sensitive isolates. Subsequent qPCR was used to confirm and extend RNAseq data and gene targets related to 5-nitroimidazole resistance.

Results: RNAseq identified DEGs in MTZ-resistant vs. sensitive isolates. DEGs from MTZ-resistant isolates included those involved in metabolic pathways relevant to 5-nitroimidazole resistance such as energy production, drug activation, and oxygen-scavenging. Other DEGs included those encoding transcription factors, ribosomal proteins, and other metabolic enzymes. RT-qPCR experiments confirmed reduced expression of genes encoding ferredoxin (Fdx) and flavin reductase 1 (FR1) in MTZ-resistant *T. vaginalis* isolates as compared to MTZ-sensitive isolates.

Conclusion: In this study, we identified several DEGs in *T. vaginalis* isolates resistant to MTZ. Further studies with large number of isolates representing a broad range of MTZ-susceptibility patterns are needed to identify genes that may represent new targets for future drug development.

Typing outer membrane vesicle proteins of *Neisseria gonorrhoeae* provides insight into antimicrobial resistance.

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Background

Outer membrane vesicles (OMVs) are known to be produced in significant quantities during gonococcal infection, however, their role remains mostly unknown. In this study, the diversity of gonococcal OMV proteins and their association with antimicrobial resistance (AMR) was investigated using computational methods.

Methods

Omics-based approaches were employed through the PubMLST.org/neisseria database to analyse a selection of 26 proteins, including 23 identified in *N. gonorrhoeae* OMVs by Deo et al.(2018). These proteins were annotated across 4884 isolates from 58 countries and formed into an OMV peptide typing scheme. This facilitated the cataloguing of OMV protein diversity across the gonococcal population by the identification of OMV sequence types (OMV STs). The association of OMV STs with sequence typing schemes that categorise the core genome (Ng cgc_400) and AMR (NG STAR) was then assessed, primarily using the Cramer's V statistic.

Results

2120 unique gonococcal OMV STs were identified. High levels of association were found between these OMV STs and both the core genome (OMV ST vs Ng cgc_400: Cramer's V = 1.00) and AMR (OMV ST vs NG STAR ST: Cramer's V = 0.967). This is consistent the potential involvement of OMVs in the generation of AMR in *N. gonorrhoeae*.

Conclusion

These results suggest that OMVs are more significantly involved in antimicrobial resistance in *N. gonorrhoeae* than previously thought, providing a new avenue for research that could inform future efforts to limit AMR evolution and treat resistant infections. Additionally, the study demonstrates the role that population-level Omics-based approaches can play in improving our understanding of sexually transmitted infections. This applies not only to AMR, but also to other traits such as transmissibility or virulence.

Effectiveness of community-based health promotion campaign methods on chlamydia screening uptake in young people: A mixed-methods systematic review

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Background

The UK National Chlamydia Screening Programme uses an opportunistic approach. Many programmes use campaigns to raise awareness of chlamydia screening in young people. This review aimed to assess the effectiveness of campaigns on uptake of chlamydia screening in young people.

Methods

We conducted a mixed-methods systematic review of articles assessing the outcomes of community-based health-promotion campaigns to increase chlamydia screening in young people, their experiences of the campaigns and other facilitators and barriers to the conduct of the campaigns. We searched 4 databases for quantitative and qualitative studies with no language restrictions.

Main results

From screening 10,329 records, 100 full text articles assessed in detail leading to 20 studies included in the review; 14 quantitative, 2 qualitative and 3 mixed-methods. All studies with quantitative outcomes were before-after study designs or interrupted time series. Relative change (RC) in test counts increased (RC 1.22; 95% CI 1.14 to 1.30) after campaigns, but no significant increase was seen for number of positive tests (RC 1.10; 95% CI 0.93 to 1.30) nor for test positivity rate (RC 0.93; 95% CI 0.81 to 1.07). Heterogeneity between studies was very high for all analyses. It was not possible to explore outcomes by type of campaign components. Seven major qualitative themes were identified: targeting of campaigns; quality of materials and message; language; anonymity; use of technology; relevance; and variety of testing options.

Conclusions

Health promotion campaigns aiming to increase chlamydia testing in those aged 15-24 may show some effectiveness in increasing overall numbers of tests, however numbers of positive tests do not follow the same trend.

Umbrella combined sexual health services, chlamydia screening and deprivation: are we achieving continued screening of high-risk populations?

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Introduction

Combined sexual health services have been provided in Birmingham and Solihull by 'Umbrella' since 2015. The local population is younger and more deprived than the average English sexual health service population. We investigated if the 2015 Umbrella redesign, and subsequent health promotion campaigns, affected uptake of chlamydia screening in those aged 15-24 in the most deprived groups compared to the total population.

Methods

Weekly aggregated data for gender, socioeconomic status (IMD-5) and chlamydia test status with test result were obtained from Public Health England's STI and HIV Surveillance Team for the period 2012 – 2018. Overall percent positivity and yearly moving averages for tests, positive tests and percent positivity, by gender, were calculated by the study team for total population, and the most deprived. Number of positive tests and percent positivity were graphically represented and mapped against dates of service redesign and subsequent campaigns. Data analysis was completed using Microsoft Excel.

Results

Positive tests in all females decreased gradually between late 2014 and early 2016 before recovering partially in 2017: this effect was not replicated for all other groups, and neither Umbrella redesign nor health promotion campaigns showed any effect on absolute numbers. In females, percent positivity increased steadily during the study period, from 10% to 12% per week in the most deprived females and 8% to 10% per week in all females. Percent positivity showed a clear link with service redesign in males: in the year following redesign, rates in all males rose from 8% to 15% per week, and from 10% to 18% per week in the most deprived males.

Conclusion

Umbrella redesign had a significant effect on detection of chlamydia cases in males; this effect is less obvious in females, and appears not to relate to the promotional campaigns. Deprived populations appear well served by Umbrella.

The impact of Ureaplasma infections on pregnancy complications

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The aim of this study was to assess if ureaplasmas are associated with pregnancy complications and diseases in newborns. Pregnant women with complaints and threatening signs of preterm delivery were included. A sample, taken from the endocervical canal and from the surface of the cervical portion, was sent to the local microbiology laboratory for DNA detection of seven pathogens: Chlamydia trachomatis, Mycoplasma hominis, Mycoplasma genitalium, Ureaplasma parvum, Ureaplasma urealyticum, Neisseria gonorrhoeae, and Trichomonas vaginalis. The Pearson Chi-Square test was used to determine the difference in unpaired categorical data. A two-sided p value <0.05 was considered to be statistically significant. In all, 50 pregnant women with complaints and threatening signs of preterm delivery were included. Premature rupture of uterine membranes was found in 23 (46%) of the patients and 38 women (76%) had preterm delivery. Ureaplasma infections were associated with a premature rupture of membranes ($p < 0.004$), the placental inflammation ($p < 0.025$), a newborn respiratory distress syndrome ($p < 0.019$). Ureaplasmas could have affected the preterm leakage of fetal amniotic fluid and are associated with the placental inflammation and a newborn respiratory distress syndrome.

Mycoplasma genitalium: The Most Prevalent STI in Saskatchewan, Canada, has a High Prevalence of Resistance to Macrolides and Fluoroquinolones

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Objectives: *Mycoplasma genitalium*, a sexually transmitted infection (STI), is one of the most common causes of non-gonococcal urethritis worldwide. An increase in resistance to antibiotics (i.e., azithromycin and moxifloxacin), recommended for treating *M. genitalium* infections has been observed. We describe the prevalence of *M. genitalium* and its antimicrobial resistance (AMR) in Saskatchewan (SK), Canada.

Methods: *M. genitalium* was identified using the Aptima *Mycoplasma genitalium* Assay (MG-TMA) on 1977 specimens collected (January and March/April 2019) for the diagnosis of *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. Mutations implicated in AMR were ascertained using PCR and DNA sequencing of 23S rRNA (azithromycin) and *parC* (moxifloxacin) from MG-TMA positive specimens.

Results: The prevalence of *M. genitalium* in SK was 9.6% (189/1977) and was higher than the prevalence of *N. gonorrhoeae* (3.09%) and *C. trachomatis* (6.85%) during the same time. Mutations mediating macrolide resistance (positions 2058/2059 in 23S rRNA) were observed in 63.6% (70/110) of the specimens, while resistance to moxifloxacin (S83I in *ParC*) was observed in 10.6% (9/85) of the specimens tested. Mutations predictive of dual resistance (both 23S rRNA and *ParC*) were observed in 2.12% (4/189) of the specimens. Females 20-24 years had the highest prevalence (18.3%, $p < 0.001$) of infection. In females, *M. genitalium* was significantly associated with *C. trachomatis* or *N. gonorrhoeae*/*C. trachomatis* ($p < 0.001$) co-infection. The prevalence of *M. genitalium* in a northern region was statistically significantly higher ($p = 0.012$), as compared to other regions in the province.

Conclusions: The prevalence of *M. genitalium* (9.6%) and associated resistance to azithromycin (63.6%) in Saskatchewan is high, suggesting that empiric azithromycin therapy may not be adequate for treating these infections. A potential risk of azithromycin treatment failure could be avoided by performing resistance-guided therapy, as azithromycin is also a recommended drug for the treatment of *N. gonorrhoeae* (combined with ceftriaxone) and *C. trachomatis* infections in Canada.

Policy and program recommendations for STBBI incentive-based testing in high-income countries: A systematic review

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Background: Despite increasing access to treatment and testing, rates of sexually transmitted and blood-borne infections (STBBI) continue to rise. At the same time, screening uptake remains suboptimal. Incentives (e.g. cash, gift cards, prize draws) have been proposed as a way to increase the immediate rewards of STBBI testing and facilitate a greater uptake of screening. This systematic review was conducted to determine if patient incentives increase STBBI screening uptake in high-income countries.

Methods: Our review was performed according to the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and the Cochrane Handbook for Systematic Reviews of Interventions. MEDLINE, EMBASE, PsycINFO, CINAHL, Scopus, and Cochrane Library were searched from 2013 to 2020. Inclusion criteria were: English language, high-income countries, primary research studies, and age >13 years. Study quality was assessed using Joanna Briggs Institute quality assessment tools.

Results: The search yielded 6217 abstracts. 13 studies met the inclusion criteria. Of these studies, five were located in the United States, three in the United Kingdom, and five in Australia. Seven studies took place in the community, five studies took place in clinical settings, and one study utilized a combination of community and clinical settings. Study design and intervention heterogeneity precluded meta-analysis or data pooling. Populations screened included: post-secondary students, parolees or probationers, youth, and inner-city emergency department patients. Incentivized STBBI tested were HIV (n=5), chlamydia (n=7), and multiple infections (n=1). Incentives offered were monetary (cash/gift cards/not specified) (n=8), non-monetary (n=2), and mixed (n=3).

Conclusion: Both monetary and non-monetary incentives enhance STBBI screening in high-income countries. Incentivized testing programs are most effective when developed specific to context and target population. Further research is needed to analyze incentivized screening across similar study designs and to evaluate long-term effectiveness.

The burden of HIV on malaria and sexually transmitted and reproductive tract infections among pregnant women of rural, Zambia

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Background

Malaria and curable sexually transmitted and reproductive tract infections (STIs/RTIs) are important causes of adverse birth outcomes. HIV has been associated with STIs/RTIs and malaria infection. The study objectives were to estimate the prevalence of malaria and STIs/RTIs and to identify risk factors for infection in rural Zambia.

Methods

A total of 1,086 pregnant women were enrolled at antenatal care booking, socio-demographic information and biological samples were collected for diagnosis of malaria, STIs/RTIs and routine HIV testing.

Results

Participants had a mean age of 25.6 years. The prevalence of HIV was 13.2% (95% confidence interval [CI], 11.3, 15.3) and the highest burden was in multigravidae (15.9%) followed by secundigravidae (13.9%) and was lowest in primigravidae (8.0%), $P = 0.018$. Of 1084 women, 700 had at least one STI/RTI (95% CI, 64.6%; 95%, 61.7, 67.4). The prevalence of STIs/RTIs was as follows: chlamydia 5.2%, (95% CI, 4.0, 6.6); gonorrhoea 3.1% (95% CI, 2.2, 4.4); trichomoniasis 24.8% (95% CI, 22.3, 27.5); bacterial vaginosis 48.7% (95% CI, 45.2, 51.2) and syphilis 7.1% (95% CI, 5.6, 8.7). The malaria prevalence measured by PCR was 57.8% (95% CI, 54.9, 60.8).

HIV infection was associated with having gonorrhoea, (aOR = 2.80; 95% CI: 1.25, 6.26); bacterial vaginosis (aOR = 2.41; 95% CI: 1.66, 3.51); syphilis infection (aOR = 2.56; 95% CI: 1.48, 4.41); having any STIs/RTIs (aOR = 2.10; 95% CI: 1.39, 3.19) and malaria infection (aOR = 1.46; 95% CI 1.00-2.13, $P = 0.045$).

Conclusion

HIV infection plays an important role in the prevalence of malaria and STIs/RTIs although its effect on malaria prevalence in this population was neutralised by its concentration in multigravidae who have acquired immunity against malaria. Preventive and control efforts against malaria and STIs/RTIs should be targeted at the groups that needs them most in resource limited settings.

Syndromic management of curable sexually transmitted and reproductive tract infections among pregnant women in rural Zambia

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Background

This study estimated the prevalence of curable sexually transmitted and reproductive tract infections (STIs/RTIs) among pregnant women attending antenatal care (ANC) in rural Zambia and evaluated the effectiveness of syndromic management of STIs/RTIs versus reference-standard laboratory diagnoses.

Methods

This was an observational cross-sectional study of 1,086 pregnant women. Participants were enrolled at ANC booking, socio-demographic information and biological samples were collected, and the provision of syndromic management based care was documented. The Piot-Fransen model was used to evaluate the effectiveness of syndromic management versus etiological testing.

Results

Participants had a mean age of 25.6 years and a mean gestational age of 22.0 weeks. Of 1084 women, 700 had at least one STI/RTI (64.6%; 95% confidence interval [CI], 61.7, 67.4). Only 10.2% of infected women received any treatment for a curable STI/RTI (excluding syphilis). Treatment was given to 0 of 56 women with chlamydia (prevalence 5.2%; 95% CI, 4.0, 6.6), 14.7% of participants with gonorrhoea (prevalence 3.1%; 95% CI, 2.2, 4.4), 7.8% of trichomoniasis positives (prevalence 24.8%; 95% CI, 22.3, 27.5); 7.5% of women with bacterial vaginosis (prevalence 48.7%; 95% CI, 45.2, 51.2). An estimated 7.1% (95% CI, 5.6, 8.7) of participants had syphilis and received treatment.

Conclusions

Curable STIs/RTIs were common and the majority of cases were undetected and untreated. Alternative approaches are urgently needed in the ANC setting in rural Zambia.

Awareness of internet-based testing for sexually-transmitted and blood-borne infections among sexual minority men in British Columbia, Canada

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Background: GetCheckedOnline is an internet-based testing program for HIV, Hepatitis C, and other sexually-transmitted infections (STIs) in British Columbia (BC), Canada. The program launched in 2014 in Vancouver, BC's largest urban centre, and expanded to six smaller urban and suburban BC communities in 2016. We sought to measure GetCheckedOnline awareness among gay, bisexual, and other men who have sex with men (gbMSM), and to identify characteristics that may contribute to program awareness.

Methods: Sex Now was a cross-sectional online health survey of Canadian gbMSM aged ≥15 years recruited from 10/2019-02/2020. BC residents were asked if they knew about GetCheckedOnline and additional questions related to implementation outcomes. We built a multivariable logistic regression model including all variables significant in univariate analysis to quantify associations with awareness, and report adjusted odds ratios and 95% confidence intervals (AOR [95%CI]).

Results: Among participants living in regions where GetCheckedOnline is available (n=1132, median age: 36 years), 38.1% were aware of GetCheckedOnline. Greater GetCheckedOnline awareness was associated with living outside of Vancouver (AOR=2.15 [1.50-3.10]), identifying as queer (AOR=1.58 [1.13-2.21]), having post-graduate education (AOR=1.84 [1.17-2.91]), being out to healthcare providers (AOR=1.97 [1.22-3.24]), using ≥3 geolocation-based sex-seeking apps (AOR=2.15 [1.40-3.33]), and past-year involvement in LGBTQ2S+-specific activities (AOR=1.56 [1.10-2.23]). Awareness decreased with increasing years of age (AOR=0.98 [0.97-1.00]). Compared with participants who usually tested for STIs at a sexual health clinic, awareness was lower among participants who usually tested for STIs through their family doctor (AOR=0.50 [0.33-0.73]) or at walk-in medical clinics (AOR=0.54 [0.30-0.96]), and among those who had never tested for STIs previously (AOR=0.17 [0.06-0.39]).

Conclusion: Almost 40% of gbMSM in our sample were aware of GetCheckedOnline. Increasing promotion to gbMSM who are not out to their healthcare provider, who have never tested previously for STIs, or who are less connected to LGBTQ2S+ communities may improve program reach.

Impact of Defunding Family Planning Health Centers on Gonorrhea and Chlamydia Cases in Iowa: A Longitudinal Spatiotemporal Analysis of 2000-2018

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Background

Family planning health centers (FPHCs) provide low-income individuals in rural areas with essential primary care services, including STD prevention, testing, and treatment. Fifteen states have defunded FPHCs, causing thousands to be left without such services. This has accelerated in the COVID-19 era. We used a longitudinal analysis to examine the impact of FPHC closures in Iowa on gonorrhea and chlamydia incidence at the county level.

Methods

In 2017, Iowa defunded FPHCs, resulting in four clinic closures. This analysis uses Poisson regression for rates on gonorrhea and chlamydia incidence data from 2000-2018 to investigate if clinic closures were associated with reported gonorrhea and chlamydia cases. Newey-West standard errors are used to adjust for any time-related trends in STI incidence. Given the mid-year policy change, all data from 2017 was removed before running the Poisson regression model.

Results

We examined 34,479 gonorrhea and 169,660 chlamydia cases. Iowans had 1.99 (95% CI: 1.67, 2.37) times the rate of gonorrhea after clinic closures compared to before closures. In 2018, people in counties with clinic closures were 1.71 (95% CI: 1.01, 2.90) times more likely to be diagnosed with gonorrhea than residents in the counties without closures. Iowans had 1.05 (95% CI: 1.03, 1.07) times the rate of chlamydia after clinic closures compared to before closures. People in counties with closures were 1.37 (95% CI: 1.11, 1.69) times more likely to have chlamydia in 2018 as compared to those in counties without closures.

Conclusions

Despite the fact that many STI diagnoses are made and reported by FPHCs, our data shows that reported gonorrhea and chlamydia cases increased in the year following clinic closures. This is consistent with delayed diagnoses and missed opportunities for providing essential STI services to vulnerable and underserved rural residents. Legislative action is urgently needed to ensure essential STI services for all.

Loneliness Among Older Black and White People Living with HIV

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Background: Loneliness is a concern among older people living with HIV (PLWH), especially given the ongoing COVID-19 pandemic. Currently, there is little research characterizing loneliness and race. To investigate how HIV impacts older (age 50+) PLWH in the US, a study called Aging with Dignity, Health, Optimism and Community (ADHOC) was launched at ten sites to collect self-reported data. This study uses ADHOC data to compare loneliness between older Black and White PLWH.

Methods: A cross-sectional analysis was performed to compare loneliness between older Black and White PLWH. Loneliness was assessed using the Three-item Loneliness Scale, a validated patient-reported outcome measure (range 3-9), with higher scores indicating greater loneliness. Student's t-test was used to compare loneliness between White and Black people. Control variables for loneliness were identified a priori and included in a multivariable linear regression model.

Results: Of 868 participants, the average age was 60 (SD 6.2) years, 77% (N=671) were White and 23% (N=197) were Black, 85% were male, and 82% were gay or lesbian. In bivariate analyses, Black participants were less lonely than White participants (5.2 vs 5.6, $P=.02$). In the multivariable linear regression analysis, Black participants were again less lonely than Whites (coef. -0.45, $P=0.01$) while controlling for age, education, depression, anxiety, number of co-morbid conditions, being single, income, gender, sexual orientation, and spirituality (Adjusted $R^2=0.38$; $P<.01$).

Conclusion: Among PLWH over age 50 in ADHOC, Black participants experienced less loneliness than White participants, even after controlling for a variety of factors. Additional research is needed to better understand the causes of these racial differences, so that programs designed to decrease loneliness among PLWH can consider the unique characteristics of each group.

The association between a diagnosis of syphilis and hepatitis B surface antigen (HBsAg) positivity in primary care

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Background: It is estimated that mortality related to chronic hepatitis B will continue to exceed 500,000 annually until at least 2070, requiring increased efforts to improve awareness, prevention strategies, and access to diagnosis and care. Our aim was to define HBsAg testing patterns and outcomes within primary care across England.

Methods: Through the Oxford-Royal College of General Practitioners Research & Surveillance Centre, we accessed data from all patients recorded at 419 primary care practices in the period January 2008-July 2019. The endpoints were proportion of individuals screened for HBsAg and proportion of HBsAg-positive individuals. Predictors were explored in multivariable models adjusted for age; gender; time registered at practice; ethnicity; socio-economic status; residence; pre-defined risk factors (injecting drug use [IDU], men who have sex with men [MSM], close contact of HBsAg-positive individual, inmate history); and diagnosis of ≥ 1 blood-borne or sexually transmitted infection (BB/STI) (HCV, HIV, gonorrhoea, syphilis, HPV, trichomoniasis, scabies, genital herpes).

Results: Among 6,975,119 patients (51% female; median age 38 years; 60% white ethnicity; 18% London residents; 0.2% ≥ 1 pre-defined risk factor; 2.7% ≥ 1 BB/STI diagnosis), 192,639 (2.8%) had undergone HBsAg testing and 8,065 (0.12%; 95% CI 0.11-0.12) were HBsAg-positive. In adjusted analyses, predictors of HBsAg positivity were male gender, older age, non-white ethnicity, lower socio-economic status, London or other urban residence, ≥ 1 pre-defined risk factor, and ≥ 1 BB/STI diagnosis. HCV, HIV, syphilis, HPV, trichomoniasis and scabies were each associated with increased odds of HBsAg seropositivity. Syphilis and gonorrhoea had a prevalence of 0.03% and 0.02%; however, syphilis alone increased the odds of HBsAg positivity after adjusting for age, gender, time registered at practice, socio-economic status, residence, and pre-defined risk factors (adjusted OR 7.40; 95% CI 5.25-10.44; $p < 0.001$).

Conclusions: Within primary care, a diagnosis of syphilis should prompt testing for HBsAg regardless of age, gender or sexual orientation.

Urine-based Chlamydia and Gonorrhea Screening among Asymptomatic Men at a Sexual Health Clinic, 2011-2019

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Centers for Disease Control and Prevention chlamydia and gonorrhea screening recommendations include at least annual screening for sexually active men who have sex with men (MSM) at site of contact and quarterly for MSM at increased risk. There are no specific recommendations for men who have sex with women (MSW). We examined urine chlamydia and gonorrhea screening positivity among asymptomatic men requesting testing at a sexual health clinic in Seattle, WA to assess current clinic screening policies.

We included asymptomatic patients assigned male sex at birth who had no known contact to chlamydia/gonorrhea who received urine-based chlamydia/gonorrhea screening at the Public Health Seattle-King County Sexual Health Clinic (PHSKC SHC) between 2011-2019. We examined urine screening positivity stratified by MSM and MSW and age group (≤ 30 years and > 30 years). Symptoms and gender of sex partners were obtained from clinic medical records. MSW ≤ 30 were stratified into < 25 years and ≥ 25 years.

Between 2011-2019, there were 12,310 clinic visits for urine chlamydia/gonorrhea screening among asymptomatic men with no known contact to chlamydia/gonorrhea, 22% MSM ≤ 30 (n=2,675), 30% MSM > 30 (n=3,752), 22% MSW ≤ 30 (n=2,755), and 25% MSW > 30 (n=3,128). MSW ≤ 30 (n=98) had the highest chlamydia screening positivity (3.6%, 95%CI 2.9-4.2%), followed by MSM ≤ 30 (n=63) 2.6% (95%CI 2.0-3.2%), MSM > 30 (n=59) 1.6% (95%CI 1.2-2.0%), and MSW > 30 (n=46) 1.5% (95% CI 1.0-1.9%). All groups had $< 1\%$ urine gonorrhea positivity. MSW < 25 and MSW25-30 had urine chlamydia positivity of 4.7% (95%CI 3.5-5.8%) and 3.1% (95%CI 2.3-4.0%), respectively. Of MSM ≤ 30 with chlamydia/gonorrhea in urine, 66% were positive for the same organism at either the pharynx or rectum. Among MSM > 30 , this proportion was 63%.

Following this analysis, PHSKC SHC changed urine gonorrhea/chlamydia screening recommendations to only recommend asymptomatic MSW < 25 screen once annually. PHSKC SHC recommends against urine-based screening for asymptomatic MSM or MSW ≥ 25 . These findings should prompt a re-evaluation of national screening guidance.

Discontinuation and inadequate adherence to pre-exposure prophylaxis of HIV: a systematic review and meta-analysis

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Background: Poor persistence and adherence hamper the maximized benefits of oral pre-exposure prophylaxis of HIV (PrEP). This study aimed to understand the rates and reasons for the discontinuation of PrEP among key populations.

Methods: A systematic review and meta-analysis were conducted by searching longitudinal studies from three databases from inception to December 18, 2020. Studies were included if they investigated and presented data on discontinuation or inadequate adherence to oral PrEP. Data were extracted and assessed for quality of evidence was rated according to GRADE approach. We did random-effect meta-analysis. This study was registered with PROSPERO (CRD42020155675).

Findings: We identified 87 longitudinal studies with 54,313 individuals across 21 countries (30 studies reported stopping, 28 reported inadequate adherences, and 29 reported both). The PrEP discontinuation rate within six months after initiation was 36.0% (95% CI 20.8-51.3%, I²=99.7). Discontinuation rates in six months after PrEP initiation among various populations: gay, bisexual and other men who have sex with men (GBMSM) (31.3%, 95% CI 13.4-49.3%, I²=99.7), heterosexuals and HIV negative partner in serodiscordant couples (32.6% ,95% CI 8.2-72.5%, I²=99.0), clinical and pharmacy records without pre-specified population (62.7%, 95% CI 57.0-68.5%, I²=39.6). Among GBMSM, the provision of two regimens (daily and on-demand) was associated with a lower rate of discontinuation, compared with the provision of a single regimen (daily) (12.3% vs. 31.4%, P<0.001). The inadequate adherence in six months after initiation remained around 41.1% (95% CI 29.2-53.0%, I²=99.4) among all populations. Seasonal risk and risk perception, side effects, and concerns for long-term side effects were reasons for discontinuation to PrEP.

Interpretation:

One-third of PrEP users stopped oral PrEP within half year after initiation, while more than one-third were using it with inadequate adherence, which should be addressed by guidelines in implementation, by PrEP providers before initiation, and by the research of intervention and support.

Prevalence and associations of condom use at last sexual encounter among adolescents of urban and Indigenous-rural regions of Panama

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Background: Adolescents of urban (URB) and Comarca Ngäbe-Buglé (CNB) regions of Panama have high prevalence of sexually transmitted infection. This research aims to compare condom use at last sexual encounter (condom use) among URB and CNB adolescents and describe demographic and behavioural associations.

Methods: Multicentric, school-based, cross-sectional study using two-stage cluster sampling was conducted among adolescents (14-19y) enrolled in public high schools in URB and CNB. Participants completed a self-administered questionnaire which included sociodemographic and sexual behaviours questions. Condom use associations were found using random-effects logistic regression.

Results: A total of 3168 participants (1721 male, 1447 female), median age 17y (IQR:15.9-18.1) were included. Sexual experience was reported by 59.9% of females and 63.8% males ($p=0.02$). Condom use at last sexual encounter was reported by 13.9% of participants. Participants in URB were more likely to use a condom than those in CNB (14.1% vs 5.5%, [age adjusted] AOR=0.32, 95%CI:0.18-0.56). In URB, condom use was associated with being male (16.7% vs 12.2% female, [age/region adjusted] AOR=1.47, 95%CI:1.12-1.94) and weakly associated with being older (16.5% among 17-19y vs 12.9% among 14-16y, AOR=1.27, 95% CI: 0.97-1.68, $p=0.08$). In CNB, condom use was associated with being female (10.5% vs 1.7% male, AOR=0.16, 95% CI: 0.04-0.58). Among URB participants, condom use was associated with sexual activity within the previous month (21.0% vs 4.4% non-recent activity, AOR=2.26, 95%CI:1.37-3.74). In univariable analysis, participants who reported sexual debut at ≥ 15 y (17.9%) were more likely to report condom use than <15 y (17.9%, OR=1.24, 95%CI: 0.95-1.62, $p=0.08$).

Conclusions: Reported condom use at last sexual encounter was low among adolescents in URB and CNB schools, particularly among adolescents of both sexes in CNB. Younger adolescents, those with a lower age of sexual debut, and especially females in URB and males in CNB, require targeted interventions to increase condom use at all encounters.

Prevalence of macrolide and tetracycline resistant *Treponema pallidum* strains in syphilis cases, Lima and Pucallpa, Peru

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Background

Genetic resistance to macrolides has become widespread in *Treponema pallidum* subspecies *pallidum* (TP), while tetracyclines continue to be useful. Alternatives to injectable penicillin are needed globally, given outages and possible allergies. Monitoring of the frequency of resistance in TP isolates remains important for both classes of antibiotics, as unregulated antibiotic use could limit the utility of tetracyclines and macrolide antibiotics like azithromycin in Peru and many countries. Our objective was to determine the frequency of macrolide and tetracycline resistance in TP-positive lesion samples from syphilis cases at Peruvian sexual health clinics.

Methods

We analyzed 58 lesion swab samples from patients diagnosed with active syphilis from five STI clinics in Lima and Pucallpa, Peru, from 2019-2020. We extracted DNA from clinical specimens and amplified *tp0548* and *tp0574* genes to detect the presence of TP. For macrolide resistance, we performed restriction fragment length polymorphism of the 23S rRNA gene to detect the A2058G and A2059G mutations. For tetracycline resistance, we analyzed the G1058C point mutation in the 16S rRNA sequences assembled from whole-genome sequencing and compared them with the standard TP Nichols strain sequence using snippy v.2 software.

Results

Among the 58 lesion samples analyzed, 25 (44%) were positive for TP DNA. Among those, we found the A2058G macrolide resistance mutation in 22 samples (88%); none (0%) had the A2059G mutation. None (0%) of six 16S rRNA sequences analyzed contained the G1058C point mutation for tetracycline resistance.

Conclusions

The frequency of macrolide-resistance mutations in these TP isolates remains elevated, confirming that macrolides should not be used to treat syphilis. Conversely, as resistance to tetracyclines was absent, corroborating that tetracyclines continue to be useful as a safe and effective alternative for syphilis treatment in this context.

Intersection of Syphilis and HIV Networks to Identify Opportunities to Enhance HIV Prevention in North Carolina, United States

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Background: High syphilis and HIV co-infection rates are disproportionately affecting men who have sex with men (MSM) and transgender women (TGW) of racial/ethnic minority groups in the United States (US). The integration of HIV genetic clustering with contact tracing efforts can provide important insight into epidemic trends in this population.

Methods: We evaluated contact networks of Black and Latinx MSM/TGW diagnosed with early syphilis and/or HIV infection between 2018-2020 in two high-morbidity metropolitan areas in North Carolina, US. HIV genetic clusters were constructed from pol sequences collected through statewide surveillance. A combined "HIV-risk" network, including persons with any links (genetic or contact) to HIV-positive persons, was evaluated by component size, demographic factors, and HIV viral suppression.

Results: Between May 2018 -February 2020, we identified 1,289 index persons who were Black or Latinx MSM/TGW, of which 33.2% had early syphilis, 30.4% had newly diagnosed HIV, and 36.4% had both infections. Most index persons were Black (88.1%) and young (median age 30 years). Fifty-five percent of index persons referred 1,153 sexual partners. In the contact network, the HIV prevalence was 45.7%. Overall, 62% of persons with HIV had a reported HIV sequence (n=697), of which 64.5% were identified in an HIV genetic cluster. The combined HIV-risk network (1,590 contact network and 1,500 cluster members) included 287 distinct components; however, 1,586 (51.3%) were in one component connecting 85 clusters and multiple regions. Among HIV-negative early syphilis cases, 20.8% were identified in the HIV-risk network. Overall, 52.9% of the HIV-risk network had no evidence of HIV suppression.

Conclusions: We identified a high HIV prevalence within the contact network of minority MSM/TGW with syphilis and/or HIV, with close ties to HIV clusters indicating potential ongoing transmission. Integration of HIV cluster and viral loads illuminates areas and networks where public health interventions could be intensified.

Comparing MSM using event-driven PrEP to those using daily PrEP - data from two European PrEP demonstration projects

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Background: Daily and event-driven PrEP are both efficacious in preventing HIV infection. However, event-driven PrEP (edPrEP) is less well understood, in particular when provided as an alternative to daily PrEP. We studied regimen preferences and switches, and sexually transmitted infection (STI) incidence.

Methods: We pooled data from the Dutch (AMPrEP) and the Belgian (Be-PrEP-ared) PrEP demonstration projects. In both projects, participants could choose between daily and event-driven PrEP (edPrEP) at 3-monthly study visits, when they were also screened for STIs including hepatitis C virus (HCV) infection. We assessed the proportion choosing each regimen, and the determinants of choosing edPrEP at baseline. Additionally, we compared the incidence rates (IRs) of HCV, syphilis, and chlamydia or gonorrhoea between regimens using Poisson regression.

Results: The pooled dataset consisted of data of 571 men who have sex with men (n=374 AMPrEP; n=197 Be-PrEP-ared), of whom 148 (25.9%) chose edPrEP at baseline. Older participants (adjusted odds ratio (aOR)=1.38 per 10 year increase, 95% confidence interval (CI)=1.15-1.64) and those unemployed (aOR=1.68, 95%CI=1.03-1.75) were more likely to choose edPrEP at baseline. Median follow up was 26 months [interquartile range 21-27]. 381 participants (68.3%) never switched between PrEP regimens, 96 (17.2%) switched once, and 81 (14.5%) more than once. After 28 months, 23.5% used edPrEP. IR of HCV and syphilis did not differ between regimens, but the IR of chlamydia/gonorrhoea was higher among daily users (adjusted incidence rate ratio=1.61, 95%CI=1.35-1.94).

Conclusion: A quarter of participants chose edPrEP at baseline and at 28 months this proportion was similar. The frequent switching suggests that participants adapt their PrEP regimen to their changing needs. Although the IR of HCV and syphilis were similar in both regimens, the lower incidence of chlamydia and gonorrhoea among edPrEP users may suggest that less frequent STI testing of this group could be considered.

Antimicrobial Resistance of *Neisseria gonorrhoeae* in Germany 2016-2020, results from the Gonococcal Resistance Network (GORENET)

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Background:

In Germany, *Neisseria gonorrhoeae* (NG) infections are not reportable and limited data on epidemiology and antimicrobial resistance (AMR) are available. Within the Gonococcal Resistance Network (GORENET) we monitor the NG-AMR in Germany to inform treatment guidelines.

Methods:

Between 2016-2020, 75 laboratories sent NG-isolates to the German reference laboratory which were tested for ceftriaxone, cefixime, azithromycin, ciprofloxacin, and penicillin susceptibility using MIC-strip test. AMR-results were interpreted according to the EUCAST breakpoints version 11.0. The proportion of resistant isolates was calculated.

Results:

As of December 2020, 2437 isolates were tested, 89.2% were from men. Median age was 33 (men) and 29 years (women). Most isolates were urethral (77.7%), followed by cervical (4.6%) and rectal samples (4.5%). One sample in 2018 was resistant to ceftriaxone (2018: 0.2%). Resistance to azithromycin was increasing from 2016-2020 (2016: 0.8%, 2017: 1.0%, 2018: 3.7%, 2019: 6.6%, 2020: 12.8%). Cefixime resistance was stable (2016: 0.6%; 2017: 0.6%, 2018: 0.9%; 2019: 1.9%, 2020: 0.8%).

On average, 60.4% of samples were ciprofloxacin- (2016: 54.3%; 2017: 63.8%, 2018: 58.5%; 2019: 66.2%, 2020: 59.5%) and 17.4% penicillin-resistant (2016: 16.1%; 2017: 15.1%, 2018: 17.0%; 2019: 21.2%, 2020: 17.9%).

Conclusion:

Comparable to other Western countries, the majority of isolates originated from men. The first-line substance ceftriaxone remains effective in Germany, whereas resistance to the important second first-line therapy component azithromycin reached high levels, nearly doubling from 2019 to 2020. Thus, ceftriaxone monotherapy is also recommended in Germany since 2019 if patient adherence is warranted.

Cefixime-resistance remained low considering that the substance is currently not available in Germany. Penicillin and ciprofloxacin resistance was stably high. NG susceptibility testing is crucial to monitor the AMR-situation in Germany and to inform treatment guidelines.

Establishing a global consortium for syphilis vaccine development: patient enrollment and sample procurement for *Treponema pallidum* genome and OMPeome sequencing

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Background: The public health impact of syphilis worldwide underscores the need to develop an effective vaccine. We established a global consortium for syphilis vaccine development, and collected *Treponema pallidum* (Tp) DNA from well-characterized syphilis patients for whole genome and outer membrane protein (OMP) sequencing.

Methods: Patients with primary, secondary or early latent syphilis were enrolled from four sites located in Chapel Hill (United States), Cali (Colombia), Lilongwe (Malawi) and Guangzhou (China) beginning November 2019. Inclusion criteria included age ≥ 18 ; early syphilis based on symptoms/signs, sexual history; positive darkfield microscopy, nontreponemal and treponemal antibodies. Patient demographics, clinical presentation, syphilis staging, HIV co-infection, and nontreponemal antibody titers were recorded. Ulcer swabs and skin biopsies were collected for DNA extraction, and blood was obtained for rabbit infectivity testing (Guangzhou site). Tp burdens in specimens were quantitated by qPCR for *tpoA* (*tp01021*).

Results: To date, 833 patients have been screened and 94 enrolled across all sites (median age of 27, range: 18-59). Among enrolled participants, 31% are female, 22% are men who have sex with men, and 20% are HIV-coinfected. Primary syphilis was confirmed in 43 persons by darkfield microscopy, and all syphilis cases were confirmed by serology. Nontreponemal titers ranged from 1:1-1:256. Twenty-one Tp strains have been isolated from rabbits, building upon recently published genomes. Tp qPCR assays have been performed on 79 specimens so far, providing a range of copy numbers based on specimen type and stage. Twenty specimens have been sequenced to-date, and analysis for structural variability in OMP targets is underway.

Conclusion: We established a global clinical research consortium and have begun to characterize Tp genomic sequences and catalog Tp's global repertoire of OMPs based on strains circulating in affected populations across sites. Our findings will enable us to identify vaccinogens with broad protective capacity against circulating Tp strains.

“There is no magic bullet.” Considerations for adoption of molecular chlamydia and gonorrhoea point of care tests into routine care

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Background

Sexually Transmitted Infections (STIs), including *Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT), continue to be a global health problem, with the majority of disease burden in Low-and-Middle-Income Countries. This could in part be addressed through increased access to point-of-care-tests (POCTs) to detect infection and appropriately manage cases and contacts. Criteria for the development of STI POCTs have been established, and several CT and NG POCTs have been brought to market. Yet even those diagnostics with good evidence of clinical effectiveness often fail to be implemented and adopted into routine care.

Methods

We first reviewed whether the Cepheid CT/NG GeneXpert POCT fulfils published international guidance for STI POCT development: the (RE)ASSURED and Target Product Profile (TPP) criteria. Then, through a systematic review of Medline and Embase of published literature that reported on the test's implementation, demonstrated its values in different settings and to a variety of stakeholders. This information was then applied to form the basis of a value proposition for an “ideal” CT/NG POCT.

Results

The Cepheid CT/NG GeneXpert did not fulfill all (RE)ASSURED or TPP criteria, however, studies of test implementation showed multiple stakeholder values for use of the test across various healthcare settings and locations. The majority of values identified were setting-specific. Sexual health services and outreach services had the least overlap in values, whereas General Practice and other non-sexual health specialist services served as a “bridge” between the two.

Conclusion

We recommend that those wishing to improve CT/NG diagnosis be supported to identify the values most relevant to their settings and context, and prioritise implementation of those tests most closely aligned with those values.

Maintaining access to HIV PrEP in a pandemic: PrEP-user and health care professional perspectives on a telephone-based PrEP service

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Background: To maintain access to PrEP during the COVID-19 pandemic our PrEP service (1000 PrEP-users) shifted to a largely telephone-based model (tele-PrEP).

Objectives: To conduct a service evaluation of tele-PrEP, exploring the views and experiences of PrEP-users and sexual health care professionals (HCPs), to understand benefits and drawbacks to inform future service delivery.

Methods: Parallel, web-based, anonymous surveys of PrEP-users and HCPs were developed using validated questions wherever possible. The PrEP-user survey was offered to people who had a tele-PrEP appointment between 13.11.2020-17.12.2020 and consented to participate. All HCPs conducting tele-PrEP appointments were invited to participate. Basic demographic data was captured. Data were analysed in Excel using descriptive statistics. Free text responses were thematically categorised using the Framework for a Systems Approach to Healthcare Delivery.

Results: Sixty-two PrEP-users and 8 HCPs completed the surveys (response rate 55% and 89% respectively). Demographic characteristics of PrEP-user respondents were broadly representative of our whole PrEP-cohort. Tele-PrEP was rated “excellent” or “good” by 61/62 PrEP-users, and 59/62 would recommend it to friends. PrEP-users identified convenience as a key benefit along with access to PrEP with reduced potential for COVID-19 exposure. Drawbacks were largely technological, including poor connection or issues with online booking. All HCPs felt that tele-PrEP allowed them to assess patients safely and confidently. HCPs also rated its convenience highly and felt it enabled better use of limited face-to-face clinic capacity. However, HCPs thought that tele-PrEP might create barriers for vulnerable patients, particularly those with low digital, health and/or English-language literacy. One HCP and 10/62 PrEP-users expressed a personal preference for face-to-face appointments.

Conclusion: Tele-PrEP is feasible and acceptable. While most respondents rated the service highly, others identified a need/preference for face-to-face appointments. Therefore, our service will continue tele-PrEP whilst ensuring availability of face-to-face care for those who require or request it.

Examining the impact of the UK's COVID-19 public health response on sexual behaviour and health service use among MSM.

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Background: The introduction of social distancing in response to the COVID-19 pandemic led to reduced STI/HIV service provision in the UK. We investigated sexual risk behaviours among MSM and unmet need for sexual healthcare during the pandemic.

Methods: A cross-sectional online survey (N=2,018) fielded via social media and dating apps (23/06-14/07/2020). We examined sexual behaviour and service use since lockdown (23/03/2020) and in the three previous months, and “unmet need for STI testing” since lockdown (any new male partners and/or multiple condomless anal sex (CAS) partners without testing for STIs).

We compared behaviours over the past three months between socio-demographically equivalent sub-samples recruited via Grindr into the present survey (N=956) and a 2017 survey (N=1,918).

Results: In 2020, 36.7% of participants reported new male partners and 17.3% reported multiple CAS partners since lockdown. Comparing time since lockdown vs previous three months, HIV testers were less likely to test at sexual health clinics (22.3% vs 70.2%) and more likely to use free online self-sampling services (64.3% vs 17.1%), and PrEP users were less likely to report PrEP use (21.7% vs 65.7%).

Since lockdown, 25.3% of participants had unmet need for STI testing. Unmet need was more likely among Asian vs White participants (aOR=1.76,[1.14-2.72],p=.01); living in Scotland (aOR=2.02,[1.40-2.91],p<.001) or Northern Ireland (aOR=1.93,[1.02-3.63],p=.04) vs England; and living with HIV (aOR=1.83,[1.32-2.53],p<.001).

Compared to 2017, the 2020 sub-sample were less likely to report new male partners (46.8% vs 71.1%, p<.001), multiple CAS partners (20.3% vs 30.8%, p<.001) and unmet need (32.8% vs 42.5%, p<.001) in the past three months.

Conclusion: We found ongoing potential STI/HIV transmission among MSM during the initial UK lockdown, despite a reduction in sexual activity, and potential inequalities in access to sexual healthcare. These findings will support public health planning to mitigate against health risks during and after the COVID-19 response.

Diagnostic agreement evaluation of treponemal test for syphilis testing

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Background

Laboratory diagnosis of syphilis infection requires treponemal and non-treponemal antibody tests. Treponemal pallidum (TP) antibody tests can be used for screening and confirmation, as part of a two-stage diagnostic algorithm. The diagnostic performance of treponemal tests should be assessed for potential implementation by local STI laboratories. We evaluated three treponemal antibody tests using serum samples from syphilis patients enrolled in a cohort study.

Methods

The Picasso study is a cohort of participants with clinically diagnosed syphilis. Enrolment criteria required a positive rapid point-of-care TP test (Alere Determine syphilis, Abbott Inc, USA) followed by qualitative and semi-quantitative RPR test or clinical evidence of syphilis infection, AND additional confirmatory testing with TPPA (Serodia TPPA, Fujirebio Inc, USA) and TPHA (Syphilis TPHA liquid, Human Diagnostics, Germany). Three comparisons of interest were: TPPA vs rapid TP, TPPA vs TPHA and TPHA vs rapid TP. For each comparison, statistical analysis included positive percent agreement (PPA) and prevalence-adjusted and bias-adjusted kappa (PABAK) correlation coefficient (i.e. a modification of Cohen's kappa when prevalence is too high). TPHA-indeterminate results were considered negative for analyses.

Results

The Picasso study has enrolled 163 participants; all of them had a positive rapid TP test; 85% had an RPR \geq 1:8; 160 had a positive TPPA test, and 142 had a positive TPHA test. The PPA between TPPA and rapid TP was 98.0% with a PABAK of 0.96. For TPPA vs TPHA comparison, the PPA was 89.2% with a PABAK of 0.78. The PPA between rapid TP and TPHA was 87.2% with a PABAK of 0.74.

Conclusion

We found a good concordance when comparing TPHA with either the TPPA or rapid syphilis test.

Right test, right time: ensuring timely renal function monitoring in clients taking PrEP

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Background

Clients receiving PrEP (HIV Pre-Exposure Prophylaxis) require renal function (estimated Glomerular Filtration Rate (eGFR)) monitoring as detailed in BASHH/BHIVA guidelines. Annual monitoring is required for individuals < 40 with normal baseline eGFR and no risk factors for kidney disease. Our busy urban sexual health clinic lacked a structured system for eGFR monitoring, with concern clients were being tested unnecessarily or not at all.

Method

A retrospective review was conducted of all clients under 40 years who received PrEP between June and November 2020. eGFR results and additional tests performed without clinical justification were extracted from records in the year preceding the issue of each PrEP prescription. The number of unnecessary repeat eGFRs within 12 months was recorded.

Results

199 clients were identified of whom 186 (93.5%) had eGFR checked in the year prior to issuing PrEP. 13 clients (6.5%) therefore had inadequate eGFR monitoring whilst continuing to take PrEP. Of those tested, 55 (29.6%) had eGFR re-checked within a year without clinical justification with a total of 69 unnecessary tests performed. This equates to £345 expenditure on tests, six hours of clinical time administering results and over-investigation of clients with minor fluctuations in eGFR. We implemented a new pathway for eGFR testing, including a visible alert on each client's record allowing clinical staff to immediately see when the eGFR was last checked, and when the next is due.

Conclusion

This study identified both under- and over-testing of eGFR for clients taking PrEP. Whilst it is vital that eGFR testing is not missed, over-testing wastes clinical and financial resources which are at a premium in an era of budgetary constraints and reduced appointment availability due to COVID-19. As the number of clients taking PrEP increases, it is important for all services to ensure robust and efficient methods of eGFR monitoring.

Clinical outcomes of syphilis in HIV-negative and HIV-positive MSM: Occurrence of repeat syphilis episodes and non-treponemal serology responses.

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Objectives

HIV-positive men who have sex with men (MSM) may be at a higher risk of repeat syphilis, have different clinical manifestations, and have a different serological response to treatment compared to HIV-negative MSM. The objective of this study was to assess whether HIV-negative and HIV-positive MSM with infectious syphilis (primary, secondary or early latent), differed in history of previous syphilis episodes, disease stage and non-treponemal titre of initial and repeat episodes, and the titre response 6 and 12 months after treatment. Furthermore, the determinants associated with an inadequate titre response after treatment were explored.

Methods

This retrospective analysis used data of five longitudinal studies (4 cohorts and one RCT) conducted at a large sexually transmitted infection (STI) clinic in Amsterdam, the Netherlands. Participants were tested for syphilis and completed questionnaires on sexual risk behaviour every 3 or 6 months. We included data of participants with one or more syphilis diagnoses in 2014-2019.

Results

We included 355 participants with in total 459 syphilis episodes. HIV-positive MSM were more likely to have a history of previous syphilis episodes compared to HIV-negative MSM (68/90 [75.6%] vs 96/265 [36.2%], $P < 0.001$). Moreover, HIV-positive MSM with repeat syphilis were less often diagnosed with primary syphilis than HIV-negative MSM (7/73 [9.6%] vs 36/126 [28.6%]) and more often diagnosed with secondary syphilis (16/73 [21.9%] vs 17/126 [13.5%]) and early latent syphilis (50/73 [68.5%] vs 73/126 [57.9%]) ($P = 0.005$). While not significantly different at 12 months, HIV-negative MSM were more likely to have an adequate titre response after 6 months compared to HIV-positive MSM (138/143 [96.5%] vs 66/74 [89.2%]) ($P = 0.032$).

Conclusions

In repeat syphilis, HIV-infection is associated with advanced syphilis stages and with higher non-treponemal titres. HIV-infection affects the serological outcome after treatment, as an adequate titre response was observed earlier in HIV-negative MSM.

The impact of the COVID-19 pandemic on the trends of Sexually transmitted infections in Belgium. Results of an STI clinic.

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Background: Due to the COVID-19 pandemic, the Belgian government imposed two semi-lockdowns (LD) with different social behavioral restrictions in 2020. Our aim was to assess the impact of these COVID-19 pandemic-response measures on *Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT) figures in an STI clinic (low-threshold clinic, PrEP & HIV follow-up) in Antwerp, Belgium.

Methods: The overall number of CT/NG requests and positivity ratio during 2020 was compared with 2019. In addition, different periods of 2019 and 2020 were compared using mixed-effects logistic regression methods. 1. pre-lockdown (01/01-17/03, no restrictions), 2. LD1 (18/03-10/05, no social contact outside the household, only 'urgent' consultations), 3. after LD1 (11/05-01/11, varying between 2-10 additional social contacts) and 4. LD2 (02/11-31/12, maximum two social contacts).

Results: Overall, the number of CT/NG requests decreased by 27.7% (7170 in 2019 to 5183 in 2020). Whilst the number of patient contacts declined by 22.4%, positivity rate of CT (8.0% in 2019; 7.8% in 2020) and NG (4.7% vs 5.5%) remained similar in both years. During LD1, a significant reduction in CT/NG requests was noted (decrease of 88.1%) and the number of consultations dropped by 60.1%. Whereas the positivity ratio of NG during period LD1 increased from 5.3% in 2019 to 9.3% in 2020, no significant change was found for CT (8.2% in 2019 to 7.8% in 2020). During the other time periods, the absolute number of requests and CT/NG infections in 2020 were comparable with 2019. Nevertheless, higher positivity ratios were found during LD2 period 2020 compared to 2019 (CT: 9.9% vs 8.2% in 2019; NG: 6.1 vs 5.1% in 2019, $p > 0.05$). **Conclusion:** Despite a sharp drop in consultations, the proportion of CT/NG did not decrease in 2020 compared to 2019. We observed a trend towards higher positive CT/NG rates in LD2 which may depict social distancing fatigue.

Ugandan men with urethritis, what can diagnostic certainty tell us?

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Background: Laboratory infrastructure is limited in Uganda; syndromic case management is used to treat sexually transmitted infections (STI). Progress in addressing the HIV epidemic is threatened by uncontrolled STI transmission. We report on the prevalence of STI in Kampala, Uganda.

Methods: Demographic and behavioral data were captured by questionnaire. Penile-meatal swabs, urine and blood were collected from Ugandan men with urethral discharge syndrome (UDS) attending 6 clinical sites in Kampala Uganda. Genital samples were cultured for *Neisseria gonorrhoeae* (NG), and nucleic acid amplifications tests (NAATs) performed for NG, *Chlamydia trachomatis* (CT), and *Mycoplasma genitalium* (MG). HIV, and syphilis were diagnosed using point-of-care assays.

Results: Of 250 participants, mean age was 27.9 (16-59 years), 140 (56.0%) were ≤ 25 years, and 238 (95.2%) identified as heterosexual. 'Always' condom use was 1 (0.4%), and 154 (61.6%) reported transactional sex in the previous 6 months. In the 14 days prior to attendance, 100 (40%) reported antibiotic use, including ciprofloxacin, doxycycline, and penicillin (26 (25.7%), 31 (30.7%), and 13 (12.9%), respectively) despite >98% resistance in NG isolates. NAAT positivity was 166 (66.5%), 51 (20.4%), and 29 (11.6%) for NG, CT, and MG respectively. Of 50 (20%) participants with HIV; 2 (0.8%) were newly diagnosed. Syphilis serology was positive in 25 (10%), of these 20 (80%) were new diagnoses; RPR range 1:1 - 1:1024. Dual and triple NG, CT, MG co-infections were found in 33 (13.3%), 4 (1.6%) respectively.

Conclusions: This cross-sectional study demonstrates a very high prevalence of bacterial STI in men with UDS, presenting to clinical services in Kampala. In contrast, new HIV infections were relatively uncommon. Without POC testing, the vast majority of syphilis infections would have gone undiagnosed. Diagnosing STI in this population presents an ideal segue into HIV prevention services; the feasibility and efficacy of this approach requires further study.

Treponema pallidum intra-patient homogeneity between various body locations in patients with infectious syphilis

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Syphilis, caused by *Treponema pallidum* subspecies *pallidum* (TP), is a complex multi-stage infectious disease. Systematic dissemination is known to occur within a few hours of transmission. We investigated the molecular variation of TP at various body locations within patients and assessed whether infections with multiple strains could be detected within one patient.

We included 293 men who have sex with men (MSM) suspected of syphilis at the sexually transmitted infections clinic in Amsterdam in 2018-2019; 70 (24%) had primary syphilis, 73 (25%) secondary syphilis, 86 (29%) early latent syphilis, 14 (5%) late latent syphilis and 50 (17%) did not have syphilis. Extra study samples were collected: peripheral blood, a pharyngeal and an anal swab, and a urine sample. TP-DNA was detected using a *polA* targeting qPCR. All positive TP samples, including ulcer swabs, were characterized using multi-locus sequence typing (TP-MLST) based on sequence analysis of three genetic regions (*tp0136*, *tp0548*, *tp0705*).

Full TP-MLST types were obtained for the following TP-DNA positive samples: 1/22 (5%) peripheral blood, 35/75 (47%) pharynx, 10/61 (16%) anus, 23/56 (41%) urine and 50/73 (68%) ulcer. At least one TP-MLST full type was obtained from 48/70 (69%) patients in the primary, 35/73 (48%) in secondary and 10/86 (12%) in early latent stage. For all 22 patients with ≥ 2 TP-MLST types, the TP-MLST type was identical at the different body locations. The most prevalent TP-MLST types were 1.3.1 and 1.1.1, detected in 39/93 (42%) and 17/93 (18%) patients. Five new *tp0548* and 2 new *tp0136* variants were found, resulting in 6 new TP allelic profiles.

The intra-patient TP homogeneity suggests that the TP-DNA detected at the different body locations occurs from dissemination rather than from different infections from multiple partners. The TP strain diversity is similar to that in previous TP-MLST studies among MSM in Amsterdam, the Netherlands.

Time-to-clearance of *N. gonorrhoeae* (NG) RNA at the pharynx following treatment with ceftriaxone and azithromycin

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Background: The time to RNA-based nucleic acid amplification tests (NAAT) clearance following treatment of NG at the pharynx remains undefined.

Methods: Between March 2019-2020, we enrolled 55 men who have sex with men (MSM) with untreated pharyngeal gonorrhea detected ≤ 14 days to self-collect daily pharyngeal swabs at home for 21 days after treatment. All men received ceftriaxone 250mg intramuscularly plus 1g azithromycin orally once at enrollment. We used Kaplan Meier estimates to determine the median days of positive NAAT following treatment and the number of positive NAAT days when $>95\%$ of the cohort cleared, with clearance defined as 2 consecutively negative tests and censoring for loss-to-follow-up. We categorized men into groups by time-to-clearance and used chi-square and t-test (categorical and continuous variables respectively) to assess for differences by demographics, clinical history and sexual behavior.

Results: Of 55 men enrolled, 7 (13%) were NAAT-negative at enrollment (pretreatment) and 8 (15%) did not return any home self-collected swabs. Of the remaining 40 MSM (NAAT-positive at baseline and returned swabs), all cleared between 0 and 17 days. The median time-to-clearance was 5 days (95% CI: 3-8 days); $>95\%$ of men cleared NG RNA at 12 days (95% CI: 10 – undefined days) following treatment. Compared to men in the slowest to clear group (median 9 days, range 8-16, $n=7$), men who cleared NG RNA most rapidly (<3 days, range 0-2 days, $n=28$) more frequently had a history of gonorrhea (14% vs. 58%, $p=0.04$), and were somewhat older (median 25 vs. 30 years), though the latter was not significant ($p=0.124$). Time-to-clearance did not differ by HIV status, BMI or mouthwash use.

Conclusions: Test-of-cure for pharyngeal gonorrhea should not be performed before 12 days following treatment when using an RNA-based NAAT. The time-to-clearance may be shorter in persons with a history of gonorrhea.

Clinical manifestations of Treponema Pallidum DNA positive syphilitic lesions among patients from STI clinics in Peru

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Background: The control of Syphilis, a sexually transmitted infection (STI) cause by Treponema Pallidum (TP), requires early diagnosis and treatment, especially during primary syphilis when serologic tests may fail to confirm infection. In our PICASSO cohort, we detected TP DNA from anogenital lesions from people with active syphilis, described clinical findings and took lesion images.

Methodology: The Picasso cohort study recruited adults with active syphilis, diagnosed either by laboratory (new seroconversions or fourfold increase in RPR) or clinical criteria (new anogenital ulcer compatible with primary syphilis). Patients underwent a short survey, clinical examination and laboratory tests including serum RPR, TP-rapid test (TP-RT), HIV rapid test, and TP-PCR from lesion swabs. Clinical examination was performed and documented by a trained clinician and pictures were taken after obtaining consent.

Results: Among 161 participants, 61 (38%) had suspected primary lesions which were swabbed and analyzed using PCR. Results were available from 58 participants. TP-DNA was detected in 27/58 (47%) lesions. Among those 27 participants, 11(41%) were HIV positive, RPR titer $\leq 1:4$ was found in 12 (44%), 2 were RPR non-reactive and TP-RT negative. The most common presentations were a single painless ulcer, found in 11/27 cases (41%) and multiple painless ulcers found in 10/27 cases (37%). Two participants with multiple lesions (one with painful lesions) also had cutaneous rash on the trunk and back; and one of them had rash on palms and soles. Five participants consented for the use of photographs of their lesions for research/publication purposes.

Conclusion: We were able to confirm primary syphilis cases by detecting TP-DNA from anogenital lesions. Describing those cases and showing lesion photographs can contribute to the current tools for clinical training to improve syphilis diagnosis and early treatment during symptomatic stages.

Missed opportunities to diagnose occult primary syphilis among adults from STI clinics in Peru

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Background: Primary syphilis, the most contagious disease stage, is when serologic tests are most likely to be negative. Including the anal canal in the clinical exam can aid diagnosis, especially during this period. We used preliminary data from our PICASSO cohort to discuss the probability of occult primary syphilis in adults not presenting with cutaneous or oral lesions.

Methodology: Occult primary syphilis probability (OPSP) was classified into three categories (Gunn, 2019): 1. High, having a non-reactive RPR/TP-rapid test (TP-RT) within one year; 2. Intermediate, having a non-reactive RPR/TP-RT more than a year ago; and 3. Low, no prior non-reactive RPR/TP-RT. The higher the probability of occult primary syphilis, the higher the potential benefit from an anal exam. Participants were eligible for OPSP classification if they had a diagnosis of asymptomatic (latent) syphilis, recent condomless receptive anal sex, and current RPR result $\leq 1:8$ if HIV-negative and first TP infection, or RPR result $\leq 1:128$ if HIV positive and/or had prior syphilis.

Results: Forty-eight participants were eligible for OPSP classification. Among those, 19 (40%) were HIV positive, 35 (73%) had prior syphilis, and 42 (88%) were diagnosed with early latent syphilis. Twenty participants (42%) were classified as high OPSP, 3 (6%) as intermediate, and 25 (52%) as low OPSP. Anoscopes were available at the study centers for 19 of the 48 cases, but only one anoscopy (5%) was performed. No anal lesions were found despite 13/19 (68%) being classified as high OPSP. Participant refusal was the primary reported reason for lack of anoscopy.

Conclusion: High OPSP among asymptomatic individuals with primary syphilis is common, but anoscopy was used infrequently even when available, missing the opportunity of diagnosis. Anoscopy promotion among clinicians and patients is needed to reduce the gap of under-diagnosed primary syphilis and prevent TP transmission when it is most contagious.

The role of prior syphilis in the clinical presentation of this disease among adults from STI clinics in Peru

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Background: Individuals with prior syphilis are believed to be less symptomatic at subsequent infections. We present preliminary data using baseline information from the PICASSO cohort among people with active syphilis to compare the clinical presentations of individuals with and without prior *Treponema Pallidum* (TP) infection.

Methodology: We included people with active early syphilis who fulfilled one of the following criteria: 1) current RPR titer of 1:8 plus a four-fold rise in RPR results within a year or 2) a new lesion with a positive TP-PCR DNA result from lesion swab. Syphilis naive (first infection) was defined as having a previous non-reactive TP-rapid test (TP-RT) within a year, and reinfection as having a prior reactive TP-RT or a prior RPR $\geq 1:8$ within a year. Chi2-square tests were used to examine associations.

Results: Among the 91 men and transgender women with early syphilis: there were 10 primary (11%), 10 secondary (11%) and 71 latent or asymptomatic (78%) infections. Penile painless ulcers were the most common presentation of primary syphilis (80%, 8/10). All secondary syphilis cases had cutaneous rash. Thirty-six (40%) were syphilis naive, and 62 (68%) were HIV negative. Of the latter, 48/62 (77%) were on PrEP. Symptomatic syphilis was more frequent in the syphilis naive group (39% vs 11%, chi2 $p=0.002$). Among 62 HIV-negative participants, symptomatic syphilis was less frequent among PrEP users (15% vs 43%, chi2 $p=0.022$). Prior syphilis was also higher among PrEP users but not statistically significant (54% vs 27%, chi2 $p=0.063$). No significant difference was found by HIV status.

Conclusion: Prior TP infection impacts clinical presentation during subsequent infections, reducing the likelihood of diagnosing primary or secondary syphilis. The finding of less frequent symptomatic cases among PrEP users may be related to higher prior syphilis among them in our study.

First clinical evaluation of a 30-minute point-of-care-test for Chlamydia trachomatis and Neisseria gonorrhoeae infection in UK sexual health clinics

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Background:

As part of a programme of work seeking to facilitate adoption of multi-STI POCTs in English sexual health services (SHS), we implemented an approach to facilitate adoption of the binx health io CT/NG Assay ("binx POCT"). This included supporting analysis and interpretation of data following clinical validation and routine use of the binx POCT as implemented into clinical care, prior to SHS adoption decisions.

Methods:

binx POCT diagnostic accuracy was compared to locally-used laboratory-based nucleic acid amplification tests (NAATs) and expressed as positive (PPA) and negative percentage agreement (NPA), with 95% confidence intervals (95% CI). Individual SHS reported turnaround time (TAT) from sample collection to patient receipt of results, before and after binx POCT implementation.

Results:

Three SHS participated, and were a mix of high, medium and low-throughput in south England. Of N=417 patients across all services, n=396 (195 women and 201 men) were successfully tested with both the binx POCT and SHS routine NAATs. CT: male PPA 92.5% (79.6-98.4), NPA 99.4% (96.6-100.0); female PPA 82.1% (63.1-94.0), NPA 98.2 (94.8-99.6). NG: male PPA 91.7% (61.5-99.8), NPA 100% (98.1-100.0); female PPA 90.9% (58.7-99.8), NPA 100% (2.0-100.0). Median TAT decreased from 5 days (IQR 3-7.25) pre-implementation, to 1 day (1=same-day (IQR 1-2)) during implementation; p <0.000001.

Conclusion:

binx POCT PPA and NPA, as compared to participating SHS routine NAATs, were largely within expected ranges of the diagnostic evaluation conducted in the United States for FDA approval, and there was significant decrease in TAT time across all services. The binx POCT was not available for purchase directly following the programme's end, however, local data gave confidence to SHS to use the test in routine care, and all indicated interest in adoption. Providing services the ability to test new POCTs in local settings prior to purchase could help facilitate their wider implementation.

Trauma and chemsex as coping among gay, bisexual and other men who have sex with men in Singapore

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Background: Sexualised substance use, or ‘chemsex’, has been identified as a major risk factor for HIV, as well as other mental health comorbidities among gay, bisexual and other men who have sex with men (GBMSM). While multiple studies have been conducted on the topic, few have explored the role of trauma as a risk factor for chemsex. This qualitative study investigates life histories of trauma, and proposes a biopsychosocial framework to better situate the factors driving chemsex among GBMSM.

Methods: We conducted semi-structured in-depth interviews with 33 purposively-sampled GBMSM with a history of sexualised substance use in Singapore. Interview topics included participants’ experiences and life histories of chemsex, substance use, incarceration, trauma, as well as stories of resilience and ongoing recovery from chemsex. Interviews were audio-recorded, transcribed, coded, and analyzed using thematic analysis.

Results: Participants described how chemsex was used as a coping mechanism to deal with emotional and situational ‘precipitants’, including dealing with loneliness and a low self-esteem, sexual shame and social anxiety, as well as general stressful situations. Participants also articulated how such precipitants were underpinned by experiences of biopsychosocial trauma, including those relating to HIV-related stigma, racism, sexual violence, death and loss, neglect, as well as internalised homophobia. Finally, participants illustrated how such trauma were in turn reinforced by several ‘preconditions’, including the accessibility of substances, emphasis on sexual capital, and lack of access to mainstream support structures in the gay male community, alongside general sociolegal barriers to accessing care.

Conclusions: This study proposes the role of trauma and the preconditions underpinning them in driving chemsex among GBMSM in Singapore. Interventions that provide support for GBMSM recovering from chemsex should provide trauma-informed care to address the complex barriers to long-term recovery.

The Impact of the Coronavirus Disease (COVID-19) on the Health and Social Needs of Sex Workers in Singapore

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Background: We evaluated the impact of the Coronavirus Disease (COVID-19) on the sex work industry, and assessed how it has impacted the health and social conditions of sex workers in Singapore.

Methods: We conducted a sequential exploratory mixed methods study amidst the COVID-19 pandemic from April to October 2020, including in-depth interviews with 24 stakeholders from the sex work industry and surveyor-administered structured surveys in the field with 171 sex workers. The in-depth interviews allowed the team to qualitatively explore and generate themes around how COVID-19 had impacted sex workers in Singapore, and informed the design of the quantitative surveyor-administered survey questionnaire. Qualitative data were analyzed through framework analysis while survey data were analyzed through descriptive statistics, and multivariable Poisson regression models.

Results: COVID-19 had a substantial impact on sex workers' income, while the illegality of sex work, stigma, and the lack of work documentation were cited as exclusionary factors for access to alternative jobs or government relief. Sex workers had experienced an increase in food insecurity (57.3%), housing insecurity (32.8%), and sexual violence and compromise (8.2%), as well as a decrease in access to medical services (16.4%). Being transgender female was positively associated with increased food insecurity (aPR=1.23, 95%CI [1.08, 1.41]), housing insecurity (aPR=1.28, 95%CI [1.03, 1.60]) and decreased access to medical services (aPR=1.74, 95%CI [1.23, 2.46]), being a venue-based sex worker was positively associated with increased food insecurity (aPR=1.46, 95%CI [1.00, 2.13]), and being a non-Singaporean citizen or permanent resident was positively associated with increased housing insecurity (aPR=2.59, 95%CI [1.73, 3.85]).

Conclusions: Our findings suggest that COVID-19 has led to a loss of income for sex workers, leading to a worsening of social and health conditions for sex workers. A lack of access to government relief among sex workers exacerbated such conditions.

Potential interactions between the pathways to diagnosis of HIV/STI and HIV self-testing: A qualitative study of gay men in Singapore

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Background: This study draws on qualitative insights on the barriers and facilitators to HIV testing, as well as perceptions of HIV self-testing (HIVST), to propose a framework to understand the benefits, but also potential knock-on implications of introducing HIVST in the context of other STI testing.

Methods: We conducted semi-structured, in-depth interviews with 30 gay, bisexual and other men who have sex with men (GBMSM) aged 18 and 39 years old in Singapore. Interview topics included barriers and facilitators to HIV and other STI testing, as well as perceptions of HIVST. Interviews were audio-recorded, transcribed, coded, and analysed using thematic analysis.

Results: For HIV testing, participants cited the perceived risk of acquiring, susceptibility to, and symptoms of HIV as internal motivators, while social influence and accessibility of HIV testing services were external motivators. For STI testing, perceived symptoms and partner notification of STI were reported as an internal and external motivator, respectively. Availability of bundle tests, starting a new relationship, and instances of mandatory testing motivated both simultaneous HIV and other STI testing. The fear of a positive diagnosis and lack of confidentiality were cited as internal and external barriers to HIV testing, respectively, while low perceived severity of other STI and the cost of STI tests were cited as internal and external barriers to other STI testing, respectively. We identified pathways to HIV and other STI testing and discussed how the introduction of HIVST may reduce opportunities for other STI testing.

Conclusions: The findings of this study suggest that introducing HIVST might weaken linkages to other STI testing if alternative strategies of promoting other STI testing are not simultaneously implemented. We recommend that future interventions address both the risks of HIV and other STI simultaneously, and that structural interventions promoting HIV and other STI prevention be balanced accordingly.

Effect of a web drama video series on HIV/STI testing among gay men in Singapore: a pragmatic, randomized controlled trial

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Background: While HIV/STI testing rates among Gay, bisexual and other men who have sex with men (GBMSM) are increasing worldwide, they remain suboptimal in a variety of settings.

Methods: The study is a pragmatic, randomized controlled trial design to evaluate a popular web drama video series developed by a community-based organization in Singapore for GBMSM. A total of 300 HIV-negative, GBMSM men in Singapore aged 18 to 29 years old were recruited and block-randomized into the intervention (n=150) and control arms (n=150). Primary outcomes included changes in self-reported intention to test for, actual testing for, and regularity of testing for HIV, Syphilis, Chlamydia and Gonorrhoea, while secondary outcomes include changes in a variety of other knowledge-based and psychosocial measures at the end of the study period.

Results: Overall, 125 out of 150 participants (83.3%) in the intervention arm completed the proof of completion survey, compared to 133 out of 150 participants (88.7%) in the control arm (Chi-square test, p=0.715). We found statistically significant differences in self-reporting as a regular (at least yearly) tester for HIV (Chi-square test, p=0.016), as well as chlamydia and gonorrhoea (Chi-square test, p=0.009), indicating that the intervention had positively impacted these outcomes compared to the control condition. We also found statistically significant differences in participants' intentions to test for HIV (Chi-square test, p=0.009), syphilis (Chi-square test, p=0.014), as well as chlamydia and gonorrhoea (Chi-square test, p=0.008) in the next three months, indicating that the intervention was effective in positively impacting intention for HIV and other STI testing among participants.

Conclusions: There are benefits for promoting intentions to test especially in tandem with interventions that address structural barriers to testing. This intervention has potential to reach GBMSM without access to conventional HIV/STI prevention messaging, and who do not frequent physical venues where such messaging targets.

Social capital and chemsex initiation in young gay, bisexual, and other men who have sex with men

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Background: Young gay, bisexual, and other men who have sex with men (YMSM) are especially vulnerable to the risks associated with sexualized substance use, or 'chemsex'.

Methods: Results of this study were derived from baseline data of the Pink Carpet Y Cohort Study in Singapore, comprising a sample of 570 HIV-negative YMSM aged 18 to 25 years old. Latent class analysis was employed to identify classes with similar patterns of sexualized substance use, and multinomial logistic regression was employed to examine associations between class membership and measures of social capital, including age of sexual debut, bonding and bridging social capital, connectedness to the lesbian, gay, bisexual and transgender community, and outness.

Results: Latent class analysis revealed three classes of YMSM based on their histories of sexualized substance use, which we labelled as 'alcohol', 'poppers', and 'chemsex'. Participants in the alcohol class (n=348) reported only ever using alcohol and not other substances during sex. Participants in the poppers class (n=140) had mostly ever used poppers (n=136, 97.1%), with some reporting ever using other chemsex-related substances, during sex. Most participants in the chemsex class (n=23) reported using methamphetamine, gamma-hydroxybutyrate/gamma-butyrolactone, and erectile dysfunction drugs during sex. Multivariable analyses revealed that participants who were older (aOR=1.19, p=0.002) and who identified as gay (aOR=2.43, p=0.002) were more likely to be in the poppers class compared to the alcohol class. Participants with a later age of sexual debut were increasingly less likely to be in the poppers (aOR=0.93, p=0.039) and chemsex classes (aOR=0.85, p=0.018), compared to the alcohol class, exhibiting a dose-response relationship.

Conclusions: Varying measures of social capital such as an earlier age of exposure to sexual networks may predispose YMSM to greater opportunities for sexualized substance use. Future interventions should target YMSM who become sexually active at an earlier age.

Implicit Bias & Sexual Health: Transforming Routine Comprehensive Sexual Histories

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Background: Implicit bias and its impact on health has been front and center as the US reckons with its history of racial injustice. Often overlooked is the role implicit bias plays in sexual health. Research suggests provider bias, judgement, and attitudes, coupled with the discomfort of taking a sexual history and discussing sensitive issues, impacts Sexually Transmitted Infections (STI) services. The CDC recommends clinicians regularly obtain sexual health histories, however, a national survey of US physicians found <33% routinely screened patients for Sexually Transmitted Infections. To address these barriers, the National Coalition for Sexual Health (NCSH) developed a user-friendly and inclusive guide to help clinicians integrate sexual health conversations and recommended services into routine clinic visits.

Methods: NCSH conducted a literature review to identify evidence-based approaches to improving provider-patient communication, sexual history -taking, and service provision. Two focus groups of providers pretested the guide and rated it based on appeal, relevance, and practicality. Additionally, the Coalition updated the guide by expanding sexual history taking to include questions about sexual orientation, gender identity, sexual functioning, and satisfaction.

Results: The findings resulted in a comprehensive sexual history-taking guide that participants found “useful and informative” to help identify appropriate patients and anatomical sites for testing, testing frequency, and questions to assess wellbeing. Since February 2018, the guide has been viewed over 7,000 times. Kaiser Mid-Atlantic and the National Prevention Training Centers to name a few, have integrated the guide into trainings reaching approximately 2,500 health care providers.

Conclusion: The lack of formal curriculum in medical and nursing schools’ on how to recognize and address bias impacts how many patients are receiving care. Practical and inclusive resources and tools can address many of these barriers, reduce bias, normalize provider-patient conversations, and improve sexual health and wellbeing.

The lasting impact of the COVID 19 pandemic on sexual health care in a metropolitan region

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Background

In the US, health policies accompanying the COVID-19 pandemic led to restricted healthcare access and decreased clinical services. Low public health funding was a barrier to accessing sexual healthcare before the pandemic and intensified during restrictions. Surveillance of the sexual healthcare landscape can inform program development to improve sexual health.

Methods

We collected information from clinics offering STI testing in the St. Louis region, Missouri, USA twice during 2020: in the spring during the first pandemic lockdown and in the fall as restrictions eased. Clinics were interviewed about sexual health services and categorized into three categories: open fully with no changes; modified if hours open and/or the ability to accept walk-ins were reduced; or fully closed. We also collected chlamydia rates by zip code and categorized zip codes as low (0-174 cases per 100,000); medium (175-653); or high (654-1291) prevalence.

Results

Of the 112 clinics, 47 are federally qualified health centers (serve the un- and underinsured); 16 were local public health authorities; and the remaining 49 include community, school, and private settings. In the fall, 29% of clinics were open, 55% modified, 5% closed compared with spring when 7% of clinics were open, 63% were modified, 17% were closed. There was a 450% and 200% increase in the number of clinics that were open in high and medium prevalence zip codes respectively in the fall compared to the spring. Forty-nine clinics remain modified or closed in medium and high prevalence zip codes.

Discussion

The COVID pandemic has a significant effect on sexual health care in a metropolitan region of the US; that effect is lasting, especially in areas of medium and high chlamydia rates. Health systems must consider how the pandemic has impacted care provided for all major public health problems, including STIs/ HIV or risk worsening sexual health.

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Background: In 2012, pre-exposure prophylaxis (PrEP) was approved as an HIV-prevention intervention. PrEP is a highly effective strategy for reducing the risk of HIV acquisition, particularly in populations at high risk of contracting the virus. In an integrative review of the literature, we explored barriers and facilitators to accessing PrEP and outlined potential interventions to mitigate access. In the integrative review, 48 studies were included. We also extracted data that provided information on potential interventions and recommendations that stakeholders and decision-makers can utilize to advance practice guidelines and health policies that will improve PrEP access among high-risk populations. In this paper, we reflect on the review findings and contemplate the silences that became visible when looking across all studies. **Methods:** We engaged in the process of reflexivity as we looked across the included studies. Throughout this process, we made notes, engaged in conversations, and consulted with others who work in the field. **Results/Conclusion:** We noted three significant areas of silence. One was a lack of intersectional analysis, which considers multiple minority-stress factors acting simultaneously. With little understanding of the complexities impacting understudied populations' intersectionalities, stakeholders and decision-makers lack not only formative contextual research, but also any effective implementable measure to increase PrEP uptake. The studies analyzed showed a lack of community-participatory research practice. At large, the studies found did not explore, nor perceive, communities at HIV risk as agents of their own health. Neither did they represent these communities as capable stakeholders and decision-makers in matters regarding sexual behavior and harm reduction. Peer-support involvement in public health measures to improve PrEP access has been scarce. Despite social connections and relationships representing efficient methods for PrEP awareness, education, and stigma reduction, peer involvement remains mostly unexplored in the literature in relation to PrEP access.

Identifying STI risk groups among heterosexuals in a cohort study based on behavioural and psychological characteristics during the COVID-19 pandemic

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Measures to reduce Coronavirus disease (COVID-19) transmission, including physical distancing, and downscaling of sexual health care impact behaviour and sexual health. We aimed to examine the impact of COVID-19 measures on sexual behaviour, and to characterize heterosexuals who were at high risk of acquiring sexually transmitted infection (STI) during the pandemic. A longitudinal cohort study (2016-2020) was conducted among Dutch heterosexual males and females aged 21-28 years in 2020. We used data on behavioural and psychological characteristics from: pre-lockdown (June-August 2019), lockdown (March-May 2020), and post-lockdown (June-August 2020). Behaviour change was compared between subgroups identified with latent class analysis. Four latent classes were identified (n=239). Individuals in class 1 (48% of study population) and 2 (36%) were at low risk of acquiring STI pre-lockdown, during, and post-lockdown, and reported mostly steady partnerships. Individuals in class 3 (9%) and 4 (7%) reported multiple casual partners pre-lockdown, and class 4 continued having multiple partners during lockdown (56% reported same/increased partner numbers compared to pre-lockdown versus 18% in class 3). Class 4 was characterized by less condom use, lower health goals, less positive STI/COVID-19 prevention attitudes, and higher impulsiveness compared to class 3. Post-lockdown, 36% in class 3 and 42% in class 4 reported same/increased partner numbers compared to pre-lockdown. Of individuals who wanted an STI test during or post-lockdown in class 3 (57%) and 4 (75%), 62% and 56% respectively did not get tested, mainly because they were not able to get an appointment. STI risk during the COVID-19 pandemic was low in most heterosexuals, but specific subgroups engaged in high-risk behaviour during lockdown and post-lockdown. During and after the COVID-19 pandemic, impulsive individuals with low health goals and less positive infection prevention attitudes should be prioritized for STI testing, and targeted with behavioural interventions tailored to these psychological characteristics.

Online partner seeking as a social practice: findings to develop the fourth National Survey of Sexual Attitudes and Lifestyles.

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Background: Rapid development and uptake of digital technologies have influenced sexual lives. As part of development research for the decennial British National Survey of Sexual Attitudes and Lifestyles (Natsal-4), we aimed to understand the practices of adults in Britain using digital technologies to meet sexual and romantic partners.

Methods: We conducted 40 semi-structured interviews with adults in Britain on the role digital technologies played in their sexual lives. Here we draw on the accounts of 22 of those who had direct experience of online partner seeking. Informed by Social Practice Theory, we developed thematic codes encompassing the materials, skills and meanings that constitute online partner-seeking as a social practice.

Findings: Online partner seeking is a social practice normalised in contemporary culture, enmeshed within broader online cultures of image presentation. It is associated with multiple goals and imbued with possibilities as well as risks. Material elements we identified related to the technology, its affordances, and how these shape interactions. We found that technological, interpersonal, and self-care skills were together required to seek and progress to various relationship forms and protect the self. Distinct linguistic, sexual, harm/damage limitation and exit strategies also drew on a range of skills. Participants reflected on how they presented themselves online, on their intentions, and on the skills required to 'read' situations and act authentically.

Conclusion: While online partner seeking has often been considered individualistic, outcomes can be read through a lens of Social Practice Theory. Successful partner selection, communication and avoidance of harm depend on a complex learned constellation of the skills, materials and meanings associated with dating choices. Our findings have potential to inform survey questionnaire design and effective, nuanced health promotion interventions which consider intersecting dimensions of this social practice to build skills, develop goals and assess strategies to respond to unwanted interaction.

Exploring the attitudes and acceptability of anal self-examination for early detection of anal syphilis – a mixed method study

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Objective

Studies have suggested MSM practising receptive anal sex are more likely to miss anorectal syphilis lesions. We hypothesised that performing regular anal self-examination (ASE) could detect anorectal syphilis lesions. We aimed to explore the attitudes and acceptability of MSM on performing ASE to detect primary anal syphilis.

Methods

This mixed-method study involved semi-structured interviews with 20 MSM purposively sampled from a sexual health clinic and a cross sectional survey with MSM over 18 years of age recruited through the clinic and social media between January to November 2020. Interviews data were analysed thematically and descriptive analysis performed on the survey data.

Results

Four major themes emerged from the interviews; reasons for ASE, preferred resources for ASE, acceptability of ASE, and attitudes towards partner anal examination. The majority of MSM had conducted ASE previously; however, only a few performed it regularly for medical reasons. Most men not regularly conducting ASE were uncertain about differentiating normal and abnormal ASE findings, although were willing to perform ASE regularly with appropriate education and training.

574 MSM completed the survey (median age: 34 [IQR 27-45]): 182 (32%) had previously performed ASE. Among 373 (65%) who had not performed ASE, 250 (67%) were willing to consider ASE as a regular practice for early syphilis detection (median 0.9 times per month). There were no significant differences in demographic characteristics and sexual practices between the two groups.

Conclusion:

Most MSM were willing to perform ASE, however, would like further education and training to gain more confidence in performing ASE as a screening tool. Almost two-third of the MSM who had never performed ASE were willing to adopt ASE practice in the future. Further studies are required to explore the adherence and cost-effectiveness of ASE.

Sex in the City: Understanding Perceived Risks and Sexual Behavior among Adolescents and Young Adults during the SARS Co-V-2 Pandemic

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Background: SARS Co-V-2 (COVID-19) mitigation strategies have resulted in limited clinical operations for sexual health services and adolescents and young adults (AYA) have received mixed messages about the risk for serious COVID-19 infection. This work describes the sexual behavior and relationship between COVID-19 risk perceptions and sexual behaviors among urban AYA during the pandemic.

Methods: Cross-sectional data were used from AYA enrolled across four sexual health studies in Baltimore, Maryland (USA). Participants had an active STI, HIV, or were at risk for STI/HIV. The March 16, 2020 'stay-at-home' orders were used to define the pandemic period in the human subjects' approved telephone survey.

Demographics, COVID-19 risk perception, testing behavior, positivity in their social circle, and relationship/sexual behaviors data were evaluated using regression analyses.

Results: 194 participants with a mean (sd) age of 22.7 (2.8) years were surveyed. Most were female (81%) with public health insurance (68%), 61% were in a relationship, 36% were cohabiting, 79% had sex during the stay-at-home order, 68% used some form of contraception, 39% used a condom at last sex, and 23% had STI screening during the pandemic. 51% had COVID-19 testing, and 31% and 8% experienced a COVID-19-related diagnosis or death, respectively, in their social circle. Using a 10-point Likert scale (10=most concerned), the mean concern score for contracting COVID-19 was 5.0 (3.7) and during intercourse was 3.0 (4.1). Those with COVID-19 positivity within their social circle were marginally more likely to have COVID-19 testing (adjusted OR 1.69, 95% CI 0.89 – 3.19, $p = 0.107$). Concern for COVID infection or COVID-19 in social circle was not associated with sexual intercourse or condom use.

Conclusion: Urban AYAs remain at risk for STIs and COVID-19 given community rates, low condom use, and low COVID risk perceptions. Youth-focused mitigation strategies to reduce STI/HIV and COVID-19 are warranted.

Not Lost in Translation: Developing a Sexual Health Communication Training Intervention for Medical Students in Dar Es Salaam, Tanzania

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Background: Health professionals in Tanzania report a perceived need for sexual and reproductive health (SRH) communication training to meet patient needs and reduce disparities. Simulation optimizes the clinical performance and public entrustment. We describe the development and preliminary quality control results from an innovative, Afrocentric SRH simulation for later use within a large randomized controlled educational trial.

Methods: Standardized patient (SP) simulation cases with embedded cultural, language, gender, age, sexuality, and legal complexity issues identified by stakeholders in Dar es Salaam were embedded in 1) adolescent health, 2) women's health, and 3) male health cases. Bilingual senior students were recruited and enrolled after informed consent to participate in a pilot trial. SP simulation interviews were conducted and via Zoom[®] in Kiswahili. Each student completed the 3 simulations as a part of study procedures. We report the student characteristics and results of the translated and close-captioned [T-CC] fidelity and quality control analysis using the evaluation of both SP performance and student engagement using established patient-centered communications standards.

Results: Twenty-four students mostly male (62.5%), year 5 (66.7%) students evenly split across nursery, midwifery, and medicine with a mean age (sd) of 25.1 (1.3) years were recruited for participation in the pilot. Review of the T-CC data was consistent across bilingual staff, demonstrated high student engagement, performances by SPs were true to the case context, and the quality of video data was consistent with other more expensive recording methods. There were no adverse events or unanticipated disruptions impacting the fidelity of the simulation component.

Conclusion: Preliminary SRH simulation data using standardized patients demonstrate student engagement and trained SP fidelity to case and protocol. The use of translated, closed-captioned video data and input from bilingual staff ensures that the training materials meet international standards for patient-centered health communication without losing key information in translation.

Follow-up assessment of participants with urethral discharge syndrome in Kampala, Uganda: Lessons learned for future STI control Interventions

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Background: After effective treatment, persons diagnosed with a sexually transmitted infections (STI) are encouraged to modify behavior and notify partners. In resource-limited settings (RLS), follow-up assessment is limited by a variety of factors, including access to knowledge, material resources, and reliable communication.

Methods: A study conducted in 2019 within the existing WHO-based Enhanced Gonococcal Antimicrobial Surveillance Program (EGASP) collected urogenital samples and blood from men with urethral discharge syndrome (UDS). Samples were tested for *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), *Trichomonas vaginalis* (TV) and *Mycoplasma genitalium* (MG), and HIV. Participants received treatment and were then followed up using phone calls on days 7, 14 and 21 post-enrolment.

Results: Of the 250 participants recruited for this study, 66.7%, 20.5%, 11.6%, and 2.0% were positive for NG, CT, MG, TV, respectively, and 20% (50/250) were HIV-positive. Follow-up visits on days 7, 14, and 21 were completed by 98.8%, 96.0%, and 96.4% of participants, respectively. The majority (94.5%) of participants completed their prescribed treatment regimen. Resolution of symptoms (penile discharge and dysuria) was reported by 76.7% of participants 3-5 days post-treatment while 7.5% reported no resolution of symptoms. The majority (77.2%) reported sexual activity while on treatment; 31.6% of those reported condom use, and 15.1% reported multiple partners. PN was reported by 66.9% of participants; 16.8% of participants reported that they had no intention of notifying their partners.

Conclusions: The prevalence of STIs was high in this group of men with UDS who also reported low condom use and multiple sex partners. While completion rate of follow-up visits was very high, innovative ways to follow-up patients to ensure response to treatment and to incentivize PN are necessary in future STI control interventions.

The Netherlands Chlamydia Cohort Study: Adverse pregnancy outcomes in women with and without a previous chlamydia infection

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Background: Chlamydia trachomatis infections can cause reproductive tract problems, but it remains unclear to what extent past infections are associated with reproductive outcomes such as miscarriages, preterm birth and stillbirth. We assessed these outcomes in women with and without a previous chlamydia infection in women participating in the Netherlands Chlamydia Cohort Study (NECCST).

Methods: NECCST is a cohort of 5,704 women of reproductive age all tested for chlamydia by PCR in a chlamydia screening study between 2008-11. Women were re-invited for NECCST in 2015-16. Chlamydia-status (positive/negative) was defined using results from the screening, CT IgG presence in serum and/or self-reported past chlamydia infections. Data on miscarriages (spontaneous abortion <16 weeks), preterm birth (live birth <37 weeks of pregnancy) and stillbirth (fetal death >15 weeks of pregnancy), was collected via questionnaires in 2019-20. Pregnancy outcomes were compared between chlamydia positive and chlamydia negative women using multivariable logistic regression analyses.

Results: Of 3,517 (61.7%) women enrolled in the third NECCST round, 1,011 (28.8%) were chlamydia positive and 2,052 (58.3%) had been pregnant at least once. In preliminary results of those 2,052 women, 585 (28.5%) had a miscarriage once, 153 (7.5%) had a preterm birth and 18 (0.9%) a stillbirth. Miscarriages and stillbirths were similar among chlamydia positive and negative women, 30.7% versus 28.3% $p=0.280$ and 1.1% versus 0.8% $p=0.590$. Preterm births were more common among chlamydia positive women compared to chlamydia negatives, 9.7% versus 6.6%, $p=0.017$. However, in multivariable analysis corrected for age, education level, migration background, body mass index and smoking, the odds of a preterm birth were not significantly higher for chlamydia positive versus chlamydia negative women, OR 1.37 (95%CI 0.95-1.96).

Conclusion: In the NECCST study we found no indication that past Chlamydia trachomatis infections are associated with an increased risk for miscarriages, preterm births or stillbirths.

Disrupted sexual health care during the coronavirus pandemic in 2020: the impact on STI positivity among sexual health clinic attendees

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Background: Dutch Sexual Health Clinics (SHCs) had to downscale services during the first coronavirus wave, but continued to provide essential STI/PrEP care including testing for persons at highest risk for (symptomatic) gonorrhoea, infectious syphilis (syphilis) and HIV. We describe STI positivity among SHC attendees between 2011-2020.

Methods: National SHC surveillance data contained information on demographics, sexual behaviour, STI testing and diagnoses. We split 2020 into periods: 1 January-12 March (pre-lockdown), 13 March-31 May (lockdown) and 1 June-31 August (post-lockdown). Chlamydia, gonorrhoea, syphilis and HIV positivity (n positive/N tested) trends were explored by gender and sexual contact.

Results: In 2020, weekly numbers of consultations varied between 2,803 and 3,515 pre-lockdown, 564 and 1,298 during lockdown and 1,084 and 1,976 post-lockdown. Relatively more MSM, PrEP users and clients notified for or with symptoms of STI were seen during- and post-lockdown compared to pre-lockdown. Chlamydia positivity was around 18% among heterosexual men and 15% among women from 2016-2019, and increased to 21.1% and 16.6% respectively in 2020. Positivity increased during lockdown, up to 32% among heterosexual men, followed by decreases post-lockdown to pre-lockdown levels. Among MSM, the increase during lockdown was smaller, only slightly affecting overall positivity in 2020. Gonorrhoea positivity also increased during lockdown, causing further increasing trends among heterosexuals from 1.8% in 2011 to 2.2% in 2020 and among MSM from 9.0% to 12.1%. Syphilis positivity among MSM fluctuated between 2.0% and 2.9% in 2011-2020. Positivity peaked (6.7%) during lockdown, while the number of diagnoses was similar to pre-lockdown. In contrast, HIV positivity continued to decrease from 2.0% to 0.3% among MSM in 2011-2020.

Conclusion: Prioritising persons at highest risk caused decreases in diagnoses, especially chlamydia and gonorrhoea, but increases in positivity. More information is needed to understand transmission dynamics, including testing at GPs, self-testing and sexual behaviour during coronavirus pandemic.

Detection of *Treponema pallidum* DNA at various body locations as a proxy for infectiousness

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Background

Syphilis is highly infectious, but it is unknown whether other anatomical sites than the primary infection site contribute to onward transmission. We aimed to evaluate the presence of *Treponema pallidum* ssp *pallidum* (TP) at various body locations of syphilis patients to elucidate transmissibility during various syphilis stages.

Methods

This study was performed at the Sexually transmitted infections (STI) clinic of the Public Health Services in Amsterdam. Eligible were: men who have sex with men (MSM), 18 years or older with clinical signs or symptoms suggestive of syphilis stage 1 or stage 2, and asymptomatic men with a positive syphilis serology. Besides routine diagnostics, anorectal and oropharyngeal swabs, urine samples, and venous blood samples were tested using an in-house polymerase chain reaction targeting the *polA* gene of *Treponema pallidum* (Tp-PCR).

Results

From 2018 to 2019 we included 293 MSM. Seventy patients had primary syphilis, 73 secondary syphilis, 86 early latent syphilis, 14 late latent syphilis, 23 treated syphilis and 27 had no syphilis. Outside of the primary ulcer, TP-DNA was detected in 35/70 among the primary syphilis patients in at least one site (2/70 blood, 7/70 oro-pharynx, 13/70 ano-rectum and 24/70 urine); in 62/73 secondary syphilis patients in at least one site (15/73 blood, 47/73 oro-pharynx, 37/73 ano-rectum and 26/73 urine); and 29/86 early latent syphilis patients in at least one site (5/86 blood, 21/86 oro-pharynx, 11/86 ano-rectum and 6/86 urine). No TP-DNA was detected among the late latent syphilis, treated syphilis or in the no syphilis group.

Conclusion

DNA of *T. pallidum* was frequently detected in various body locations of MSM with primary or secondary syphilis. This is in agreement with the high transmissibility of syphilis.

Value of CLIA seroconversion with negative RPR and immunoblot for the diagnosis of early syphilis.

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INTRODUCTION

An isolated CLIA seroconversion (i.e. CLIA-reactive, immunoblot non-reactive, RPR non-reactive, with a previous negative CLIA) could indicate a false positive result or early incubating syphilis. To confirm early syphilis, follow-up appointments are often needed. We wanted to evaluate the diagnostic value of such seroconversions.

METHODS

We included every patient with a positive CLIA (Liaison) and a negative RPR and immunoblot visiting the STI clinic (To) between January 2014 to April 2020, and a preceding visit with a negative CLIA in the 6 months prior to the initial consultation (T-1). If available, a follow-up appointment in the 2 months after the initial consultation (T1) was included. If darkfield microscopy (DFM) or PCR for *Treponema pallidum* was positive at T0, diagnosis of syphilis was confirmed. This also applied to a positive RPR and/or immunoblot in the T1 consultation.

RESULTS

We included 91 participants with an isolated CLIA seroconversion. The value of the CLIA seroconversion in 19/91 (21%) of the study population could not be established, since they had no positive PCR or DFM ulcer sample at To and had no T1 consultation. Of the remaining 72 patients, 54 (75%) the CLIA seroconversion was confirmed. 28/54 persons (52%) had a PCR or DFM confirmation in the initial consultation and 26/54 persons (48%) had a serologic confirmation in the follow-up appointment. In 18/72 (25%) persons the CLIA seroconversion was regarded as false positive reaction since no seroconversion in RPR or immunoblot was seen at T1.

CONCLUSION

Of the evaluable patients with a CLIA seroconversion, 75% had an early incubating syphilis infection. 48% of these patients would benefit from presumptive treatment, since they had no signs of primary syphilis at the moment of the CLIA seroconversion. However, 25% had a false positive result, thus would receive unnecessary presumptive treatment.

Prevalence and Correlates of Mycoplasma Genitalium Infection Among Gay and Bisexual Men (GBM) in Greater Montréal, Canada (Engage Study)

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Background

Mycoplasma genitalium (MG) infection causes persistent/recurrent urethritis and may contribute to HIV transmissibility. Test availability is limited and screening is not routine. Population-based prevalence data are lacking. We estimated MG prevalence and examined correlates among GBM.

Methods

Using respondent-driven sampling (RDS), we recruited sexually active cisgender and transgender men, ≥16 years, residing in greater Montreal. Participants completed a computer-assisted self-interview and HIV/STI testing. Pharyngeal samples were collected by research nurses, urine and rectal samples by participants. Specimens collected at cohort study visits between 11/2018-11/2019 were analyzed using Allplex™ CT/NG/MG/TV Assay, Seegene Inc. Socio-demographic characteristics, HIV status and numerous factors from the past 6 months (P6M) were explored: HIV pre-exposure prophylaxis (PrEP), sexual behaviors (including group sex, transactional sex), substance use, mental health, and STIs. Correlates were identified using substantive knowledge, statistical significance, and AIC for final model selection. All estimates are RDS-II-adjusted.

Results

Specimens from a total of 717 participants were analyzed. RDS-adjusted prevalence (95% CI) of MG infection at rectal, urethral, pharyngeal, and at least one anatomical site was: 3.0 (1.5-4.5), 1.9 (0.7-3.1), 0.5 (0.2-0.9), 4.7 (2.9-6.6), respectively. RDS-adjusted prevalence (95% CI) (at least one site) of Neisseria gonorrhoeae (NG), Chlamydia trachomatis (CT), and Trichomonas vaginalis (TV) infection were: 5.2 (3.3-7.2), 2.4 (0.6-4.2) and 0.5 (0.1-0.8), respectively. Three correlates of MG were identified: age <30 years (aOR 2.8 [1.4-5.8]), a higher number of sexual partners P6M (> 10, aOR 6.4 [1.9-21.9]), and a chlamydia diagnosis P6M (aOR 2.5 [1.0-6.0]).

Conclusions

Prevalence of MG (at least one site) was twice the level of CT infection and comparable to NG infection. This finding and the information on various correlates (younger age, a greater number of sexual partners, and recent CT infection but not HIV status or PrEP use) may be useful for the development of MG screening guidelines.

Discordant cures are associated with *Mycoplasma genitalium* infection in men treated with azithromycin for nongonococcal urethritis

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Background:

In men with nongonococcal urethritis (NGU), clinicians and patients rely on the resolution of urethritis signs and symptoms to determine the need for additional testing/treatment and when to resume sexual activity, respectively. Whether clinical NGU cure correlates with microbiological clearance across sexually transmitted infections (STI) remains unknown.

Methods:

Within the Idiopathic Urethritis Men's Project (IUMP), we identified men with mono-infection NGU due to *Chlamydia trachomatis*, *Mycoplasma genitalium*, or *Ureaplasma urealyticum*. Men had presented to the Bell Flower Clinic in Indianapolis, Indiana, and were diagnosed with NGU and enrolled in IUMP. Men provided a urine specimen for STI testing by NAAT, received azithromycin 1gm and returned for a 1-month test-of-cure visit. At the test-of-cure visit, men were asked about interval antibiotic use, sexual activity, interval urethritis signs and symptoms, and repeat STI testing was performed. Clinical cure was defined as resolution of urethritis signs and symptoms. Microbiological cure was defined as clearance of STI at the test-of-cure visit. Significance was evaluated by Fisher's exact test.

Results: Seventy-five men were included in this analysis, 52 with CT, 16 with MG, and 7 with UU. Clinical cure occurred in 50-100% and microbiological cure occurred in 31-100% of men. Discordant cures were more common in men with MG than CT (44% vs 15%, $p = 0.102$); no UU discordant cures occurred. Men with MG-NGU were significantly more likely to have a clinical cure with microbiological failure compared to CT-NGU (31% vs 4%, $p = 0.0042$). Clinical failure with microbiological cure occurred in approximately 10% of men.

Conclusions: Discordant NGU cure outcomes do occur and are more common in men with MG-NGU. The most common discordant cure outcome was clinical cure with microbiological failure. In men treated with azithromycin for NGU, MG testing should be included and a test-of-cure considered to ensure STI clearance.

Clinical Performance Assessment of the Alinity m STI Assay

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Background: It is estimated that everyday over 1 million individuals contract a curable sexually transmitted infection (STI) worldwide. For an appropriate STI treatment, it is necessary to have an accurate diagnosis. The Alinity m STI assay is a multiplex RT-PCR assay that identifies four STI pathogens: Chlamydia trachomatis (CT), Neisseria gonorrhoeae (NG), Trichomonas vaginalis (TV), and Mycoplasma genitalium (MG) in a single (115 min) reaction. The aim of this study was to evaluate the assay clinical performance.

Methods: Clinical performance of Alinity m STI assay was assessed using 201 residual clinical samples [119 urine and 82 in gynecological specimens] and compared with Abbott RealTime CT/NG assay and XGEN MULTI UP test (Mobius Life Science) for TV/MG. Precision and reproducibility were evaluated by testing panel members in contrived swab. Five panel members (PM) were tested in 12 replicates in two days: PM1=CT, PM2=NG, PM3=TV, PM4=MG and PM5=CT/NG/TV/MG at 2X claimed LoD.

Results: For CT, the positive (PPA) agreement and negative (NPA) agreements were 95% and 100% respectively. For NG, the PPA was 94% for urine and 100% for gynecological specimens, and NPA was 99% and 100%, respectively. For MG, PPA and NPA were 100%. For TV, NPA was 100% (no positive result obtained). Co-infection with MG was observed in 5% of CT or NG positive samples. The overall agreement for both sample types and the four organisms was 98.5% (516/524). All panel members were detected and accurately identified, individually (PM1-4) or in the presence of the other three pathogens (PM5).

Conclusion: The Alinity m STI assay showed excellent agreement (97-100%) between methods and streamlines laboratory workflow with simultaneous detection of 4 pathogens in a single reaction from the same sample. This assay allows rapid infection identification supporting clinicians to properly treat patients, especially when a co-infection is present.

Tolerability of topical imiquimod against high-risk human papillomavirus infection in men-who-have-sex-with-men living with HIV

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Background:

Men-who-have-sex-with-men (MSM) living with HIV have a high prevalence of high-risk human papillomavirus (hrHPV) in the anus, and a high incidence of anal cancer. We conducted an open-label, single-arm pilot study to assess the utility of imiquimod cream against hrHPV among MSM living with HIV.[ACTRN12617001355369]

Methods:

The study was conducted at Melbourne Sexual Health Centre between April 2018 and June 2020. MSM aged ≥18 years, living with HIV, who tested positive for any anal hrHPV on clinician-collected swabs were eligible. We instructed men to apply 5% imiquimod cream (6.25 mg) intra-anally and peri-anally 3 doses per-week for 16-weeks (Phase 1), followed by a maintenance period of 1 dose per-week for 48-weeks (Phase 2). We collected adverse events (AE) using text messages and questionnaires.

Results:

Thirty MSM were enrolled to phase 1 and 27 completed the week 16 follow-up (median age 50). Twenty-four MSM (86%) applied at least 50% of imiquimod doses. All men reported AE, with 39.5% reporting grade 1, 39.5% grade 2, and 21% grade 3 AEs. Eighteen MSM (67%) required treatment interruption. The reasons for interruption were haemorrhoids (n=3), herpes genitalis reactivation (n=2), and grade 2-3 AEs (n=11) such as irritation, itching and tenderness. 60% of MSM with grade 2 (n=6) and 33% with grade 3 AEs (n=2) opted to continue to phase 2. Eighteen MSM were enrolled to phase 2 and 13 completed the week 48 follow-up. All MSM took at least 50% of doses. No treatment-limiting AEs were reported. 10 MSM in phase 1 (37%) and none in phase 2 reported their sex life was negatively impacted from imiquimod use.

Conclusion:

Intra-anal and peri-anal imiquimod at 3 doses per-week was poorly tolerated over 16 weeks and most men required treatment interruption due to AEs. In contrast, once-a-week application was well tolerated with no treatment-limiting AEs reported over 48-weeks.

ACCEPTABILITY OF SELF-COLLECTED THROAT SWABS AMONG MEN WHO HAVE SEX WITH MEN ATTENDING A SEXUAL HEALTH CENTRE

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Background:

Due to the COVID-19 pandemic, sexual health clinics across Australia have switched from clinician-collected to self-collected swabs for oropharyngeal STI screening. The study aimed to determine the acceptability of self-collected throat swabs among 200 gay, bisexual and other men who have sex with men (GBMSM) attending a sexual health service.

Methods:

GBMSM aged ≥ 16 years old, had a throat swab taken at the Melbourne Sexual Health Centre (MSHC), and provided consent to participate in research, were invited to take this online survey by SMS. The survey collected data on how easy or difficult men found collecting their own throat swab.

Results:

273 GBMSM completed the survey; 218 (79.9%) self-collected their throat swab and were included in the final analysis. Most participants found collecting their own throat swabs very easy, easy, or were neutral (190; 87.2%; 95% confidence interval [95%CI]: 82.0% to 91.3%) and 28 (12.8%; 95%CI: 8.7% to 18.0%) found it difficult or very difficult. There were 85 (39.0%) who reported taking the swab by themselves was worse than previous experiences of clinician-collected swabs, compared to 110 (50.5%) who reported it was better taking the swab by themselves or found no difference to previous clinician-collected swabs. The two most commonly reported experiences during self-collection were gagging (155; 71.1%) and being worried they had not done it correctly (46 out of 95 who were asked this; 48.4%). Almost half of participants preferred to have a clinician take their throat swab (103; 47.5%; 95%CI: 40.5% to 54.1%); 66 (30.4%; CI: 24.3% to 36.8%) did not have a preference and 48 (22.1%; 95%CI: 16.7% to 28.1%) preferred to take the swab themselves.

Conclusion:

Most GBMSM did not find self-collecting throat swabs difficult, however almost half of participants preferred to have a clinician take the swab.

SEXUAL HEALTH SERVICE ADAPTATIONS TO THE CORONAVIRUS DISEASE 2019 (COVID-19) PANDEMIC IN AUSTRALIA: A NATIONWIDE ONLINE SURVEY

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Background:We aimed to examine the changes public sexual health services across Australia made during the national lockdown (March-May 2020) due to the COVID-19 pandemic.

Methods:From July-August 2020, we emailed a link to an online survey to 21 sexual health clinic directors/managers who were part of the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmissible Infections and Blood-borne Viruses (ACCESS) network.

Results:All 20 participating clinics remained open but reported changes during the lockdown, including suspension of walk-in services in 8 clinics.

Some clinics stopped offering asymptomatic screening for heterosexuals (n=11), men who have sex with men (MSM) (n=3), or transgender persons (n=2). Most clinics offered a mix of telehealth and face-to-face consultations for asymptomatic MSM (n=11), asymptomatic transgender persons (n=12), post-exposure prophylaxis (PEP) prescription (n=13) or to initiate pre-exposure prophylaxis (PrEP) (n=14). People who were symptomatic for STIs and contacts of STIs were offered face-to-face and telehealth consultations across all clinics. Seven clinics suspended STI test-of-cure consultations and four clinics suspended hepatitis vaccinations for people not living with HIV. Nineteen clinics reported delays in testing and 13 reported limitations in testing during lockdown. Most clinics changed to phone consultations for HIV medication refill (n=15) with faxed (n=14) or mailed (n=13) prescriptions. Fourteen clinics had staff redeployed to assist the COVID-19 response; 14 clinics reported a reduction in total number of full-time equivalent (FTE) clinical nurses from 74.4 to 45.6 FTE collectively and three clinics reported reduction in FTE clinical doctors, from 20.1 to 17.1 FTE collectively.

Conclusion:Australian public sexual health clinics rapidly pivoted service delivery to reduce the risk of COVID-19 transmission in their clinical settings, managed staffing reductions and delays in molecular testing, released staff to support the COVID-19 response, and maintained a focus on urgent and symptomatic STI presentations and those at higher risk of HIV/STI acquisition.

Age patterns of oral and anal sexual practices among heterosexual males and females: a cross-sectional survey in Melbourne, Australia

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Background: Oral and anal sex practices among heterosexuals are not well-studied. We aimed to explore these sexual practices among heterosexuals attending a sexual health clinic.

Methods: This cross-sectional survey was conducted at Melbourne Sexual Health Centre between March-April 2019. This survey asked questions on oral sex (fellatio or cunnilingus), anal sex and rimming in the previous 3 months among heterosexuals. Age was categorized by: 18-24; 25-34; and ≥ 35 years.

Results: There were 709 participants (333 males; 376 females) who were eligible and completed the survey, with a median age of 26 (IQR: 23-31) and 35% (n=250) born in Australia. Most participants had had vaginal sex (n=677; 95.5%), with a median of 2 (IQR: 1-3) vaginal sex partners, and half did not use a condom (n=358; 50.1%). 148 (20.8%) participants had had anal sex, with a median of 1 (IQR: 1-1) anal sex partner, with 63.5% (n=94) not using a condom. There were no significant differences in vaginal/anal sex partner number or condom use by gender. Being ≥ 35 years was associated with higher mean partner number for anal sex (ptrend=0.021) and being 18-24 years with higher mean partner number for vaginal sex (ptrend=0.027). Most participants (n=637, 89.8%) had received oral sex; this proportion did not differ by age group or gender. Females (n=351, 93.4%) were more likely to perform oral sex than males (n=275; 82.6% males) (p<.001). Females were more likely to have received rimming (26.6% females vs 12.6% males; p<.001) and males were more likely to have performed rimming (25.5% males vs 9.3% females; p<.001). Performing but not receiving rimming increased with age (ptrend=0.011).

Conclusion: Rimming and anal sex are practiced by one fifth or more of heterosexuals. Younger heterosexuals had higher numbers of vaginal sex partners, while older heterosexuals had higher numbers of anal sex partners and were more likely to perform rimming.

Social network distribution of syphilis self-testing among MSMs in China: study protocol for a cluster randomized control trial

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Background: Syphilis is a common sexually transmitted infection (STI) among men who have sex with men (MSM). Increasing syphilis testing is important to syphilis control. However, in low- and middle-income countries like China, syphilis testing rates remain low among MSM. We describe a randomized controlled trial protocol to examine the effectiveness of social network distribution approaches of syphilis self-testing among MSM in China.

Methods: We will recruit index and alter MSM. Indexes will be eligible if they: are born biologically male; aged 18 years or above; ever had sex with another man; are willing to distribute syphilis testing packages or referral links to their alters; and willing to provide personal contact information for future follow-up. Three hundred MSM will be recruited and randomly assigned in a 1:1:1 ratio into three arms: standard of care (control arm); standard syphilis self-testing (SST) delivery arm; and referral link SST delivery arm. Indexes will distribute SST packages or referral links to encourage alters to receive syphilis testing. All indexes will complete a baseline survey and a 3-month follow-up survey. Syphilis self-test results will be determined by photo verification via a digital platform. The primary outcome is the mean number of alters who returned verified syphilis testing results per index in each arm.

Discussion: The trial findings will provide practical implications in strengthening syphilis self-testing distribution and increasing syphilis testing uptake among MSM in China. This study also empowers MSM community in expanding syphilis testing by using their own social network.

Lessons learned from an educational intervention to improve HIV testing by GPs in Amsterdam, the Netherlands

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Background

In the Netherlands, general practitioners (GPs) diagnose 79% of STIs and 36% of HIV infections, but opportunities for earlier HIV diagnosis are being missed in primary care. We assessed changes in GPs' HIV testing behaviour following an educational intervention using competitive feedback, to improve HIV testing in primary care in Amsterdam.

Methods

The educational intervention, open for all Amsterdam GPs, was implemented from 2015 to 2020. The mean annual number of HIV tests per GP from 2011-2019 was calculated using data from diagnostic laboratories for primary care, and stratified by 4-digit postal code (PC4). Questionnaires and semi-structured interviews were conducted to identify perceived barriers and facilitators to HIV testing.

Results

In total, 229 GPs (42%) participated in the educational intervention. Participation varied per PC4 area (median 27%, IQR 0%-60%). At baseline, the mean annual number of HIV tests per GP was similar for participants versus non-participants (26.8 versus 24.7, respectively). The number of tests per GP declined from 2011 to 2014 from 29.5 to 20.7, and increased thereafter to 27.1 in 2019. Testing was highest in PC4 areas with highest HIV prevalence. Qualitative analyses revealed various barriers to HIV testing, including taboo and stigma, a shrinking epidemic, and financial barriers. The use of competitive feedback was perceived as a motivator to improve testing behaviour. Of 59 GPs that completed the questionnaire, 68% stated the programme provided eye-openers, and 72% declared it improved their HIV testing behaviour.

Conclusion

The observed increase in HIV testing coincided with the implementation of our intervention, but there was marked heterogeneity, with testing seemingly associated with local HIV prevalence. Amsterdam is well on its way towards zero new HIV infections, but it will be challenging to keep GPs engaged in proactive testing to prevent late presentations and missed opportunities for HIV diagnosis in primary care.

PrEPped for COVID? Exploring the association between HIV Pre-Exposure Prophylaxis use and COVID-19 experience among MSM

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Background: Pre-exposure prophylaxis (PrEP) is highly effective at reducing HIV acquisition. Studies are underway to investigate the effectiveness of HIV antiretrovirals, including Tenofovir-based PrEP, for treating and preventing COVID-19. We investigated the association between HIV-PrEP use and COVID-19 among men who have sex with men in the UK.

Methods: Participants completed an online survey (23/06/20-14/07/20), including men (cis/transgender), transwomen or gender-diverse people reporting sex with another man (cis/transgender) or non-binary person assigned male at birth. The outcome was COVID-19 experience, defined as reporting a positive test (antigen/antibody) or symptoms of a new continuous cough, high temperature or anosmia following the implementation of UK-wide restrictions ('lockdown' 23/03/20). All participants reporting taking HIV-PrEP since the beginning of the COVID-19 pandemic (12/19) were compared with those who did not. Analysis was performed using logistic regression, adjusting for sociodemographics (age, ethnicity, education, country) and subsequently for behavioural factors during lockdown (relationship status, chem-sex and number of new partners).

Results: Altogether, 1,814 (89.9%) participants reported that they were living without HIV, of whom 253 (14.0%) reported experiencing COVID-19 (positive test or symptoms). Since December 2019, 410 (22.6%) participants reported taking HIV-PrEP, with daily use being lower during lockdown (6.2%) compared with the three months pre-lockdown (14.3%). HIV-PrEP use was positively associated with COVID-19 (crude-OR=1.51, 95%CI=1.13-2.04, p=0.006), including after adjusting for sociodemographics (OR=1.57, 95%CI:1.16-2.11, p=0.005), and after further adjustment for behavioural factors (OR=1.51, 95%CI:1.11-2.06, p<0.01).

Conclusion: There is a positive association between HIV-PrEP use and COVID-19, independent of number of new partners. Our findings may reflect behaviours that increase COVID-19 exposure amongst HIV-PrEP users that are not captured in our analysis. People may also perceive that HIV-PrEP offers them protection against COVID-19. However, until robust evidence is available, people taking HIV-PrEP should adhere to COVID-19 prevention advice.

Developing a symptom-based risk score for infectious syphilis among men who have sex with men

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Background

Syphilis incidence is rising among men who have sex with men (MSM). An online tool based on a risk score identifying men with higher likelihood of infectious syphilis could motivate MSM to seek help. We aimed to develop a symptoms-based risk score for infectious syphilis.

Methods

We included data from all consultations by MSM attending the Amsterdam STI clinic, in 2018-2019.

Infectious syphilis (i.e. primary, secondary or early latent syphilis) was diagnosed according to the clinic's routine protocol. The associations between symptoms and infectious syphilis were expressed as odds ratios (OR), with 95% confidence intervals (CI). Based on multivariable logistic regression models we created several risk scores. We assessed the area under the curve (AUC) and cutoff based on the Youden index. We estimated which percentage of men should be tested based on a positive risk score and which percentage of infectious syphilis cases would then be missed.

Results

21,646 consultations with 11,594 unique persons were conducted. The median age was 34 years (interquartile range 27-45), and 14% were HIV-positive (93% on antiretroviral treatment). 538 cases of infectious syphilis were diagnosed. Associations with textbook syphilis symptoms or signs were strong and highly significant, e.g. OR for a painless penile ulcer was 35.0 (CI 24.9-49.2) and OR for a non-itching rash 57.8 (CI 36.8-90.9). None of the individual symptoms or signs had an AUC >0.55, and the AUC of risk scores varied from 0.68 to 0.69; weighting for size of coefficient did not affect AUC. Using cutoffs based on Youden index, syphilis screening would be recommended in 6% of MSM, and 59% of infectious syphilis cases would be missed.

Conclusion

Symptom-based risk-scores for infectious syphilis perform poorly and cannot be recommended to select MSM for syphilis screening. All MSM with relevant sexual exposure should be regularly tested for syphilis.

How do we measure unmet need within sexual and reproductive health? A systematic review

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Background

Addressing health inequality with sexual and reproductive health requires an understanding of unmet need within a range of populations. This review examined the methods and definitions that have been used to measure unmet need, and the populations most frequently assessed.

Methods

Five databases (PubMed, Web of Science, Scopus, CINAHL and HMIC) were searched for studies that described quantitative measurement of unmet need within sexual and/or reproductive health between 2010 to 2020. A narrative synthesis was then undertaken to ascertain themes within the literature.

Results

The database search yielded 18539 papers; 145 papers were included after screening.

128 studies assessed unmet reproductive health need, of which 94 were analyses of trends among women living in low/lower-middle income countries; 121 used cross-sectional data, with only seven analyses being longitudinal.

Twelve studies analysed unmet sexual health need, of which nine focused on high and upper-middle income populations. All twelve used cross-sectional analyses.

The remaining five studies examined unmet need for a combination of sexual and reproductive health services, all among populations from upper-middle or high income countries and all being cross-sectional analyses.

138 of the papers were analyses of questionnaire data, five used reviews of medical records, one compared demand before and after an intervention, and one used modelling techniques.

113 studies used the DHS definition of unmet need; no other standardised definition was used among the remaining papers.

Discussion

There is a significant focus on unmet need for contraception among women in low income countries within the published literature, leaving considerable evidence gaps in relation to unmet need within sexual health generally and among men in particular, and unmet reproductive health need in high income settings. Additionally, using an increased range of data collection methods, analyses and definitions of unmet need would enable better understanding of health inequality in this area.

How can we enhance the implementation of PrEP? Developing evidence-based and theory-informed recommendations from Scotland's national PrEP programme.

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Background

Widely accessible, acceptable, equitable, HIV pre-exposure prophylaxis (PrEP) services are central to HIV transmission elimination. Multi-stakeholder collaboration, activism and government support enabled Scotland to implement a publicly-funded national PrEP programme delivered through sexual health services from 2017. Although innovations in PrEP implementation occur, they are rarely analysed or consolidated. We address this gap in Scotland by: 1) examining diverse perspectives on barriers and facilitators to the key steps of PrEP implementation (i.e., awareness, access, uptake, initiation, adherence and retention in care) and 2) using implementation science theories to systematically specify transferable ways to improve these steps.

Method

Semi-structured interviews and focus groups (2018-2019) with geographically and demographically diverse sexual health clinic patients seeking/using/declining or stopping PrEP (n=39), sexual healthcare professionals (n= 54), community-based organisation (CBO) service users (n=9) and staff (n=15). Thematic analysis identifying barriers and facilitators to implementing PrEP was complemented by analyses using the Behaviour Change Wheel to specify detailed recommendations for enhancing PrEP implementation.

Results

Barriers and Facilitators to the key steps ranged from: macrosocial (political will, competitive dynamics in the service ecology, structural racism); mesosocial (effective monitoring systems and reporting); to microsocial (staff skills and self-efficacy, low HIV literacy).

Enhancing implementation across the key steps included: incentivising organisations to share expertise (funding mechanisms, equitable partnership work); targeted culturally sensitive, normalising and awareness-raising interventions; co-production of nationally co-ordinated training and patient resources (e.g. for managing side-effects, adherence support, improving cultural competencies); guidance for correct use of event-based PrEP; supporting PrEP provision in diverse settings to reach underserved communities.

Conclusion

Systematic analysis of what had and had not worked, and why has enabled development of wide-ranging but specific recommendations for policy-makers, clinicians, CBOs and individuals to optimise PrEP awareness, access, uptake, initiation, adherence and retention in care. These recommendations could be used to improve all PrEP services.

Does Accelerated partner therapy improve partner notification outcomes for people with chlamydia? The LUSTRUM cluster cross-over randomised control trial.

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Background:

Accelerated partner therapy (APT) is a partner notification (PN) method whereby healthcare professionals assess sex partners by telephone, then send or give the index patient antibiotics and self-sampling kits for their sex partner(s). We determined the effect of APT on proportions of: index patients who test positive for chlamydia at 12-24 weeks (primary outcome) and sex partners treated (key secondary outcome).

Methods:

We did a cross-over cluster-randomised controlled trial comparing APT, as an additional PN method to enhanced patient referral (2018-2019, ISRCTN Reference 15996256). Clusters were 17 UK clinics, assigned in the first period by random permutation. Each period lasted 6 months, with a two-week washout. Participants were heterosexual women and men, ≥16 years with a positive *C. trachomatis* test and/or clinical PID, cervicitis, non-gonococcal urethritis or epididymo-orchitis, reporting ≥1 contactable sexual partner in the past six months. Analysis was by intention-to-treat, fitting random effects logistic regression models.

Results:

All clinics completed both periods. 1536 and 1724 index patients provided data in intervention and control phases. In total, 4807 sex partners were reported, of whom 1636 (34%) were committed/steady partners. Characteristics of index cases and partners were balanced. Overall, 293/1536 (19.1%) of index patients chose APT for a total of 305 partners, of whom 248 accepted. In intervention and control phases, 666 (43%) and 800 (46%) of index patients were tested for *C. trachomatis*; 31 (4.7%) and 53 (6.6%) were positive, adjusted odds ratio (aOR) 0.66 (95% CI 0.41–1.04, *p*=0.07). The proportion with ≥1 sex partner treated was 775 (92.7%) in intervention and 760 (89.3%) in the control phase, aOR 1.43 (95% CI 0.98–2.07, *p*=0.06). There were no significant harms reported.

Conclusion:

The findings suggest a benefit from the offer of APT supplementing enhanced PN. Differences in the outcomes were however small, with lower than expected uptake.

Characteristics and outcomes of people who used Accelerated Partner Therapy for chlamydia in the LUSTRUM cluster cross-over randomised control trial.

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Background:

Accelerated partner therapy (APT) is a partner notification (PN) method whereby healthcare professionals assess sex partners by telephone, then send or give the index patient antibiotics and self-sampling kits for them. We described characteristics and outcomes of people choosing APT in an RCT.

Methods:

We did a cross-over cluster-randomised controlled trial comparing APT, additional to enhanced patient referral (2018-2019, ISRCTN Reference 15996256). Clusters were 17 UK clinics, assigned by random permutation. Each period lasted 6 months, with two-week washout. Participants were heterosexual women and men, ≥16 years with a positive *C. trachomatis* test and/or clinical PID, cervicitis, non-gonococcal urethritis or epididymo-orchitis, reporting ≥1 contactable sex partner in the past six months. Analysis is “per protocol”, using random effects logistic regression.

Results:

1536 index patients were offered APT. They described 2137 partners and selected APT for 305/2137(14.3%). Of these 166/305(54%) were Committed/steady, 85/305(29%) New, 45(15%) Occasional and 9(3%) One-off partners. Common index reasons for declining APT included: preference for face-to-face conversation 400/1832(21.8%), partner already in clinic 388/1832(21.2%), unwilling to engage with partner 206/1832(11.2%), preferring partner to attend clinic 202/1832(11.0%), partner overseas 150/1832(8.2%). Of 241 partners sent APT packs, 119/241(49%) returned chlamydia and gonorrhoea testing samples, of which 78/119(65.5%) were positive, but only 60/241(24.9%) HIV and syphilis samples (all negative). Of 106 index patients offered APT which was accepted ≥1 partners, and tested for chlamydia at 12-24 weeks, only 2(1.9%) were positive. This contrasts with 6.6% (53) in the control arm and 5.2%(29) in index patients not selecting APT or whose partners refused.

Conclusion:

APT may improve PN outcomes but uptake is not universal and varies by partner type. Many index patients preferred face-to-face discussion and/or partners to attend clinic, while many were already attending. The role of APT in optimising PN, index patient care and STI control requires further clarification.

Explaining experiences of Accelerated Partner Therapy partner notification for people with chlamydia in the LUSTRUM randomised control trial: Process evaluation.

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Background:

Accelerated partner therapy (APT) is a partner notification (PN) method whereby healthcare professionals assess sex partners by telephone, then send or give the index patient antibiotics and self-sampling kits for their sex partner(s). APT was implemented within a cluster cross-over randomised control trial in 17 sexual health clinics in Britain (2018-2019, ISRCTN Reference 15996256). We conducted an integral process evaluation to help explain experiences of using APT.

Methods:

Focus groups and telephone interviews with 34 healthcare professionals who delivered APT, and telephone interviews with 15 index patients and 17 sex partners who chose APT. Topic guides focussed on how APT was implemented and overall APT experiences. Data were analysed deductively using a bespoke framework derived from initial conceptualisations of APT, and key trial findings.

Results:

Low uptake of APT was largely because index patients felt it was only suitable for certain types of sex partner. APT was considered best suited to established relationships and not appropriate for relationships with lower emotional connection. However, APT was not always offered by healthcare professionals and many sex partners attended clinic with index patients when they attended for treatment. Nevertheless, those who chose APT felt it worked better than existing options and helped partners overcome barriers to face-to-face care. Most sex partners received APT packs directly from the index patient within a day of consultation; some prioritised taking treatment over self-sampling. Some sex partners reported difficulties in blood sampling (finger-prick) resulting in fewer HIV and syphilis samples being returned than chlamydia and gonorrhoea (urine/vulvo-vaginal swab). Some sex partners did not value testing for infections other than chlamydia/gonorrhoea.

Conclusions:

APT benefits established sexual partnerships with greater emotional connection, by providing treatment rapidly and overcoming barriers to face-to-face care. Targeting of APT combined with interventions to increase sex partner return of self-samples are needed.

Frequency and predictors of repeat infectious syphilis infections in men who have sex with men in the Netherlands

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Background

Syphilis rates are increasing globally among men who have sex with men (MSM). Repeat infections within core groups could contribute to ongoing transmission of syphilis. The aim of this study was to measure the frequency and to explore predictors of repeat infectious syphilis infection among MSM attending Sexual Health Centres (SHCs) in the Netherlands.

Methods

We analysed national SHC surveillance data between July 2014 and December 2019. A unique identifier enabled individual level analysis of repeat consultations and infections. Infectious syphilis (syphilis) included primary, secondary and early latent syphilis diagnoses. Repeat infection was defined as having two syphilis diagnoses during the study period. Multivariable logistic regression analyses were used to explore predictors of repeat syphilis infection. MSM with at least one syphilis diagnosis and one following consultation were included. Age, education level, ethnicity, HIV infection, having symptoms related to syphilis/HIV, being notified for STI, prior STI, condom use and number of partners at first infectious syphilis diagnosis were included in the analysis.

Results

There were 184,621 consultations registered among 41,210 MSM who tested repeatedly. Among 3,504 MSM, 4,282 syphilis infections were diagnosed. At first syphilis diagnosis median age was 39 (IQR: 29-49), 32.4% was known HIV positive and 41.4% had 10 or more partners in the past 6 months. Repeat infection occurred in 647 MSM (18.5%; median time to repeat infection: 468 days (IQR: 287-808)). Being HIV positive (aOR: 2.02 [95% CI: 1.69-2.42]) and being notified for STI (aOR: 1.21 [95% CI: 1.01-1.46]) were statistically significant predictors of repeat infection.

Conclusion

This study showed that repeat infection was common and that HIV infection and being notified for STI at first syphilis diagnosis were predictors of repeat infection among MSM who tested repeatedly. Preventive strategies, including adequate partner management, for repeat syphilis are needed, especially for HIV-positive MSM.

Differences in risk perception and risk behavior between PrEP-using and non-PrEP-using MSM in the Netherlands

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BACKGROUND: Pre-exposure prophylaxis (PrEP) uptake has remained low among men who have sex with men (MSM) eligible for PrEP in the Netherlands, which could partly be due to stigma associated with taking PrEP. Perceptions about PrEP users (e.g., PrEP users have an increased rate of (condomless) sexual encounters) may modify mixing behavior and subsequently affect dynamics of HIV and STIs. We investigated whether HIV and STI risk perception, risk behavior, and partner selection depend on PrEP usage.

METHODS: We analyzed sexual behavior and PrEP data from 426 HIV-negative MSM who participated in the Flash! PrEP in Europe survey in the Netherlands in 2016. We distinguished between current PrEP users (n=29), men interested in PrEP (n=267), and men not interested in PrEP (n=130). We tested differences between these 3 groups in risk perception and sexual behavior variables using ANOVA and Chi-squared test.

RESULTS: Mean age of participants was 42 yrs (range= 18-75); 85% were born in the Netherlands. PrEP users and men not interested in PrEP consider their risk of acquiring HIV low, while men interested in PrEP consider their risk higher ($p<0.001$). Perceived risk of getting infected with STIs is higher for PrEP users and men interested in PrEP ($p<0.001$). PrEP users have significantly more sex partners (mean=53, (SD=95) vs. 13 (20) vs. 3 (6), $p<0.001$), and more condomless sex ($p<0.001$). PrEP users and men interested in PrEP are less likely to refuse to have sex and more likely to have condomless sex with a PrEP user ($p<0.001$).

CONCLUSION: PrEP users engage in sexual behavior with higher risk of STI acquisition than non-PrEP users. Men not interested in PrEP are less open for sexual encounters with PrEP users than men in other groups. Therefore, perceptions of PrEP users and non-PrEP users may change mixing patterns and thus STI dynamics.

Investigating intimate physical contact between partners from different households during the COVID-19 pandemic: findings from a large, quasi-representative survey (Natsal-COVID).

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Background

Physical distancing as a non-pharmaceutical intervention (NPI) to prevent SARS-CoV-2 transmission aims to reduce interactions between people, including between different households. We explored whether sexual intimacy needs impacted on compliance with physical distancing at a population level in Britain following the initial national lockdown on 23 March 2020.

Methods

We undertook the Natsal-COVID web-panel survey between 29 July-10 August 2020. Quota-based sampling and weighting were used to obtain a quasi-representative sample of the British population. We estimated reporting of physical contact outside of the household (PCOH) with a romantic/sexual partner in the four weeks prior to interview, described the type of contact, identified demographic and behavioural factors associated with PCOH and present age-adjusted odds ratios (aORs).

Results

Of the 6,654 participants aged 18-59 years, 9.9% (95%CI:9.9-10.6%) reported PCOH. Of these, 86.1% reported oral/anal/vaginal sex or genital contact, while the remaining reported kissing (10.4%) or only holding hands/hugging/cuddling (3.4%). PCOH varied by age and gender and was highest in those aged 18-24 (20.6% of women and 15.6% of men). PCOH was more likely in participants identifying as gay/lesbian (aOR 2.5; 1.82-3.45) or bisexual (aOR 1.52; 1.12-2.05) and those reporting >1 partner (aOR 1.71; 3.77-5.88) or condomless sex with a new partner (OR 5.03; 1.07-6.21) in the past year. PCOH was less likely in those reporting a steady or cohabiting relationship (aOR 0.66; 0.55-0.79 and aOR 0.11; 0.08-0.14 respectively), and in those reporting bad/very bad health (aOR 0.54; 0.32-0.93).

Conclusion

The intimate nature of sexual contact is high-risk for SARS-CoV-2 transmission and PCOH may expand transmission networks by connecting households. Mathematical models of NPIs might consider age- and gender-specific PCOH in the context of other mixing patterns. Public health messaging needs to recognise the importance of sexual and romantic contact in people's decision-making and adherence to control measures.

Sexual contact with partners outside of household during the COVID-19 pandemic: Investigating motivations and decision-making using Natsal-COVID data

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Background

Worldwide, efforts to control SARS-CoV-2 transmission have included lockdowns and restrictions on contact with others, including sexual partners. Our research (Natsal-COVID) indicates that in the UK, 10% of people aged 18-59 had physical or sexual contact with a romantic or sexual partner outside their household (PCOH) during a period in which contact was limited. We explored motivations and decision-making among people reporting PCOH in the four months following the initial national lockdown on 23rd March 2020.

Method

Semi-structured interviews were conducted with 18 individuals reporting PCOH during a period in which physical distancing measures were in place. Participants were recruited through a large, quasi-representative survey investigating sexual behaviour in the UK during the COVID-19 pandemic (Natsal-COVID). Interviews were analysed thematically.

Results

Participants were single (n=8) or in long-term, non-cohabiting, relationships (n=10). While participants in the two groups differed in their reported motivations for PCOH, all demonstrated complex and individualised decision-making, weighing up risks such as SARS-CoV-2 transmission, judgement of peers, and benefits, including feelings of security and improved mental health. For those in relationships, the primary motivation was continuity: participants expected to continue seeing their romantic partner. Participants rationalised this contact as 'low risk' in relation to other 'risks' of COVID-19 exposure, and reduced other activities (such as shopping, seeing friends) to maintain this contact. For single participants, loneliness and boredom were reported as the primary motivators for PCOH, with dating apps often used to facilitate contact. For both groups, evidence of considered decision-making was clear, with participants referencing government guidance, personal situations, and risk when describing their deliberations.

Conclusion

Individuals did not make decisions about PCOH lightly. However, physical contact with partners was considered important and thus rationalised. Public health policy-makers must therefore consider sexual behaviour and needs for physical contact in designing effective future public health messaging.

Qualitative findings from Natsal-COVID: exploring difficulties and distress within established relationships during COVID-19 pandemic

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COVID-19 related restrictions have impacted the dynamics of romantic relationships, with many cohabiting partners spending more time together and non-cohabiting partners much less. We explored qualitatively, the vulnerabilities (characteristics that decreased resilience) and stressors that impacted intimate relationships following the initial COVID-19 lockdown.

45 semi-structured interviews were undertaken with participants who had completed a national web-panel survey (Natsal-COVID) and agreed to follow-up. Here we draw on the accounts of 19 participants in steady relationships who reported relationship difficulties. Analysis drew on Karney and Bradbury's 'Vulnerability-stress-adaptation' model.

The sample comprised 12 women and 7 men, 13 were living with their partner and 6 were not. Participant's pre-existing attachment, coping, and communication styles shaped their susceptibility to relationship difficulties. The stress of COVID-19, amplified by financial strain and health issues, affected couple's ability to adapt. In live-in relationships, childcare, divisions of housework, and a lack of space in which to unwind and escape from negative behaviours intensified pressures on relationship quality. One participant described these in the context of a violent relationship that worsened during lockdown, which she had managed to leave. Participants who did not live with their partners described struggling with phone/digital communication, physical distance, and a lack of certainty in the future of their relationship. In adapting to 'pandemic life', tensions arose over how much time to spend together. Those in non-cohabiting relationships were torn between balancing risks of COVID-19 against those of not seeing each other, with many reporting feeling they had placed their relationship on hold. For some, their sex life improved their adaptation, while for others it was a further source of stress.

Understanding how existing vulnerabilities interact with a stressful event to shape adaptive processes in couples' relationships might provide insights for counsellors and healthcare providers to better support couples through COVID-19.

Cervicovaginal microbiota species distinctly modulate the immunometabolic microenvironment in a human three-dimensional cervical model

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Background: Bacterial vaginosis-associated bacteria (BVAB) have been linked to gynecologic and obstetric sequelae, including an increased risk of STI acquisition and pre-term birth. However, there is a fundamental gap that exists in understanding the function of these microorganisms in the local microenvironment that contribute to disease. Hence, our objective was to identify immunometabolic signatures of cervicovaginal microbiota species in the context of cervical epithelium that can relate to clinical findings.

Methods: Human three-dimensional (3D) cervical epithelial cell models were infected under anaerobic conditions with *Gardnerella vaginalis*, *Prevotella bivia*, *Atopobium vaginae*, *Sneathia amnii*, a polymicrobial community of BVAB, or health-associated *Lactobacillus crispatus*. Cell culture supernatants were collected 24 h post infection and analyzed using multiplex cytometric bead arrays and ultrahigh-performance liquid chromatography-mass spectroscopy.

Results: *Lactobacillus* and BVAB effectively colonized the surface and crevices of human 3D cervical model visualized by scanning electron microscopy. Immunoproteomics analysis (28 targets) revealed that *A. vaginae*, *S. amnii* and polymicrobial community exert the greatest proinflammatory potentials, whereas *G. vaginalis* and *P. bivia* mostly altered epithelial barrier targets. *S. amnii* also induced proteins related to cellular stress and angiogenesis. The metabolomics analysis yielded 418 known metabolites. Random Forest analysis of metabolic profiles highlighted excellent prediction (93.75%) of infections. Furthermore, *A. vaginae*, *S. amnii* and the polymicrobial community profiles clustered separately from *G. vaginalis*, *P. bivia*, *L. crispatus* and controls. BVAB induced production of biogenic amines in a species-specific manner. *A. vaginae* and *S. amnii* impacted arginine/citrulline metabolism, leading to pro-inflammatory signaling, and induced production of oxidative stress-related metabolites. In contrast, *G. vaginalis* and *P. bivia* altered epithelial barrier through mucin and collagen degradation and potential ammonia production.

Conclusions: We demonstrated the utility of our 3D model to recapitulate the cervicovaginal microenvironment and identified unique and species-specific mechanisms by which BVAB contribute to pathophysiological changes favorable for STIs.

Measuring impacts of COVID-19 on sexual and reproductive health service use in Britain: findings from a large, quasi-representative survey (Natsal-COVID)

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Background

Sexual and reproductive health (SRH) services in Britain shifted rapidly in response to COVID-19 and the first national lockdown. We investigated SRH service access and unmet need in Britain in the 4-months following lockdown (23/03/2020) to inform service delivery during and after the pandemic.

Methods

6,657 participants aged 18-59 years completed a web-panel survey (29/07/2020-10/08/2020). Quota-based sampling and weighting enabled a quasi-representative population sample. We estimated the prevalence of reported SRH service access and failed access, and calculated age-adjusted odds ratios (aOR) for sexually-experienced (≥ 1 sexual partner/lifetime; n=3,065) and sexually-active (≥ 1 sexual partner/past year; n=2,752) participants aged 18-44 years.

Results

20.8% (95%CI:19.3%-22.3%) of sexually-experienced participants reported accessing ≥ 1 SRH service in the 4-months from lockdown. 9.7% (8.6%-10.8%) reported being unable to access a service they needed, though many of these participants (76.4%) also reported successful access. 14.8% (13.1%-16.6%) of sexually-experienced women reported accessing contraception services since lockdown, and this was more likely for younger women (OR, 18-24 vs. 35-44 years: 2.96 (1.95 – 4.49)). Among sexually-active participants, 4.8% (4.0%-5.7%) reported accessing STI-related services (STI/HIV testing and follow-up care) and this was higher in those aged 18-24 years (10.1%). Participants reporting any new condomless partner(s) since lockdown were more likely to report accessing STI-related services (aOR, men: 23.77 (11.55-48.92), women: 10.53 (3.94-28.15)) and, amongst men, to report a failed attempt (aOR 13.32 (5.39-32.93)). Among those reporting STI testing (n=106), 33.4% (24.1%-44.2%) did so online, 31.5% (22.0%-42.9%) by phone, 43.9% (33.4%-55.0%) in-person, and 14.8% (8.3%-25.2%) via video consultation.

Conclusion

Our findings are consistent with SRH services in Britain adapting rapidly in response to COVID-19 and prioritising access for those in need. However, a significant proportion of participants reported difficulty accessing care, suggesting that services may need to adapt further to address and prevent a backlog of need among some high-risk groups.

A cost-neutral rapid STI service implementation providing the right treatment at the right time to improve patient experience and outcomes

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Background: A pilot using point-of-care (POC) technology for men with urethritis symptoms found most patients (80%) prefer same day results. We designed a new pathway for managing these patients.

Methods: Through this pathway, symptomatic men had a nucleic acid amplification test for chlamydia and gonorrhoea (CT/GC NAAT) in clinic, and returned for treatment, usually the same day. Use of Panther (Hologic Inc) at POC provided rapid CT/GC NAAT results within four hours. Microscopy was limited to those testing CT/GC NAAT-negative. GC-culture was sent if GC-positive, when treatment was administered. If CT/GC NAAT-negative and non-gonococcal urethritis (NGU) negative the patient was reassured with information on why they might be experiencing pain (anxiety can increase pelvic floor muscle tone resulting in referred pain and genitourinary symptoms), guided on how to relax their pelvic floor, and advised to re-attend if symptoms persisted.

We compared outcomes (Chi-square) over 6 weeks post-implementation in 2020, to 12 weeks in 2014/15.

Results: Of 265 symptomatic men in the new pathway, 33/265(12.5%) had CT and 30/265 (11.3%) GC, similar to rates ($p>0.5$) in 2014/15 with 59/431(13.7%) and 45/431(10.4%) respectively. 40/264(15.1%) GC-culture specimens were sent, compared to 385/431 (89.3%)($p<0.0001$) in 2014/15.

With our new pathway, 180/265(67.9%) proceeded to microscopy, with NGU diagnosed in 61 (23%) compared to 385/431(89.3%)($p<0.0001$) proceeding to microscopy in 2014/15; with 192/431(44.5%)($p<0.0001$) diagnosed with urethritis; 154 with NGU and 38 with GC. In 2020, 17/265(6.4%) were treated for confirmed *Mycoplasma genitalium*. Total reattendance within 4 weeks of initial presentation was 66/265(24.9%) in 2020 compared to 150/431(34.8%)($p=0.008$) in 2014/15.

Conclusions: The new rapid service resulted in quicker diagnosis with prompt and specific antimicrobial treatment, reducing the cost and inconvenience of unnecessary microscopy and GC-culture. Patient outcomes and management costs have also improved by reducing reattendance. The new pathway facilitates prompt partner notification, minimising onward STI transmission.

Egocentric Analysis of Sexual Partnerships and Partnership Formation in a Military Population

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Military service provides unique opportunities for sexual partnership development. Changes in social networks, geographic relocation, and other bridging opportunities may contribute to the high burden of sexually transmitted infections (STI) in the military. Here we present a statistical analysis of sexual partnerships in a sample of military beneficiaries at five military treatment facilities.

A sample of 821 military beneficiaries completed a computer-assisted self-interview (CASI) cross-sectional egocentric survey of sexual history and individual STI risk factors and a detailed 90-day sexual partner inventory. Additional demographical and clinical data were captured from the electronic medical record. Weighted logistic regression was used to assess the association between risk factors and laboratory-confirmed STI.

669 of 821 (81.49%) subjects submitted at least one partnership survey, yielding data on 1,416 sexual partnerships. Partnerships per respondent ranged from 0-24. Condom or dental dam usage by partnership type (MSM, MSW, WSM, WSW) ranged from 5-32% at last sex act, and was associated with partnership status (main/"steady" versus casual/anonymous) ($p < 0.001$). Partnership mixing on age group, race/ethnicity, and military status each showed statistically significant difference by partnership type (MSM, MSW, WSM, WSW) ($p < 0.001$). Recent STI was not associated with disassortative mixing on age group or military status but was associated with disassortative mixing on race/ethnicity ($p = 0.003$). 194 of 669 (29.0%) subjects reported concurrent partnerships or suspected sexual concurrency by their partner(s). Suspected sexual concurrency by respondents' partner(s) significantly increased the odds of STI in the respondent after adjusting for partnership type ($p = 0.02$).

Military service includes unique social and cultural constructs that may influence sexual partnership formation. While not likely representative of the U.S. military as a whole, these results attempt to identify partnership characteristics and risk factors that may support the maintenance of high rates of select STIs among military populations.

Genomic epidemiology of *Neisseria gonorrhoeae* isolates in Sweden – 2016 national study

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Background

The number of reported cases of gonorrhoea in Sweden continuously increased from an incidence of 7.8 per 100 000 inhabitants in 2009 to 31.4 in 2019. The largest increase in incidence was observed during 2016–2017. No national molecular epidemiological study investigating the population of *N. gonorrhoeae* circulating in Sweden has been performed in the last two decades. Our aim was to examine the antimicrobial resistance (AMR) and genome-based epidemiology, in conjunction to patient epidemiological data, of all gonococcal isolates (n=1279; one isolate per case) from gonorrhoea cases in Sweden during 2016.

Methods

AMR testing was performed using Etest, and MICs were interpreted using current clinical resistance breakpoints from EUCAST. All isolates were whole genome sequenced using Illumina HiSeq X platform. Patient epidemiological data was obtained from the Public Health Agency of Sweden.

Results

The gonorrhoea patients consisted of 252 (19.7%) women and 1027 men (80.3%). The median age of the women was 27.4 years and of the men 32.1 years. Regarding sexual orientation, 619 (48.4%) reported homosexual, 605 (47.3%) heterosexual, 31 (2.4%) bisexual, and 24 (1.9%) did not report. Most prevalent countries of infection were Sweden (n=875, 68.4%), followed by Thailand (n=70, 5.5%) and Germany (n=32, 2.5%).

Overall, the phenotypic AMR was as follows: ceftriaxone and spectinomycin (0%), cefixime (1.7%), azithromycin (1.3%) and ciprofloxacin (51.1%). A high concordance between phenotypic AMR and molecular AMR determinants was found. Results from the genome-based epidemiology are currently in final analysis.

Conclusions

AMR in *N. gonorrhoeae* in Sweden remains low, in particular to ceftriaxone and azithromycin that is recommended internationally for dual therapy. The incidence increases in Sweden appear to be driven by increased spread among men-who-have-sex-with-men but also younger heterosexuals of both genders. This is the first national genome-based epidemiological study for *N. gonorrhoeae* in Sweden and final genomic results are pending.

Online HIV/STI-Clinical Training for Eleven Pacific Island Countries Provided by the UNDP Multi-Country Western Pacific Integrated HIV/TB Programme

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Background

The Pacific Islands have a low HIV prevalence, but high rates of STI's and large high-risk populations. The UNDP Programme supports 11 Pacific Island Countries (PICs). In-country clinical training are provided as well as HIV/TB diagnostics, treatments, and specialist HIV clinical advice. In 2020, in-country support was not possible because of the COVID19 pandemic.

Approach

After discussion with UNDP partners and PICs HIV/STI-healthcare workers, we presented the following online education:

- Monthly webinars. Eight one-hour webinars on Zoom, each repeated 4 hours later as the PICs span 7 time-zones. These case-based educational webinars covered HIV/STI clinical care related topics. Guest speakers were invited for specialist topics.
- In-country HIV/STI-online education workshops run over one-day for nine PICs and over half-day for Niue and Tuvalu, the two smallest PICs. The workshops ran in late 2020 to build on the webinar knowledge and were tailored to in-country needs. Training was mainly case based, co-facilitated by a worker from the Fijian HIV-positive peoples NGO, FJN+, with guest speakers invited for specialist topics.

Outcomes

- Monthly webinars: 323 individual attendances for the 8 webinars. 114 evaluations were returned; 95% found the HIV webinars very helpful and 92% would recommend them to other clinical staff. As poor internet was a problem, the presentation slides and the recorded webinars were sent to the PIC attendees.
- In-country online HIV/STI-education workshops: 241 participants across the PICs. A planning meeting was conducted with each PIC. The average scores in questionnaires pre- and post-training doubled from 40% to 80%. Participants found the case-based training useful and requested follow-up training.

Innovation/Significance:

This is first time in the HIV/STI clinical support to the Pacific has been provided on-line and despite internet challenges, it is an economical and efficient way to provide ongoing HIV/STI clinical education in this remote setting.

The potential role of masturbation in transmitting *Neisseria gonorrhoeae* at multiple anatomical sites among men who have sex with men

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Background: *Neisseria gonorrhoeae* can be cultured from saliva in men with pharyngeal gonorrhoea and could theoretically be transmitted from the pharynx to the urethra when saliva is used as a lubricant for masturbation. To explore this issue, we developed mathematical models for the transmission of *Neisseria gonorrhoeae* at each of oropharynx, urethra and anorectum among men who have sex with men (MSM).

Methods: Model 1 included transmission routes (oral sex, anal sex, rimming, kissing, and three sequential sex practices) we have previously validated. In Model 2, we added masturbation to model 1. In Model 3, we included masturbation but excluded the three sequential sex practices. We calibrated our data to six international studies. We evaluated the model performance using the Root Mean Squared Error (RMSE) and Cohen's d statistic.

Results: Model 2 has significantly higher RMSE than model 1 (p-value <0.01 in five datasets, and p=0.47 in one dataset), but only p-values from two datasets revealed a substantially large effect (Cohen's d > 0.8) compared with Model 1. This suggests performance of Model 1 and Model 2 are similar. In contrast, Model 3 has significantly higher RMSE than both Model 1 and Model 2 (p-value <0.01 for all six datasets), and p-value revealed a large effect (Cohen's d > 0.8 for all six datasets) compared with the two models. This suggests performance of Model 3 is significantly worse than Model 1 and Model 2.

Conclusion: Our findings indicate that masturbation plays a moderate role in the transmission of *Neisseria gonorrhoeae*. Our model also suggests that sequential sexual practices may be more important than masturbation for explaining the site-specific prevalence in men with multi-site infection. Our model predicted that about 1 in 4 cases of urethral gonorrhoea might arise from masturbation if it transmits gonorrhoea.

The role of saliva as a lubricant for masturbation for transmitting *Chlamydia trachomatis* in men who have sex with men

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Background: Masturbation is a common sexual practice and saliva is often used as a lubricant. To date, research into the role of oropharynx and saliva in the transmission of *Chlamydia trachomatis* is limited. We developed three deterministic, population-level, susceptible-infected-susceptible compartmental models to explore the role saliva as a lubricant for both solo and partnered masturbation plays in the transmission of *Chlamydia trachomatis* at multiple anatomical sites among men who have sex with men (MSM).

Methods: Our first model did not include masturbation but included the basic transmission routes (anal sex, oral-penile sex, rimming, kissing and sequential sexual practices) we have previously validated in a published transmission model (Model 1). In model 2, we considered masturbation as a transmission route in addition to Model 1. We used data from five different local and international studies to calibrate the model. We evaluated the model 1 and 2 using the Root Mean Squared Error (RMSE) and then evaluated the magnitude of the effect using Cohen's d statistic.

Results: Model 2 had significantly higher RMSE values than model 1 (p-value <0.01) for all five datasets, and in four datasets the effect size was large (Cohen's d > 0.8). Using the five data sets, model 2 generated an incidence of chlamydia caused by masturbation from 3.9% (95%CI 2.0 to 6.8) to 7.8% (95%CI 4.3 to 15.6) which was primarily due to solo masturbation (estimates of 3.5% (95%CI 1.7 to 6.1) to 7.1% (95%CI 4.0 to 13.1)) with little contribution from partnered masturbation (estimates of 0.3% (95%CI 0.0 to 1.5) to 0.7% (95%CI 0.1 to 4.0)).

Conclusions: Our model suggests that saliva use as a lubricant for solo/partnered masturbation plays a negligible role in chlamydia transmission in MSM.

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.

Do GBMSM's preferences for in-person, telephone or digital sexual healthcare vary according to health concerns and symptoms? A cross-sectional survey.

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Background: As sexual healthcare moves online, it's important to understand the needs and preferences of groups with a higher burden of poor sexual health, to ensure equitable services. We explored gay, bisexual, and other men who have sex with men's [GBMSM] preferences for in-person, telephone, and online provision of sexual healthcare and whether preferences change in the presence of symptoms and/or concerns about STI risk.

Methods: Cross-sectional online survey of GBMSM in Scotland recruited from sexual-social media 12/2019-03/2020 (pre-Covid-19 pandemic). Participants were asked their preferences (or no preference) for accessing appointment booking, providing sexual/medical history, and accessing HIV/STI results in two scenarios: routine check-up (no symptoms/ concerns); and concerned about new symptoms/ possible infection. Data were analysed using Pearson chi-squared, McNemar-Bowker, and post-hoc McNemar tests.

Results: 755 GBMSM participated, median age 39, 71.4% completed higher education, 69.9% were White Scottish. When accessing a routine check-up, proportions preferring in person, telephone and online care respectively were: booking appointments [27/755 (3.6%), 113/755 (15.0%), 520/755 (68.9%)]; reporting sexual behaviour [184/748 (24.6%), 39/748 (5.2%), 382/748 (51.1%)]; reporting symptoms [254/747 (34.0%), 46/747 (6.2%), 308/747 (41.2%)]; reporting medication [163/745 (21.9%), 46/745 (6.2%), 358/745 (48.1%)]; receiving HIV results [200/699 (28.6%), 73/699 (10.4%), 304/699 (43.5%)]; receiving STI results [143/746 (19.2%), 96/746 (12.9%), 361/746 (48.4%)]. A significant proportion of participants' preferences changed across all elements of care measured, when concerned about symptoms or infection ($p < 0.005$). Post-hoc analyses suggest that these changes were mostly attributed to a shift in preference from online to in-person care in the presence of symptoms/STI risk.

Conclusions: In this online-recruited sample of highly educated, older GBMSM, online care was highly acceptable but a significant proportion preferred in-person care in the presence of symptoms/STI risk. Choice in sexual healthcare provision is essential as GBMSM's preferences are not static and appear highly associated with emotional context.

Oropharyngeal gonorrhoea infections among females and heterosexual males with genital gonorrhoea attending a sexual health clinic in Melbourne, Australia

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Background: There is limited evidence about the transmission and prevalence of oropharyngeal gonorrhoea in heterosexuals. From August 2017, Melbourne Sexual Health Centre (MSHC) began testing for oropharyngeal gonorrhoea among heterosexuals with untreated genital gonorrhoea. This study aims to determine the positivity of oropharyngeal gonorrhoea among heterosexuals diagnosed with genital gonorrhoea at the MSHC between August 2017 and May 2020.

Methods: We conducted a retrospective analysis including individuals who had oropharyngeal gonorrhoea testing within 30 days of initial genital gonorrhoea testing. We report oropharyngeal gonorrhoea positivity, stratified by gender and reported contact with gonorrhoea. Chi-square test was performed to compare oropharyngeal gonorrhoea positivity between groups.

Results: Of 617 individuals with untreated genital gonorrhoea, 424 (68.7%) were tested for oropharyngeal gonorrhoea. Oropharyngeal gonorrhoea positivity was 38.9% (95% CI 34.2% to 43.7% [165/424]), and was higher in females than males (45.6% [115/252] vs 29.1% [50/172], $p=0.001$). Furthermore, oropharyngeal gonorrhoea positivity was higher among individuals reporting contact with gonorrhoea compared to those who did not (65.9% [29/44] vs 35.8% [136/380], $p<0.001$). There was no significant difference between females who were sex workers and those who were not (38.5% [30/78] vs 48.9% [85/174], $p=0.126$).

Conclusions: Our data suggests oropharyngeal gonorrhoea infection was common among females and heterosexual males with untreated genital gonorrhoea. The high proportion of unrecognised oropharyngeal gonorrhoea suggests routine oropharyngeal testing will identify a significant proportion with previously undetected oropharyngeal infections. These findings bear important public health implications for preventing the transmission of gonorrhoea by elucidating the necessity for routine screening and treatment among such individuals.

Antibiotic Use and Chlamydia Infection among Women at Reproductive Age in Guangdong, China

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Background:

The overuse of antibiotics accelerates antibiotic resistance. However, limited studies assessed the antibiotic use history and its association with current chlamydia infection among women of reproductive age in China. This study aimed to investigate the recent antibiotic usage pattern and its association with current chlamydia infection among reproductive-aged women (RAW) in gynaecology clinics in Guangdong, China.

Methods:

We conducted a cross-sectional study to recruit women aged between 16 to 55 in Guangdong. All participants were tested for chlamydia by using Nucleic Acid Amplification Testing and finished a computer-based survey containing their self-reported antibiotic consumption in recent 12 months. We described characteristics of participants and recent antibiotic usage patterns based on two different classifications at first. Then we calculated the antibiotics usage rate and analyzed the association between antibiotic use and current chlamydia infection through logistic regression.

Results:

Among 391 recruited women with a mean age of 31.51±6.20 years, 41.2% (161/ 391) of participants self-reported that they used antibiotics in recent 12 months, and the prevalence of chlamydia incidence was 8.2% (32/391). The β -lactam antibiotics (Penicillin, Amoxicillin, ceftriaxone) were the most popular (89.4%, 144/161) among female patients, while the rate of using other antibiotics (Clindamycin, Metronidazole) was the lowest (31.7%,51/391). Additionally, we found that age, histories of pelvic inflammatory disease and reproductive infections, and had clinical symptoms in the recent 12 months were significantly associated with antibiotic usage among RAW. Overall antibiotic use (aOR: 0.32; 95%CI: 0.15-0.94) and using antibiotics under the Access classification (aOR:0.30; 95%CI: 0.07-0.92) were negatively associated with current chlamydia infection.

Conclusion:

This study suggests that a high rate of recent antibiotic use and an inverse association between the antibiotic use and current chlamydia infection among RAW in Guangdong, China. Findings will provide an insight to evaluate the impact of antibiotic use on chlamydia screening.

A mixed-method investigation into challenges in accessing sexual and reproductive health (SRH) services in Britain during the COVID-19 pandemic (Natsal-COVID)

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Background

COVID-19 restrictions led to widespread disruption of SRH services in Britain following the first national lockdown (23/3/2020). One-in-ten people who tried to access SRH services during reported being unable to do so (Natsal-COVID). We used mixed-methods research to quantify unmet need and explore its context and impact.

Methods

6,657 participants aged 18-59 years completed a web-panel survey (29/07-10/08/20). Quota-based sampling and weighting enabled a quasi-representative population sample to be achieved. Quantitative analysis focused on participants' challenges accessing contraception and STI-related services since lockdown. We conducted 23 in-depth interviews with participants, 15 who reported not receiving an SRH service and eight who discussed this in a different topic interview.

Results

Reasons for not receiving STI-related (n=103) or contraception services (n=144) despite need included that appointments were unavailable (STI-related services: 28.6% (95%CI:19.5-39.8)/ Contraception services 36.3% (28.1% - 45.4%)), were cancelled (22.8% (14.9%- 33.3%)/23.9% (16.8%-32.8%) or services were closed (21.2% (13.7%-31.4)/26.1% (19.1%-34.5%). Discomfort with using online/telephone services was more common amongst those not receiving STI-related services 26.0% (17.4%-36.9%) than for contraception services 6.7% (3.4%-12.8%).

Interviewees described how some services were unavailable, while others were disrupted. Many were offered and received alternatives to in-person service (e.g. telephone/online) and some had to use different contraceptive methods. Most understood attempts to limit SARS-CoV-2 transmission and found alternatives convenient, though others saw them as inferior due to interaction limitations. Tenacity was required to access some services. Several participants described how they had avoided or deprioritised their own needs. Fears of contracting COVID-19 and of judgement for having sex against restrictions deterred help-seeking.

Conclusion

While some people were unable to access an anticipated service, many were offered alternatives with varied consequences. Services may need to adapt further to improve access by offering efficient face-to-face and remote provision while emphasising lack of judgement and validating help seeking.

Secondary syphilis in patients living with and without HIV in Cali, Colombia: an immunohistochemistry study

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Background: The upsurge of syphilis cases is a public health threat, particularly in people living with HIV (PLWH). The aim of this case series was to describe the histological and immunohistochemical changes in skin lesions of patients with secondary syphilis (SS) by HIV status.

Methods: Clinical data and skin biopsies from SS patients who were consented and enrolled in Cali, Colombia between 2003 and 2018 were included in the analysis. Clinical data was extracted using a standardized form. Four-micrometer sections of paraffin embedded skin biopsies were stained with haematoxylin and eosin (H&E) or labelled with antibodies to detect CD4, CD8, CD56, CD68, CD138 or *Treponema pallidum* (Tp). Data from PLWH and people without HIV (PWH) were compared using the Fisher's exact test for qualitative variables, the Student's t test or the Wilcoxon rank-sum test for quantitative variables according to their distribution. The Kruskal-Wallis test was used to compare cellular populations according to categories of Tp burden (absent, sparse or moderate to severe).

Results: Of 114 subjects with SS, 28 PWH and 10 PLWH subjects had available skin biopsies. Most participants were male (65.8%), the mean age was 27 years (range 18-60). PLWH were more likely to identify themselves as mestizo (100% vs 52%, $p=0.01$), there were no differences in age, sex, symptoms or signs of syphilis. PLWH were more likely to have acanthosis (70% vs 32%, $p=0.06$) and epidermal hyperplasia (70% vs 18%, $p=0.005$). There were no differences in other H&E findings. PLWH had lower CD4 cells in the skin ($p=0.0001$), without differences in other cellular populations or Tp positivity. There were no differences in the cell counts by categories of Tp burden.

Conclusions: HIV infection was associated with non-specific epidermal hyperplasia and lower CD4 cell counts in the skin, but not with Tp positivity.

Elimination of mother-to-child transmission of HIV and syphilis in the Mercosul countries: a general overview

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Background: Mercosul (Southern Common Market) consists of four countries - Argentina, Brazil, Paraguay and Uruguay – with close economic relations in Latin America. The displacement of people within countries and across borders is frequent observed and needs surveillance and health care implementation for infections that do not recognize borders. The present study aims to presenting the HIV and syphilis overview in Mercosul countries, highlighting the vertical transmission of these diseases.

Methods: We systematically collected data from Mercosul countries in the past two years through Ministry of Health websites, countries national official data and Pan-American Health Organization (PAHO) reports. We compared country data with each other and with the targets set by PAHO elimination of mother-to-child transmission (MTCT) of HIV and syphilis.

Results: The HIV detection in Uruguay and Paraguay had the highest rates, with 29/100,000 inhabitants and 22.8/100,000 inhabitants, when compared to Brazil (17.8/100,000 inhabitants) and Argentina (10.3/100,000 inhabitants). Regarding the MTCT of HIV, Brazil and Uruguay are within the PAHO elimination target ($\leq 2\%$), showing rates of 1.6% and 1.5%, respectively. The syphilis rates have increased significantly in recent years, reaching 75.8/100,000 inhabitants in Brazil, 51.1/100,000 inhabitants in Argentina and 46/100,000 inhabitants in Paraguay. In Brazil, the pregnant rates were 20.8 pregnant women per 1,000 live births (LB) in 2019. The goal of eliminating congenital syphilis ($\leq 0.5/1,000$ LB) was not achieved by any country, with Paraguay having the highest rate (17.9/1,000 LB), followed by Brazil (8.2/1,000 LB), Argentina (1.55/1,000 LB) and Uruguay (1.4 /1,000 LB).

Conclusions: Official national standardization data is an important tool for planning joint actions. These data indicate the need to maximize strategies, especially related to congenital syphilis prevention. Also they reinforce the importance of political commitment from the Ministries of Health and international cooperation for the elimination of MTCT in Mercosul.

TRYPTOPHAN METABOLITES ARE NOT ASSOCIATED WITH DEPRESSIVE SYMPTOMS IN HIV

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Background: This study aims to determine the relationship amongst tryptophan metabolites, inflammation markers, and depression in people with HIV (PWH).

Methods: This is a 12-month prospective study of chronically depressed (PHQ9 \geq 10 for 2+ years) PWH on antiretroviral therapy (ART) to evaluate the effect of baseline plasma tryptophan (TRP), kynurenine (KYN), kynurenic acid (KA) and quinolinic acid (QA) and inflammation markers (hsCRP, IL6, sTNF-RI and -RII) quantified by LC/MS/MS and ELISA, respectively, on depressive symptoms over time. Age/sex/CD4-count matched PWH with PHQ9<5 underwent a single visit for cross-sectional comparisons. Multivariable linear and logistic regression and linear mixed effects models were utilized.

Results: 95 adults were enrolled (48 depressed; 47 control). Median age was 46; 63% men, 35% woman; 2% transgender MTF; 58% black; 36% white; and 6% Hispanic regardless of race. Depressed were less likely to have completed high school/GED (70 vs 91%), were more sedentary (67 vs 18% <10hrs exercise/week) and more likely to smoke (75 vs 19%) (all $p<0.03$). Baseline CD4 count (median 673 cells/mm³), proportion with HIV-1 RNA<20 (77%) and HIV duration were similar (9yrs). Baseline sTNF-RI and -RII were positively correlated KYN, KYN:TRP, QA and QA:KA (all $p<0.01$). hsCRP and IL6 were positively correlated with QA and QA:KA. After adjusting for demographics and factors different between groups, depressed participants had higher inflammatory markers with the exception of IL6 and slightly lower tryptophan metabolites than controls (differences not statistically significant). Higher baseline tryptophan, but not other metabolites nor inflammation markers, was associated with higher PHQ over time ($p=0.04$). Last, none of the markers were associated with depressive symptom remission at 6 or 12 months.

Conclusion: In the context of ART-treated HIV, tryptophan metabolites and inflammation markers were strongly correlated, but neither appear to be related to symptoms of depression.

Giant condylomata accuminata associated with HIV and hepatitis case report

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Giant condylomata acuminata also known as Buschke-Löwenstein tumor (BLT) is a benign, slow-growing, locally destructive cauliflower-like lesion usually in the genital region. The disease is usually locally aggressive and destructive with a potential for malignant transformation. The causative organism is human papilloma virus. The most common risk factor is immunosuppression with HIV; however, any other cause of immunodeficiency can be a predisposing factor. They are prevalent in human immunodeficiency virus (HIV)-infected individuals and sexually active populations at risk for HIV acquisition. Some reports have suggested that immunosuppression is a risk factor for recurrence of a condyloma. Thus, we observed the association for a giant anal condyloma in human immunodeficiency virus (HIV)-positive patient and patient with hepatitis C.

Sexually transmitted diseases (STDs) showed a higher prevalence of hepatitis B, followed by hepatitis C, syphilis and HSV.

We present 2 patients male who practice sex with males and have giant condyloma in anal region. For every patient who is entering at operating room we do the screening for STD and hepatitis and we found out that in these two patients who have a giant condylomata accuminata in the anal region were positive on HIV and hepatitis C.

We performed laser Co2 1064nm excision of the lesion and local cytostatic imiquimod after the threat with laser and send the patients in STD department for the therapy and further investigation regarding health condition.

On the basis of our work and literature, it can be concluded that giant anogenital warts occur in almost one-third of the male population infected with HIV and factors associated with a higher risk of being diagnosed with anogenital warts as a co-infection with Hepatitis B or C.

Key words: Condylomata accuminata, Buschke-Löwenstein tumor (BLT), Hepatitis B, hepatitis C, HIV infection.

The impact of active surveillance and the COVID-19 pandemic on recruitment of research participants with early syphilis in Cali, Colombia

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Background: Syphilis remains as a global public health threat. Understanding the immune response and the molecular variability of Tp is needed for vaccine development. However, most clinical studies do not reach their target sample size. The aim of this study was to describe our experience recruiting early syphilis cases for translational studies in Cali, Colombia.

Methods: The monthly number of enrolled participants (MNEP) was obtained from medical records. Three distinct periods were identified. During period 1 (July-2003 to December-2018) the study personnel visited the staff of 87 health institutions and presented the eligibility criteria. During period 2 (May-2019 to March-2020), in addition to staff visits, the active surveillance (AS) of syphilis test results was conducted and an HIV outpatient clinic (HOC) was added to the network. During period 3 (March-2020 to January-2021) the COVID-19 pandemic reached Colombia. The median and interquartile range (IQR) of the MNEP was calculated. The frequency and proportion of subjects from HIV and AS was calculated for periods 2 and 3. Finally, to assess the association between the proportion of months with 0, 1, 2, 3 or 6 participants and the period the Fisher's exact test was used.

Results: 159 months were included in the analysis. The median MNEP was 1 for the three periods, while the IQR was 0-1, 1-6 and 0-2 for periods 1, 2 and 3, respectively. During period 2 only one (10%) month had zero enrolled participants and three (30%) had enrollment of six participants, while around 40% of the months of periods 1 and 3, had zero enrolled participants and none had 6 ($p=0.004$). During period 2 and 3, 22 (48%) participants were enrolled from AS and 6 (13%) from HOC.

Conclusions: Active surveillance increased the enrolment of patients with early syphilis, and potentially limited the impact of the COVID-19 pandemic.

High rates of syphilis in Brazilian's border strip: a challenge to be addressed

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Background: Infectious diseases do not recognize international borders. Despite the importance of on the border strip in Brazil, the theme has been little explored under the focus of syphilis data. We aim to analyzing syphilis the detection rate of syphilis in the Brazilian border strip.

Methods: A descriptive study including an ecological and cross-sectional evaluation employing data from Brazilian Ministry of health databases for 2019. Cases of Syphilis were available at the National System of Disease Notification and diagnostic and treatment data were available at the Primary Health Care System. The syphilis detection rates per 100.000 inhabitants were calculated. Comparisons data were made between the municipalities in the strip border and the federative units.

Results: The syphilis detection rate in Brazil in 2019 was 72.8/100,000 inhabitants, when the border areas data were analyzed separately the detection rate in the country was 71.6/100,000 and in the border region 91.9/100,000. In the bordering regions, the highest detection rate was observed in the southern region (116.0/100,000 inhabitants), and the lowest in the northern region (55.6/100,000). Brazil had 152,915 cases of acquired syphilis, of which 10,636 (6.9%) were in border areas. A total of 20% of the municipalities had no cases of syphilis and 31.6% had a detection rate above the national average. There are 263(45%) municipalities up to 7,000 inhabitants, 82% up to 25,000 inhabitants and only 11(2%) above 100,000 inhabitants.

Conclusions: Brazil has a high detection rate of syphilis and this rate is even higher when it was considered the strip border in general. Nevertheless, the rates were different when it was compared the borders with different countries. There is a need to improve the countries' capacity to collect high quality data in the coverage of interventions and inequalities and to use this data as a basis for decisions to improve care.

Public policies for syphilis in pregnancy and congenital syphilis in Brazilian border strip

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Background: Congenital syphilis (CS) is a public health issue in Brazil. Despite the importance of on the border strip, the country do not have many data in these areas. Our goal is analyzing the profile of syphilis in pregnancy and CS in the Brazilian border strip.

Methods: We performed an ecological and cross-sectional study using data from 2019. Cases of Syphilis were available at the National System of Disease Notification and diagnostic and treatment data were available at the Primary Health Care System. The syphilis in pregnancy and CS detection rates per 1.000 living-births (LB) were calculated. Comparisons data were made between the municipalities in the strip border and the federative units.

Results: Among the 586 municipalities, 84.8% carry out rapid test, 391(67%) reported syphilis in pregnancy and 396(67.6%) applied benzathine penicillin in primary care units. Regarding CS, 366(64%) municipalities did not report CS cases, 90(17%) had a lower incidence than the national average and 102(19%) had similar or greater incidence. Around 45% of women were diagnosed in the first trimester of pregnancy; this proportion was higher in the southern region (52.6%). Around 80.5% of women received adequate treatment, with no difference between regions. The national detection rate of syphilis during pregnancy was 20.8 cases/1000LB and in border region was 23.3/1000LB. Regarding the CS incidence, we calculated 8.2/1000LB for Brazil and 5.5/1000LB for border region. It is noted that the northern region presented the lowest syphilis rate in pregnancy (19.2/1000NV) and CS (3.7/1000LB) compared to the Midwest (27.9/1000LB and 6,4/1000LB, respectively) and South (24.9/1000LB and 6.6/1000LB, respectively).

Conclusion: The results showed a good performance of care in pregnancy and low rate of CS. Although it is still important diagnostic and treatment implementation to qualify the care in order to reduce the vertical transmission of syphilis in the Brazilian border strip.

Associations between methods of meeting sexual partners and sexual practice among heterosexuals: a cross-sectional study performed in Melbourne, Australia

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Background: The association between meeting partners online and sexual practices has been under-studied in heterosexuals. This study aimed to examine the associations between the methods of meeting partners with sexual practices, as well as sexually transmitted infections (STIs) and human immunodeficiency virus (HIV), in heterosexuals.

Methods: We conducted a survey among heterosexuals attending the Melbourne Sexual Health Centre between March and April 2019. This survey asked about the methods through which participants had met their sexual partner(s), sexual practices and intravenous drug use (IVDU) over the past 3 months. Participants' HIV/STI (chlamydia, gonorrhoea, syphilis) status was obtained from clinical testing. A multivariable logistic regression was used to examine the association between each method of meeting partners and the participants' sexual practices, IVDU, and STI status.

Results: A total of 698 participants (325 males, 373 females) were included in the study. The majority of participants reported using only one method to meet partners (68.3% males, 65.7% females, $p=0.0462$). Males most commonly met partners at social-venues (e.g. bar, pub, party) (38.8%, $n=126$), whilst females most commonly met through friends/family (47.7%, $n=178$). Paying for sex was associated with males meeting partners at sex-venues (AOR=145.34, 95%CI: 26.13-808.51) and the internet (AOR=10.00, 95%CI: 3.61-27.55). There was no association between IVDU and methods of meeting. Social-venues were associated with condomless vaginal sex in males (AOR=3.31, 95%CI: 1.94-5.71) and females (AOR=2.58, 95%CI: 1.61-4.13) and testing STI positive in males (AOR=3.04, 95%CI: 1.24-7.48) and females (AOR=3.75, 95%CI: 1.58-8.89).

Conclusion: Heterosexuals that met sexual partners at social-venues had a more than threefold risk of testing positive for STIs, indicating that heterosexuals may benefit from health promotion campaigns that are delivered through a more public setting.

Impact of screening of *Mycoplasma genitalium* and its macrolide resistance in men who have sex with men living in Australia

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Background: There is rising rate of antimicrobial resistance for *Mycoplasma genitalium* (MG). We examined the impact of various screening strategies on the incidence and prevalence of MG among MSM.

Methods: A compartmental mathematical model of MG transmission among MSM was constructed and calibrated using data from the Melbourne Sexual Health Centre. The model stratified men by symptom status, sexual risk behaviours and whether or not they had MG with macrolide resistance. We simulated the impact on endemic steady-state MG prevalence and incidence of the following screening scenarios, namely screening: 1) no MSM; 2) only symptomatic MSM (the current recommendation); 3) all symptomatic and high-risk asymptomatic MSM; and 4) all MSM.

Results: The model predicts that the overall endemic MG prevalence is 9.1% (95% CI: 7.9-10.0) in the current situation where screening is only offered to symptomatic MSM (base-case). This would increase to 11.4% (95% confidence intervals (CI): 10.2-13.7) if no MSM are offered screening, but would decrease to 7.3% (95% CI: 5.7-8.4) if all symptomatic and high-risk asymptomatic MSM were offered screening and 6.4% (95% CI: 4.7-7.7) if all MSM were offered screening. Increasing coverage of MSM screening strategies shows a similar effect on decreasing endemic MG incidence. When evaluating the simultaneous impact of treatment effectiveness and screening coverage, we found that offering screening to more MSM may reduce the overall prevalence but leads to a higher proportion of macrolide-resistant MG, particularly when using treatment regimens with lower effectiveness.

Conclusions: Based on the available treatment options, offering screening for MG to other MSM (beyond the currently recommended group of symptomatic MSM) could slightly reduce the prevalence and incidence of MG. However, further increasing screening coverage must be weighed against the impact of lower treatment effectiveness, increasing the selection of macrolide resistance, and other negative consequences related to AMR and management.

Preferences for chlamydia testing and management in Hong Kong: a discrete choice experiment

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Background

As most chlamydia cases are asymptomatic, regular screening and timely management is important for chlamydia control. We aimed to determine the preferences of people living in Hong Kong for chlamydia testing and management services.

Methods

An online panel (hosted by Toluna) of sexually active individuals living in Hong Kong completed an online survey with two discrete choice experiments (DCEs). The first DCE examined the preferred attributes of a chlamydia testing service (cost, location, appointment time, speed of results, delivery of results and availability of other STI testing). The second DCE examined the preferred attributes of a chlamydia management service (cost, access to patient delivered partner therapy (PDPT), location, travel time, type of person consulted, and attitude of staff).

Results

A representative sample of 520 individuals participated; average age was 36.8 years (SD 9.9), 40% were males and 66% had a Bachelor's degree or higher. The choice to test was most influenced by cost (free), followed by speed of results (in 14 days), delivery of results (via SMS), extra STI testing, appointment available (same day), and the least important was location of testing (private hospital). The choice to attend for management of chlamydia was most influenced by the attitude of staff (not rude), followed by cost (free), who they consult (specialist), access to PDPT, travel time (less than 30 minutes) and the least important was treatment location (antibiotics sent to home). There was significant heterogeneity in preferences related to age, place of birth, those reporting more than one sexual partner in the preceding six months and gender.

Conclusion

To design effective chlamydia testing and management services, it is important to account for patient preferences. For people living in Hong Kong, cost and staff attitude were the most important factors for deciding whether to test or be managed for chlamydia, respectively.

Association between choice of non-barrier contraceptive and condom use among FSWs in China: implications from a national cross-sectional study

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Background: Condom promotion was primarily to prevent human immunodeficiency virus (HIV) among Chinese female sex workers (FSWs), which may have missed to improve their reproductive health and sexual health holistically. A more complete understanding of FSWs' sexual and reproductive health needs specifically pertaining to the choice of contraceptive would be beneficial to make progress in disease control. This study aimed to better characterize contraceptive use and explore the interaction between contraception and condom use among Chinese FSWs.

Methods: A cross-sectional study was conducted in eight cities throughout 7 provinces in China, 2019. Participants completed a survey including sociodemographic information, sexual behaviors and reproduction measures. The exposure of interest was non-barrier contraceptive use, and the outcome of interest was inconsistent condom use with clients. Multivariate logistic regression and subgroup analysis were conducted to assess the relationship between non-barrier contraceptive use and condom use among Chinese FSWs.

Results: In total, 1229 FSWs participated in the study with a median age of 35 years. 629(51.2%) women reported using non-barrier contraceptives while 586 (47.7%) used barrier contraceptives. Odds of inconsistent condom use was higher (aOR=1.24, 95% CI: 0.99-1.57) among non-barrier contraceptives users than among barrier contraceptives users, but it lacks statistical significance. However, for women in middle-tier venues (aOR=0.66, 95% CI: 0.46-0.96), upper-tier venues (aOR=1.64, 95% CI: 1.14-2.36), and those who completed senior high school or above (aOR=4.07, 95% CI: 2.20-7.52), we observed correlation between inconsistent condom use and non-barrier contraception.

Conclusion: We observed that non-barrier contraceptive users who work in upper tier settings and with higher educational attainment tend to use condom inconsistently. Condom promotion efforts currently focused on HIV and STI prevention among FSWs in China would benefit from considering the contraceptive and reproductive needs of this population.

Keywords: Female sex workers; contraception; condom use; China

Designing HIV testing and self-testing services for young people in Nigeria: A discrete choice experiment

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Introduction

A third of new HIV infections occur among young people and the majority of young people living with HIV are in sub-Saharan Africa. Global scale-up of HIV self-testing (HIVST) could improve testing rates among young people in SSA, who have reported suboptimal HIV testing. We examined the strength of Nigerian youth preferences related to HIV testing.

Methods

Discrete choice experiments (DCEs) were conducted among Nigerian youth (age 14-24 years). Participants completed one of two DCEs: one for preferred qualities of HIV testing (cost, location of the test, type of test, the person who conducts the test, and availability of HIV medicine at the testing site) and another for preferred qualities of HIVST kits (cost, test quality, type of test, extra items and support if tested positive). We use random parameters logit model to quantify the relative strength of preferences and test for preference heterogeneity.

Results

A total of 504 youth participated: mean age 21 (SD 2) years, 38% were men, and 35% had higher than secondary school education. Youth equally preferred HIV testing services in public hospitals and home testing, all other attributes being equal. For HIVST kits, youth preferred the kit to be low cost (up to \$USD1.38), accessible from community health centers, and integrated with self-testing for syphilis and other sexually transmitted infections (STIs). Preferences differed according to age, education level, gender, sexual, and HIV testing behaviours.

Conclusions

We found that there could be demand for HIVST for Nigerian youth, who preferred HIVST kits that integrate testing for other STIs and is accessed from community health centres. These data could inform tailoring of HIV testing delivery services for Nigerian youth, to ultimately increase reach and acceptability.

Sexual Mixing Patterns by Bisexuality Among Male-Female Partnerships in Melbourne, Australia

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Background: Past studies have shown that sexually transmitted infections (STI) may be transmitted across different high-incidence populations in Australia. Bisexual individuals have a higher likelihood of STI transmission between different populations due to their sexual practices. This study aimed to explore the sexual mixing patterns by bisexuality among male-female partnerships attending a sexual health clinic in Melbourne, Australia.

Method: We analysed all male-female partnerships attending the Melbourne Sexual Health Centre (MSHC) together over a 5-year period from 2015 to 2019. Gender and number of sexual partners were collected via computer-assisted self-interview (CASI). We calculated the proportion of partnerships where at least one individual reported bisexual activity (i.e., having both same-sex and opposite-sex partners in the previous 12 months).

Results: A total of 2112 male-female partnerships (i.e. 4224 individuals) were included with a median age of 27 years (IQR 23-31) and 37.5% (1584/4224) were born in Australia. Overall, 89.3% (1885/2112) of male-female partnerships were heterosexual partnerships where both individuals only had opposite-sex partners; however, there were 9.5% (201/2112) of partnerships where one of the individuals was bisexual, and 1.2% (26/2112) of partnerships where both individuals were bisexual. These proportions did not change between 2015-2019. Bisexual men had a higher number of casual sex partners than heterosexual men (median=5 vs 1; $p<0.001$). Similarly, bisexual women had a higher number of casual sex partners than heterosexual women (median=6 vs 1; $p<0.001$).

Conclusion: One in 10 male-female partnerships had at least one individual who reported bisexual sexual activity within the previous 12 months, and bisexual individuals had more casual sex partners than heterosexual individuals. The sexual mixing by bisexuality in male-female partnerships may have significant impact on STI transmission in the heterosexual populations.

Risk of Infertility in Relation to Chlamydia and Pelvic Inflammatory Disease: A Case-control Study in Chinese Population

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Background: Chlamydia trachomatis and pelvic inflammatory disease (PID) are well-known risk factors for female infertility. But there are limited evidence from China. This study aimed to estimate the association between previous/current chlamydia infection, PID and infertility in Chinese population.

Methods: We performed a 1:2 matched case-control study with two control groups: pregnant controls and non-pregnant controls in China in 2019. Women diagnosed with infertility were selected as cases (n=255). Controls were selected based on the following criteria: Pregnant women who were documented in the selected hospitals of the study cities were selected as Pregnant controls (n=510), and people who sought for health care in Obstetric/Gynecologic clinics, Family Planning clinics, Dermatology & STD Department or Urological department for the first time in the past one year were selected as Non-pregnant control (n=510), reported ever having sexual intercourse and willing to be tested for chlamydia. Infertility induced by male factors and people who used antibiotic in vagina within two weeks were excluded. First-stream specimen of urine samples were tested for chlamydia by nucleic acid amplification testing (NAAT). Conditional logistic regression was used to estimate the association.

Results: The prevalence of previous chlamydia infection and PID were significantly higher in cases (2.4%, 17.3%) than in controls (Non-pregnancy: 0.4%, 3.0%; Pregnancy: 0.4%, 9.0%). The current chlamydia infection rates were 5.9%, 7.3% and 7.1% in infertile, pregnant and non-pregnant women, respectively. After adjusting for maternal age, BMI, monthly income, chronic disease and other genital tract infection, PID largely elevated the risk of infertility (Non-pregnancy: adjusted OR=2.41, 95% CI: 1.47, 3.95; Pregnancy: adjusted OR=6.67, 95% CI: 3.42, 12.98), while past chlamydia infection was marginally associated with infertility.

Conclusion: Previous chlamydia infection was marginally associated with infertility, while previous PID was indicated to largely elevate the risk of infertility.

Increased clinician confidence and uptake of event-based PrEP by men who have sex with men during the COVID-19 pandemic

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Background

HIV pre-exposure prophylaxis (PrEP) is an effective, safe strategy to prevent HIV. PrEP can be used either daily or as an event based dosing (EBD) regimen by men who have sex with men (MSM) having condom-less anal sex, however clinicians with expertise delivering daily PrEP often lack confidence delivering EBD-PrEP. During the COVID-19 pandemic, MSM appear to have tailored their sexual behaviour in-line with local social restrictions including the way they use PrEP.

Method

We aimed to investigate the proportion of MSM using EBD-PrEP between October-December 2020 and to survey clinician confidence in delivering EBD-PrEP through an online questionnaire.

Results

551 MSM were seen who were eligible for PrEP in the study period, of which 448 were prescribed PrEP (64-declined, 2-stopped, 8-new patients and 29-repeat attenders accessed PrEP from another source). The median age of PrEP users was 37 years (IQR=29-48). Overall, 94/448 (21%,95%CI=17-25) of MSM were using EBD-PrEP. New starters were significantly more likely to use EBD-PrEP compared to existing PrEP users (34%.v.13%, $\chi^2=27.6, p<0.00001$). There was no significant difference in age between daily and EBD-PrEP users (37years. v.41years, $p=0.2$).

There were 33/38 clinicians who responded to the online survey. Clinicians felt equally confident at delivering daily PrEP as EBD-PrEP (Likert scores=4.4/5 v 4.2/5, $p=0.2$). However, potential barriers identified to providing EBD-PrEP by clinicians were; assessing which MSM would be suitable for using EBD-PrEP, having access to appropriate information for patients to support their understanding of using EBD PrEP; and clinician knowledge and belief in the efficacy of EBD-PrEP.

Conclusion

The uptake by MSM and clinician confidence in discussing EBD-PrEP appears to have increased since the start of the COVID-19 pandemic. Giving MSM greater choice in how PrEP is used will optimise its effect on reducing HIV transmission. More research is needed to support both MSM and clinicians to deliver EBD-PrEP.

Could number of partners be a risk for antimicrobial resistance? Higher macrolide consumption amongst a core group of PrEP users.

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Background: A core group of men who have sex with men (MSM) may sustain the high sexually transmitted infection (STI) prevalence among HIV-PrEP users. Regular gonorrhea/chlamydia screening/treatment in this core group might reduce STI prevalence, but also augments antimicrobial use. Macrolides in particular affect the resistome and may enhance the spreading of antimicrobial resistance. Using data from a single-center randomized clinical trial in our clinic we aimed to assess if PrEP-users with multiple sexual partners used more macrolides than others.

Methods: Between April 2019 and June 2020, 343 PrEP users participated in a trial that assessed if an antiseptic mouthwash could prevent bacterial STIs (NCT03881007). During 3-monthly study visits participants reported their number of casual partners and underwent gonorrhea/chlamydia screening/treatment at the oropharynx, anorectum and urethra. Macrolide use, expressed as defined daily doses per 1000 individuals per day (DID) was compared between individuals with maximum ten versus more partners per three months.

Results: Participants (median age 40.0, IQR 32.0-48.0) contributed for 203.0 person-years. They had a median of 10.0 (IQR 5.6-20.0) partners per three months. Bacterial STI incidence (gonorrhea + chlamydia + syphilis) was 126.6 per 100 person-years. Overall macrolide use was 8.48 DID. Macrolide consumption correlated weakly with number of partners (spearman's rho 0.18, $p < 0.001$). Half (48.5%) of the participants had more than ten partners per three months and accounted for 60.3% of bacterial STIs. At 10.39 DID their macrolide consumption was 1.62 times (95% CI 1.38 – 1.91) that of participants with less partners (6.42 DID) and three times (2.97, 95% CI 2.69-3.27) that of the 2019 general Belgian population (3.50 DID).

Conclusion: PrEP users that undergo 3-monthly gonorrhea/chlamydia screening use a multitude of the macrolides used by the general population. Especially those with over ten 3-monthly partners may be at risk to carry and spread antimicrobial resistance.

Using the Healthcare-OP tool to evaluate the overall cost of introducing an online service for STI and HIV self-sampling

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Background

Online services for STI and HIV self-sampling are increasingly being adopted by sexual health services (SHSs). Exploring the impact on overall cost of introducing a new service can be challenging. We developed a simple costing tool (Healthcare-OP) for use by clinicians and managers to support business case preparation for introducing a new service. Healthcare-OP was used to examine the impact on overall cost for the introduction of an online STI and HIV self-sampling service for asymptomatic clients attending our SHS.

Methods

Client care-pathways were categorised into 16 types based on clinic workflow and estimated duration of consultation. Each pathway was broken down into discrete “processes,” which were costed based on healthcare professional time and costs of tests/consumables. The probability of clients entering each care-pathway and transitioning between “processes” in Healthcare-OP was estimated using 12 months electronic patient record data. Costs were derived from national pay scales and literature. The model did not include costs which remain the same before and after the introduction of online self-sampling service (e.g. diagnostic costs when the service is provided in-house). When the diagnostic tests are provided externally via a commercial provider, we assumed that only 30% or 50% of the test costs (marginal costs) could be released by microbiology.

Results

The average weekly staff cost for managing 227 male and 237 female clients was £3104 and £3075, respectively. 50% of 76 male and 78 female asymptomatic clients using the online self-sampling services resulted in: a weekly cost saving of £261 and £49 respectively when provided in-house, and ranged from a weekly cost saving of £103 to an additional £241 for male pathways and an additional £126–£479 for female pathways when provided externally.

Conclusions

The introduction of online-based self-sampling for asymptomatic patients may reduce the overall cost when provided in-house but not externally.

Frequent detection of *Shigella* in MSM also in the absence of clinical symptoms

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Introduction: Shigellosis can present as a severe infection, including bloody diarrhea. About 22% of reported shigellosis cases in the Netherlands occur in men who have sex with men (MSM). Not all infections result in clinical symptoms and not all persons with clinical symptoms are diagnosed. We performed a study among MSM visiting the STI clinic in Amsterdam to assess the prevalence of *Shigella*.

Methods: From March to June, 2020, Anal swab samples taken from MSM routinely visiting the STI clinic to detect *Chlamydia trachomatis* and *Neisseria gonorrhoeae* were additionally tested pseudonymously for the presence of *Shigella* by PCR on the ipaH gene. Consecutive samples from MSM who reported no diarrhea, or diarrhea during last month, or diarrhea at visit of clinic were included. Predefined minimal numbers of inclusion of these groups were 150, 100 and 50, respectively. During the same months the frequency of *Shigella* as assessed by PCR in routinely tested samples sent by general physicians was assessed.

Results: We included samples from 214 MSM without diarrhea, 109 MSM who recently had diarrhea and 68 MSM who reported diarrhea at visit of the clinic. The total number of samples positive for *Shigella* was 13/389 (3.3%), of whom 6/212 (2.8%) had no diarrhea, 4/107 (3.7%) recently had diarrhea and 3/68 (4.4%) had diarrhea at clinic visit. Positive samples were more frequently found in persons using or recently having used PREP (10/152), compared to no PREP (2/163) or being HIV-positive (1/74) ($p=0.02$, chi square test). In comparison, only 11/774 (1.4%) routinely tested fecal samples sent by general physicians during the study period were positive for *Shigella*.

Conclusion: *Shigella* infections without symptoms or with minor symptoms are relatively common in MSM. More detailed studies should focus on the risk of transmission from these persons to others, leading to symptomatic infections.

Pharmacodynamics of Ceftriaxone, Ertapenem, Fosfomycin and Gentamicin in *Neisseria gonorrhoeae*

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Introduction. Due to ceftriaxone-resistance in *Neisseria gonorrhoeae*, the use of other antibiotics might become necessary for treatment. In the recently performed NABOGO trial, efficacy of ertapenem, gentamicin and phosphomycin was compared with ceftriaxone. In this in vitro study, the pharmacodynamics of these antibiotics were studied.

Methods: The ceftriaxone-susceptible *N. gonorrhoeae* strain WHO-F, the ceftriaxone-resistant strain WHO-X and the clinical strain CS03307 were used. Standard MICs for study antibiotics were measured by e-tests. Using time-kill assays for each antibiotic and strain, time-kill curves were constructed by measuring bacterial growth rates at doubling antimicrobial concentrations. Maximal growth in the absence of antibiotics (Ψ_{max}), minimal (negative) growth in the presence of antibiotics (Ψ_{min}), and concentration of antibiotic resulting in stationary amounts of CFU/ml (zMIC) were calculated.

Results: Ψ_{max} values were between 0.5 and 0.85 and did not vary between strains. Ψ_{min} values for ceftriaxone were -2.7 for the highly susceptible WHO-F strain (MIC= <0.002 mg/l), but only -0.9 for CS03307 (MIC=0.012 mg/l), and -0.8 for the resistant WHO-X strain (MIC=1.5 mg/l). Ψ_{min} values for ertapenem were -1.1 for WHO F (MIC=<0.002 mg/l), -0.9 for CS03307 (MIC=0.006 mg/l), and -0.5 for WHO-X (MIC=0.032 mg/l), reflecting slower bacterial killing than ceftriaxone. All strains were rapidly killed by gentamicin as shown by Ψ_{min} values of -5 to -7 (range of MIC=1.5-3 mg/l). Phosphomycin Ψ_{min} values were -1.7 for WHO-F (MIC=24 mg/l) and CS03307 (MIC=4 mg/l), but only -0.5 for WHO-X (MIC=12 mg/l). For ceftriaxone, zMICs were three- to sixfold lower than MICs, but for other antibiotics, zMICs were comparable to MICs. **Conclusion:** Compared to ceftriaxone, bacterial killing of ertapenem is less rapid and is affected in WHO-X despite low MIC. Given the differences observed between zMIC and MIC, ceftriaxone might not be completely ineffective in ceftriaxone-resistant strains, especially if given in higher and repeated dosages.

Sexual behaviours and Herpes Simplex Virus Type-2 Incidence and Prevalence among adolescent girls and young women in KwaZulu-Natal, South Africa

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Background: Adolescent girls and young women (AGYW) in rural KwaZulu-Natal, South Africa are disproportionately affected by herpes simplex virus type 2 (HSV-2) and HIV. As HSV-2 infection enhances the acquisition and transmission of HIV and other STIs, broader STI control requires understanding of HSV-2 predictors. We therefore assessed how HSV-2 incidence and prevalence were associated with sexual behaviours among AGYW in this region.

Methods: We analysed data from a two-year (2017-2019) prospective cohort study among a random sample of 2184 AGYW aged 13-22 which was representative of the study population. Data were collected at baseline, 12 months and 24 months. We calculated HSV-2 prevalence at any study visit and incidence among those HSV-2 negative at baseline. We ran Poisson and logistic regressions to assess the association of sexual behaviours with both HSV-2 incidence and prevalence.

Results: HSV-2 prevalence was 26.2% among the study population, and was strongly associated with having sexual debut before the age of 16 (adjusted odds ratio (aOR) 1.52, 95% confidence interval (CI) 1.06-2.17) and having two or more sexual partners in the past 12 months (aOR 3.64, 95% CI 1.39-9.50). 307 of 1,433 baseline HSV-2 seronegative AGYW seroconverted during follow-up (incidence rate 16.5/100 person years at risk, 95% CI 14.7-18.4). Self-reported lower age of sexual debut, one or more sexual partners and inconsistent condom use were bivariately associated with HSV-2 incidence. None of these self-reported sexual behaviour measures remained associated with incident HSV-2 after adjusting for socio-demographic, social and biological variables.

Conclusion: The high HSV-2 rates among AGYW particularly those engaging in high-risk sexual behaviours underscores the need for HSV-2 control interventions to slow its spread and other STIs in KwaZulu-Natal. However, further research is required for more targeted interventions due to the lack of association between sexual behaviours and HSV-2 incidence.

A review of Type 2 diabetes and traditional risk factors in a large HIV+ cohort

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Introduction – As antiretroviral therapy (ART) has become more effective, life expectancy of HIV+ patients has increased to normal levels. Therefore, there is an increased risk of developing other age-associated chronic illnesses, including type 2 diabetes (T2DM). Some older ARTs and protease inhibitors may increase the risk of developing insulin resistance and diabetes. This study aimed to measure prevalence of diabetes within a large HIV+ cohort and describe potential risk factors for developing diabetes and factors predictive of a poor outcome.

Methods – A case note review of a 2390-person HIV+ cohort was conducted and people with diabetes were identified. Data on demographics, HIV duration, ART exposure, diabetic risk factors, and comorbidities were collected.

Results – 77 patients within the HIV+ cohort had T2DM. 63 were male (81.8%) and the median age was 59.0 (Interquartile range 54-67). Median time between HIV and DM diagnosis was 16.3 years (IQR 12.4-24.0). The median ART duration was 16.3 years, with a median of 14.5 years from antiretroviral commencement until diabetes diagnosis (IQR 9.8-21.9). 50 (64.9%) had been exposed to protease inhibitors. 17 (22.1%) had a nadir CD4 <200. Many had risk factors for diabetes, 34/74 (45.9%) had BMI >30 and 22 (28.6%) were from minority ethnic groups. Factors associated with diabetic complications included 27 (35.1%) had hyperlipidaemia and 33 (42.9%) had hypertension.

Conclusion– This study shows a prevalence of 3.2% of T2DM within a large HIV+ cohort, similar to the prevalence in the UK adult population. Traditional risk factors were common, and it seems a long duration of HIV infection and long exposure to ARV therapy, particularly protease inhibitors may increase risk. Factors associated with a poor prognosis were frequent, suggesting more aggressive management may be required in HIV+ patients with T2DM. Further research into the outcomes of such patients is needed.

Can a rapid STI sexual health service reduce gonococcal culture testing without reducing culture sensitivity? A service evaluation.

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Background: The Panther (Hologic Inc) was introduced to our specialist sexual health service at point-of-care, which could provide a rapid gonorrhoea (GC) and chlamydia (CT) nucleic acid amplification test (NAAT) result within 4 hours. GC-culture testing was limited to those testing GC NAAT-positive and/or to those who received treatment before the NAAT result was available. We hypothesised that this would reduce the number of cultures and cost, but not reduce the sensitivity of GC-culture. GC isolates are required for susceptibility testing to optimise antimicrobial therapy and for Anti-microbial Resistance surveillance.

Methods: We obtained and compared data on NAATs taken 12 months before and 12 months after the introduction of rapid testing in November 2019. We linked GC-cultures taken within 2 weeks of the NAAT. Chi-square was used to compare proportions.

Results: 23,588 CT/GC NAATs were taken before and 21,588 after the introduction of the new rapid STI service of which 684(2.9%) and 766(3.5%) were GC-positive respectively. GC cultures dropped from 10881 to 6022 after November 2019 with the proportion of cultures to NAATs decreasing from 0.46 to 0.28 ($p < 0.0001$ Chi-square). This proportion decreased over each 4-month period after November 2019: 0.46(3472/7531), 0.29(1999/6950); and 0.08(551/7107) ($p < 0.0001$ Chi-square). There was no significant difference between the proportions of GC NAAT-positive and culture-positive specimens before and after the introduction of the new service: 0.35 (237/684) against 0.35 (265/7660) respectively ($p = 1.0$ Chi-square). The proportion of culture-positive specimens was not significantly different in each 4-month period after Nov-2019: 0.36(91/256); 0.38(102/267) and 0.30(72/243) ($p = 0.12$ Chi-square). 86% of NAAT-positive sites had a culture swab taken in the last 4 months compared to >95% in previous 8 months.

Conclusions: Implementation of the rapid STI service resulted in fewer GC-culture specimens being taken which reduced the cost of GC-culture but with no loss in GC-culture sensitivity overall.

STI PREVENTION IN BLACK MEN WHO HAVE SEX WITH MEN TAKING PREP: CONCERNS, COGNIZANCE, CONDOM NORMS AND MORE

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Introduction: Profound sexual health disparities exist for Black men who have sex with men (MSM) in the US South, including high prevalence of sexually transmitted infections (STIs). STI prevention strategies beyond condoms are needed for Black MSM taking PrEP.

Methods: We conducted in-depth interviews with Black MSM taking PrEP. Informed by the Health Belief Model, we asked about participants' STI knowledge; perceived susceptibility, severity, and concerns; and perceived benefits of STI prevention. We also asked about support systems, condom use norms, and various STI prevention strategies, particularly peer support via an mHealth application. Interviews were audio-recorded and analyzed using directed content analysis.

Results: We interviewed 20 Black MSM ages 18-35. Eight had an STI diagnosis within 12 months; most (n=15) had been taking PrEP for more than one year; 15 identified as gay, 4 as bisexual, and 1 as queer; and 17 had insurance. Participants felt well-informed about STI symptoms, transmission, and treatment. Most had concern about an STI diagnosis, noting shame or disappointment. Potential long-term effects were described as concerning but not frequently considered. Almost all reported strong social support from family or friends. Participants described being less likely to use condoms with routine partners or those on PrEP, noting the norm "had switched from condoms to PrEP." Most were willing to test for STIs more frequently (e.g. monthly), but desired convenience. Most said they would deliver partner therapy and some desired STI education. Although some did not use social media, most felt app-based social support would be helpful.

Conclusion: Black MSM on PrEP voiced concern about STIs but many noted condom use was no longer the norm. They were willing to engage in methods focused on preventing STIs on an individual- or population-level. Most had sources of social support but still desired app-based peer support from other MSM.

IMPLEMENTATION OF ROUTINE HPV TESTING IN MEN

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Objective

Rising awareness of human papillomavirus (HPV) infection in both genders leads to an increasing demand for HPV testing in men. In a previous study, two different collection devices were compared according to their performance and failure rate (CerviBrush and FLOQSwabs®). Since the quality of the specimens was significantly better when taken with FLOQSwabs® (COPAN), all samples in this study were collected with FLOQSwabs® only. Aim of this study was to further evaluate the performance of FLOQSwabs® in a larger cohort to confirm the results already generated.

Methods

In total 632 samples collected using the FLOQSwabs® from the penile, perigenital, pharyngeal and anorectal area were tested for HPV at the Outpatient's Centre for Diagnosis of STIs by using the Greiner Bio-One PapilloCheck® genotyping assay.

Results

HPV prevalence was 49.7 %. The most frequent HPV hr types were 16, 53, 51, 66, 39, 59 and 31. The highest prevalence of HPV hr types was detected in penis (41.5%), urethral orifice and glans penis (39.5%), followed by mons pubis (31.25%). The most prevalent HPV lr types were 6 (16.8%) and 42 (6.6%). The highest prevalence of HPV lr 6 was detected on the scrotum (60%) and the penis shaft (54.5%).

Out of 632 samples tested, 26 led to an invalid result (4.1%) due to a reduced signal for the sample control (SC). A weak PCR performance was observed in 3.5% of all samples tested. Interestingly, PCR failure rate was more prominent among anal specimens (21.1%).

Conclusion

The high prevalence of HPV infections in men shows that routine testing is justified. FLOQSwabs® proved to be the main criterion for a robust HPV analysis allowing sufficient collection of cellular material. Further studies need to be conducted to improve collection and processing of anal samples to increase number of valid anal samples.

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HIV Status Disclosure Among Pregnant Women at a District Hospital in Ghana.

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Background

HIV disclosure plays a critical role in the prevention, treatment, care and support for HIV-infected persons. In the context of PMTCT, disclosure to sexual partners has been associated with improved adherence to antiretroviral therapy, better infant feeding practices, safer sex and increased male partner testing. The objective of this study was to assess HIV status disclosure among pregnant women and explore factors that affect disclosure.

Methods

A cross sectional institutional based survey was conducted at the Suntreso Government Hospital Kumasi from April to May 2020 using a quantitative approach. Data was collected from pregnant women accessing antenatal care at the selected facility using a structured questionnaire and analysed using STATA 18 version.

Results

A total of 118 pregnant women were sampled for the study. Majority (27.97%) of pregnant women were between 21-25 years. More than half (52.54%) were married. Almost a half (48.2%) had at least a secondary school education. HIV status disclosure rate was 37.29% and the most predominant reason for nondisclosure was fear of loss of economic support (28.81%). A third (33.05%) will never disclose their status. 43.22%, believe antiretroviral therapy could prevent mother to child transmission of HIV. Education, parity and reason for nondisclosure were found to be statistically associated with HIV status disclosure.

Conclusion

The high nondisclosure rate among seropositive women in this study highlight the need for interventions that will encourage HIV status disclosure among pregnant women.

Disseminated Gonococcal Infection (DGI) in Seattle-King County, Washington (WA), 2006-2020

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Background: DGI occurs through hematogenous bacterial spread in 0.5-3% of gonorrhea cases. We present a contemporary epidemiologic analysis of DGI in Seattle, King County, WA, USA.

Methods: We used STI surveillance data to identify cases of DGI diagnosed 2006-2020 in King County, WA, USA, and abstracted medical records on 27 cases hospitalized in the University of Washington (UW) system.

Results: Over 15 years we identified 44 cases. After an outbreak of 19 cases in 2006, Zero-three cases were reported annually except in 2007 and 2020 (5 cases each). Overall, 70% were male (N=31). Diagnosis was established by NG culture of synovial fluid (66%, n=29), blood (16%, n=7), aortic tissue (2%, n=1), lymph tissue (2%, n=1), and unspecified site (14%, n=6). There were no cases of meningitis, infection during pregnancy, or death. Among the 27 cases hospitalized at UW, 78% were male (n=21); 59% (n=16) presented with polyarthralgia, 85% (n=23) with arthritis, 37% (n=10) with tenosynovitis; 30% (n=8) had fever, 18% (n=5) had dermatitis, and 15% (n=4) had urogenital symptoms. Most (78%, n=21) had NG-positive and purulent (74%) synovial fluid or facial/tendon culture (WBC IQR=54,550-118,000); bacteremia was uncommon (18%, 5/18). Less than half (41%, n=11) had urogenital NG testing with few positive (18%, n=2). Three of 4 tested had pharyngeal infection and zero of three tested had rectal gonorrhea. Medical management of DGI was highly variable: Although 77% (n=17, 5 missing) had at least 3 days of 1-2g IV ceftriaxone initially; the range was wide (0-28 days, IQR 2-6 days). Subsequent IV and/or oral antibiotic class and total antibiotic duration also widely varied (0-60 days, IQR 2-14 days).

Conclusion: King County experienced a 2006 DGI outbreak with sporadic cases of uncertain relatedness occurring since. Marked variations in the use of diagnostics and clinical management suggest the need for more consistent management.

Disparities and trends in sexual practices and STI positivity among women according to sexual orientation in Melbourne, Australia, 2011-2019

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Objectives: Despite rises in sexually transmitted infection (STI) notifications among Australian women in the previous decade, limited STI surveillance data exists for women by sexual orientation. This study aimed to compare differences in sexual practices and STI positivity among women by sexual orientation, and whether these changed over time.

Methods: In this retrospective repeated cross-sectional study, women attending the Melbourne Sexual Health Centre for the first time between 2011-2019 were categorised as 'bisexual', 'lesbian' or 'heterosexual' according to sexual practices in the previous 12 months. Demographic information, sexual practices and STI positivity were compared between the three groups and over time.

Results: 36,147 women (2,618 bisexual, 534 lesbian and 32,995 heterosexual) were included. Bisexual women reported more sexual partners (median=6; IQR=4-10), followed by heterosexual (median=3; IQR=2-5) and lesbian (median=2; IQR=1-4) women. A higher proportion of bisexual women consistently used condoms with casual male partners compared to heterosexual women (20.4% vs 15.9%; $p<0.001$). Consistent condom use with casual male partners decreased over time in heterosexual women, (19.9% in 2011 to 15.2% in 2019, $P[\text{trend}]<0.001$) but not in bisexual women. Bacterial vaginosis was more common in lesbian women (14.8%) than in bisexual (11.8%) and heterosexual women (7.7%) ($p<0.001$). Chlamydia was more common in heterosexual women (9.3%) than in bisexual (6.6%) and lesbian women (1.2%) ($p<0.001$). Syphilis was more common in heterosexual women (1.0%) than in bisexual (0.3%) and lesbian women (0.0%) ($p=0.004$). Over time, chlamydia positivity in lesbian women increased (from 0.0% to 2.7%, $P[\text{trend}]=0.014$), and syphilis positivity in bisexual women increased (from 0.0% to 0.7%, $P[\text{trend}]=0.028$), but positivity of these STIs did not change in other groups.

Conclusion: Sexual practices and STI positivity differed according to the sexual orientation of women. Knowledge of these differences is important to account for future changes in STI trends that may occur in these subpopulations.

HIV status is not associated with *Treponema pallidum* burden in early syphilis cases in Cali, Colombia.

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Background: The re-emergence of venereal syphilis cases is a public health concern, particularly in people living with HIV (PLWH). There is conflicting evidence whether or not *Treponema pallidum* (Tp) burdens are higher in early syphilis (ES) patients with HIV. The aim of this retrospective study was therefore to compare Tp burdens in blood and tissues of PLWH and people without HIV (PWH).

Methods: Patients with ES were consented and enrolled in Cali, Colombia between 2003 and 2020. Age, sex, HIV status and Tp *polA* results were extracted from available clinical and laboratory records. Data from PLWH and PWH were compared using Fisher's exact test for qualitative variables and Wilcoxon rank-sum test for age at time of diagnosis. The natural logarithm of *polA* copies/uL was regressed on HIV status and *polA* geometric mean ratios (GMR) and corresponding 95% confidence intervals (95%CI) were generated. **Results:** Of 188 subjects with ES, 22 PLWH and 72 PWH had available *polA* results in blood or tissues. PLWH were more likely to be male (84% vs 50.6%, $p=0.005$). There were no differences in age (range 18-62) or ethnicity between PLWH and PWH. There were no differences in the proportion of patients with *polA* positivity between groups in blood (72% vs 55%, $p=0.269$), skin (64% vs 57%, $p=0.763$) or mucous membranes (67% vs 67%, $p=1.000$). There were also no differences in the geometric means of *polA* copies in the blood (GMR=1.8, 95%CI 0.5-6.0, p -value=0.339), skin (GMR=2.8, 95%CI 0.4-21, p -value=0.307) or mucous membrane samples (0.001, 95%CI 0-27, $p=0.284$).

Conclusions: HIV status was not associated with higher *polA* Tp burdens in blood or skin in subjects with early syphilis.

Scale-up of a novel testing service: Examining how public health policies impact the context for ongoing program implementation

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Background: The role of macro-level contextual factors (e.g., healthcare system configuration, legislation, policy) in program implementation is well-documented, yet their changing function throughout all implementation phases is less established. We examined contextual factors shaping the ongoing implementation of GetCheckedOnline—an internet-based testing program for sexually transmitted and blood-borne infections (STBBIs) available since 2014 in British Columbia, Canada.

Methods: An institutional ethnography approach was used to examine how the work processes of scaling-up the service were organized. Data were collected April 2019–February 2020, including interviews (n=25), meeting observations with implementers of GetCheckedOnline, and analyses of key documents (e.g., provincial policies, progress reports).

Results: The provincial 2012 HIV framework emerged as central to the tasks of implementing sexual health services. We uncovered a disjuncture in implementers' continued task of extending the regional reach of innovative STBBI programming. On one hand, implementers actively sought regional scale-up, but on the other, their work was limited by the parameters set within HIV targeted funding and the service implementation challenges brought by underfunded comprehensive sexual health care provision. Between 2014–16, the HIV framework enabled implementers to identify the conceptual, financial, and operational means for program scale-up. The work of interdisciplinary teams formed for the rollout of the HIV framework supported further regional expansion in 2019. However, implementers' efforts to continue to expand STBBI testing services were limited by policy, fostering co-testing only when centred around HIV and having to administer tight, targeted funds.

Conclusion: Our findings reveal that targeted policy premised on biomedical HIV exceptionalism paradoxically opens opportunities for scale-up of STBBI programming while closing other possibilities over the implementation cycle. This study underscores the need for policy frameworks not to remain static, draws attention to the ways in which policy can foreclose public health service availability, and encourages ongoing critical policy scrutiny to promote change.

Impacts of the COVID-19 pandemic on accessing needed sexual health services during March–July 2020 in British Columbia (BC), Canada

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Background: The COVID-19-pandemic impacts on sexual health services access have not been fully examined. We sought to describe characteristics associated with unmet sexual health needs and access barriers during the initial pandemic phases in BC, Canada.

Methods: An anonymous online survey about sexual health service needs and access was administered from July 21–August 4, 2020 to clients ≥ 16 years old who had visited the BC Centre for Disease Control's sexually transmitted infections (STI) clinic and/or GetCheckedOnline testing service in the year prior to March 2020. Using logistic regression, we reported univariate odds ratios (OR) with 95% confidence intervals [95% CI] for characteristics associated with unmet sexual health needs (i.e., not accessing needed services) during March–July 2020.

Results: Of 1198 respondents, 59% ($n=706$; median age: 32 years, 71% White, 47% women, 27% men having sex with men only (MSM)) reported needing sexual health services since March 2020, of which 52% (365/706) did not access needed services. Women ($OR=1.37$ [1.01–1.86]) were more likely to have unmet sexual health needs, while MSM ($OR=0.37$ [0.23–0.61]) were less likely to. Participants needing routine STI testing were more likely to report not accessing services ($OR=2.49$ [1.64–3.79]), whereas those needing birth control ($OR=0.48$ [0.30–0.75]), HIV pre-exposure prophylaxis ($OR=0.39$ [0.22–0.66]), or treatment for a new STI ($OR=0.40$ [0.21–0.76]) were less likely to report not accessing services. Most common reasons for avoiding/delaying service access were: concern about getting COVID-19 while at or traveling to a clinic/lab (249/689, 36%), public messaging against seeking non-urgent healthcare (239/689, 35%), and closure of usual place of service (182/689, 26%).

Conclusion: BC sexual health service clients experienced numerous barriers in accessing needed sexual health services during the initial pandemic phases. Offering alternative service delivery methods and more nuanced public health messaging may help address the identified barriers to improve access.

Acceptability of alternative sexual health service delivery methods during the COVID-19 pandemic in British Columbia (BC), Canada

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Background: In response to the COVID-19 pandemic, sexual health services have started to implement alternative service delivery methods that reduce in-person contact (e.g., telemedicine, virtual health). We sought to understand acceptability of alternative service delivery methods among sexual health service clients in BC, Canada.

Methods: We used data from an online anonymous survey administered from 21/07/2020-04/08/2020 to clients (aged ≥16 years) who had used the BC Centre for Disease Control's sexually-transmitted infection (STI) clinic and/or the GetCheckedOnline testing service in the year prior to COVID-19 public health responses (03/2020). We described participants' likelihood of using potential alternative sexual health service delivery methods, and conducted bivariate analysis to examine its association with experiencing any sexual health service access barriers during the pandemic.

Results: Of the 1198 survey participants (aged 17-76 years), 48% identified as men, 47% as women, and 5% as another gender; 71% identified as White, 24% as racialized minorities, and 4% as Indigenous. Overall, support for using alternative STI testing models was high, with 88% likely to use at-home self-collection kits and 79% likely to use an express testing model (i.e., phone/video triage prior to specimen collection at a clinic). More participants were likely to discuss sexual health with a healthcare provider over the phone (64%), compared with video visits (53%) and text (49%). Text messaging to receive STI test results and reminders were of high interest (71% and 63% likely to use, respectively). Likelihood of using alternative service delivery methods did not differ by participants' experience of access barriers, where 66% of total participants reported having avoided/delayed seeking services during 03/2020-07/2020.

Conclusion: Likelihood of using potential alternative sexual health service delivery methods was high overall, including among participants who did not avoid/delay seeking services. Sustaining and expanding such services would facilitate access during and beyond the COVID-19 pandemic.

Repeated, low dose Chlamydia infections trigger aberrant immune responses and enhanced tissue pathology

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Introduction:

Chlamydia trachomatis (Ct) infections severely impact women's health due to pelvic inflammatory disease (PID), and, for unclear reasons, repeated infections are correlated with severity. Contributions from animal studies, using a single inoculation, have imparted valuable findings, but utilizing a repeated infection model could expand the understanding of Ct driven tissue damage. We hypothesize that, compared to single infections, repeated Chlamydia infection dysregulates the immune response, and results in more severe pathology.

Methods:

We inoculated mice with *C. muridarum* (Cm) using the conventional, single dose (1 dose of 6×10^5 IFU; 1X), or repeated, low dose infections with the same cumulative number of bacteria (5 doses of 1.2×10^5 IFU; 5X), and assessed the cellular, molecular, and pathology indicators of their immune response on days 10, 23, and 30 post-initial infection.

Results:

Following 5X infection, pathology severity, indicated by oviduct cyst diameter, was significantly increased compared to the 1X group. This increase was associated with significantly elevated neutrophilic influx and pro-inflammatory cyto/chemokine concentrations in the genital tracts of 5X, but not 1X, infected animals, denoting differential host responses. IgG1 levels were markedly higher in the 5X group, while IgG2a levels were significantly higher in the 1X group, suggesting a skewed Th2 response in the 5X group, indicating a potential mechanism of pathology development following repeated infections. Variances in bacterial burden did not account for these differences, as both groups had similar levels of bacterial shedding.

Conclusions:

Repeated Cm exposure induces a distinct molecular response, triggering maladaptive neutrophil recruitment, leading to a pathogenic modulation of T helper responses that promote tissue damage. These findings demonstrate the potential of repeated infection models to provide insight into the immune and pathology states in humans, and may be of value in elucidating, and targeting interventions to, host mediators of tissue damage during Ct infection.

Sexually Transmitted Infections in Women Victims of Sexual violence in Vitoria, Brazil

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Background: Sexual violence increases the risk of sexually transmitted infections (STI) and pregnancy, which makes it essential to approach them as part of an integrated healthcare. The goal of this study was to analyze the frequency of STI and its prophylaxis in women victims of sexual violence.

Methods: A retrospective cohort study including adolescent and adult women assisted in referral clinic was performed in Vitoria, Brazil. Clinical records were reviewed from 2010 to 2019. Prevalence rates were calculated using data from STI diagnostic at the first visit and incidence rates using diagnostic from the follow-up visit.

Results: Data from 814 women were reviewed. Most of them were adolescent (42.7%) and single (79.2%), the mean of sexual partners was 3.1 (SD±2.8), one third have not had the first sexual intercourse yet. Rape was the predominant type of sexual violence (90%), mainly perpetrated by one aggressor, unknown person in 46%. Recurrence of the aggression was observed in 24%. STI prophylaxis was performed in 44.3% and emergency contraception in 39.8%. The prevalence rates detected were 0.5% of syphilis and 0.1% of hepatitis B (HBV). Incidence rates were 1.2% of syphilis, 0.8% of HBV, 1.0% of hepatitis C and 1.9% of trichomoniasis. There were no cases of HIV. Physical violence and several partners increased the chance of syphilis by 15.9 times ($p=0.048$) and 1.3 times ($p=0.040$), respectively. Incidence of hCG positive test was 29.6%; 88.3% of women requested a legal termination of pregnancy and 67.7% did it. Receiving emergency contraception prophylaxis decreased in 85.6% the chances of pregnancy ($p<0.001$).

Conclusion: STI prevalence and incidence were low, even though STI prophylaxis has been performed in less than half of the women. These results emphasize the need of implementing public policies and strategies that guarantees the access to the sexual and reproductive rights in Vitoria.

Role of neighborhood factors on racial/ethnic differences in sustained HIV viral suppression among Ryan White Program clients in Miami, 2017

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Background: Neighborhoods characterized by adverse socioeconomic factors may be associated with poor HIV care outcomes, including viral suppression, which varies by race/ethnicity. Health disparities are observed among racial/ethnic minorities in disadvantaged neighborhoods. Moreover, once a person is virally suppressed, it is imperative that suppression is sustained long-term to reduce risk of secondary transmission and disease progression to AIDS. Therefore, the study's objective was to examine the effect of neighborhood factors on the association between race/ethnicity and sustained viral suppression.

Methods: A cross-sectional study was conducted using 6,491 people with HIV from the Miami-Dade County Ryan White Program dataset, in 2017. Neighborhood level data was collected from the American Community Survey. Indices were created using exploratory and confirmatory factor analysis for psychosocial and neighborhood level data. Multilevel mixed effects modeling was used to examine the effects of neighborhood characteristics on the association between race/ethnicity and sustained viral suppression (<200 copies/ml on all viral load test in a given year).

Results: Three neighborhood indices were created (socioeconomic disadvantage index, residential instability index, racial/language homogeneity index), and were categorized into tertiles (low, moderate, high). Significant differences in race/ethnicity was observed within each neighborhood tertiles. Non-Hispanic Blacks had lower odds of sustained viral suppression in neighborhoods characterized by low socioeconomic disadvantage (adjusted odds ratio [aOR]: 0.39; 95% confidence interval [CI]: 0.20-0.74), moderate residential instability (aOR: 0.31; 95% CI: 0.15-0.65), and low racial/language homogeneity (aOR: 0.38; 95% CI: 0.16-0.88) and high (aOR: 0.38; 95% CI: 0.19-0.75), when compared to non-Hispanic Whites. Haitians also exhibited poor outcomes in moderate residential instability (aOR: 0.42; 95% CI: 0.18-0.97) and high racial/language homogeneity neighborhoods (aOR: 0.49; 95% CI: 0.26-0.93), when compared to non-Hispanic Whites.

Conclusions: Racial/ethnic differences in rates of sustained viral suppression exist in different neighborhood characteristics. Findings indicate that neighborhood factors might affect optimal care for minorities.

Assessment of Changes and Coping Mechanisms in a Large, Stand-alone HIV Testing Centre, in India, During the Covid-19 Pandemic.

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Background- The sudden emergence of the unprecedented Covid-19 pandemic, saw the world grappling with a never-before crisis situation in all walks of life. The repercussions were many, and each country, and discipline of medicine, handled it in the best way possible. Our HIV testing laboratory, catering to the large population of Delhi and neighboring states, faced many challenges and handled them, during the pandemic, which are discussed.

Methods- The study-setting is the stand-alone Integrated Counseling and Testing Centre (ICTC) for HIV, located in the capital city of New Delhi, India. The study period included a full year from March 2020 to February 2021, when the Covid-19 pandemic hit the country. Various aspects of the changes in our HIV testing facility during the lockdown were studied, including- changes in footfall, demography of clients, availability of staff and supplies, numbers tested for HIV, HIV positivity and Covid-19 patients tested for HIV.

Results- The study yielded mixed results, with some parameters showing a decline (numbers tested, female to male ratio, fall in numbers of children and elderly tested for HIV, fall in laboratory errors), some parameters remaining the same (kits and supplies, HIV positivity percentage of 2- 4 %), and some other parameters showing a distinct increase in numbers (efficiency of laboratory staff as measured by fall in errors, improvement in competency assessment scores, attendance in training programs and compliance with standard precautions, documentation and record keeping). A totally new parameter included in this study was the testing of Covid-19 positive patients for HIV, with a positivity of 2.08%.

Conclusion- In conclusion, this study yielded some interesting revelations on various aspects of working in an HIV testing laboratory. It has clearly demonstrated that adversities can be used as opportunities for improvement in work ethics, documentation, service providing skills and practice of universal work precautions.

Antigenic variation in a primate model of persistent *Mycoplasma genitalium* infection

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Background:

Mycoplasma genitalium persists in the genital tract for months despite the presence of specific antibody that reacts with the immunodominant MgpB and MgpC adherence proteins. MgpB and MgpC undergo antigenic variation via recombination between the mgpBC expression site and archived variable sequences present in nine MgPar sites located around the genome. The objective of this study was to determine if antigenic variation occurs in our pig-tailed macaque model of persistent cervical infection, if variants arise coincident with the appearance of antibodies specific for MgpB and MgpC, and if variation correlates with persistence.

Methods:

MG was cultured from persistently infected primates over 18 weeks. Whole genome sequencing was performed on these MG cultures using Nanopore sequencing technology then compared to the MG reference genome and to in vitro passaged bacteria.

Results:

Antigenic variants arose in the variable regions of MgpB and MgpC in infected primates but not during in vitro passage in broth. Variants were abundant in primates with persistent infection, and dynamic with different variants predominating at different time points. The sequence changes observed were consistent with reciprocal exchange of variable regions between the expression site and MgPars. Antigenic variants were not detected in a primate that cleared the infection after four weeks, suggesting that variation is required for persistence.

Conclusion:

Antigenic variation of the MG MgpB and MgpC proteins occurs frequently in vivo and is associated with persistence in the genital tract of female pig-tailed macaques. Future work will measure antibody reactivity to specific variable and conserved regions within the MgpB and MgpC proteins to correlate the appearance of antibody to specific sequences with clearance from the genital tract.

HIV partner notification among MSM living with HIV in Guangdong Province, China: Findings from a cross-sectional study

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Background:

HIV partner notification is critical in preventing HIV transmission, but not widely used in many low and middle-income countries, including China. We conducted a cross-sectional survey to investigate the usage of partner notification (PN) for MSM living with HIV in China, and to identify factors that could influence their PN decisions towards different types of sexual partners.

Methods:

The study recruited MSM who were diagnosed as HIV positive in the past two years in six cities of Guangdong province, China. All participants were ≥ 18 years old and informed consented. Descriptive analysis was used to report the partner notification rates among different types of sexual partners, along with the top facilitators and barriers for PN. Logistic regressions were used to examine correlates of PN.

Results:

Among 5799 MSM with HIV, 1376 clicked the link and 944 completed the survey. Mean age was 29 (SD:7.6) and 674 (70.8%) identified gay. Overall, 65.1% (300/461), 46.4% (194/416) and 54.5% (30/55) notified at least one of their stable, casual, and female partners, respectively. 26.7% (165/617) of the stable male partners tested as HIV positive, while 6.8% (74/1091) of the casual partners tested positive. Important facilitators included stepwise disclosure to friends and HIV support groups, relational intimacy, and anonymous notification, while important barriers included anticipated HIV stigma and fear of discrimination.

Conclusions:

This study presents the most updated HIV PN data among MSM and contributes to the knowledge of PN in China by differentiating the partner types. It identifies important factors that could influence stable and casual PN decisions, which offers great implications for designing tailored partner services intervention in further research.

Synergistic activity of azithromycin plus cephalosporin dual therapy for multidrug-resistant *N. gonorrhoeae* in increasing resistance endemic setting: A China regional study.

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Background: The emergence of multidrug resistance (MDR) in *Neisseria gonorrhoeae* is concerning, especially the co-occurrence of azithromycin resistance (AZMR) and decreased cephalosporin susceptibility (ECSD). We evaluated the feasibility of azithromycin and cephalosporin dual therapy to provide a treatment solution for MDR *N. gonorrhoeae* strains in Guangdong, China.

Methods: A total of 3,609 *N. gonorrhoeae* strains were collected, and the minimum inhibitory concentrations (MICs) of various antibiotics were assessed for each strain using the agar dilution method. Among the identified MDR strains, 45 isolates were selected and analyzed by *N. gonorrhoeae* sequence typing for antimicrobial resistance (NG-STAR), *N. gonorrhoeae* multi-antigen sequence typing (NG-MAST), multi-locus sequence typing (MLST), and phylogenetic tree. The effectiveness of dual therapy was scored by a combination of the MIC and the fractional inhibitory concentration (FIC) index.

Results: Among the selected isolates, a high degree of antibiotics resistance was observed: 11.54% of strains were resistant to AZM; 9.25% of strains displayed decreased susceptibility to ceftriaxone (CROD); and 11.84% were less susceptible to cefixime (CFMD). The proportions of isolates with both AZMR and ECSD were once up to 2.11% for AZMR /CFMD and 1.79% for AZMR/CROD . NG-STAR, NG-MAST, and MLST categorized the 45 MDR isolates into 35, 35, and 23 major genogroups, respectively, which could be divided into different evolutionary branches due to genetic diversity. These isolates could be effectively killed with the coadministration of less than 1 mg/L AZM and 0.125 mg/L ECS, with a synergistic effect of FIC < 0.5.

Conclusions

AZM plus ECS dual therapy remains effective against MDR *N. gonorrhoeae*.

Impact of a new rapid specialist sexual health result service on time from testing to treatment of Chlamydia trachomatis

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Background:

Unity Sexual Health, Bristol UK, introduced a Panther (Hologic Inc) system in November 2018 at point-of-care. This rapid *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) nucleic acid amplification test (NAAT) provides results to patients within 4-48 working hours compared with 1-2 weeks previously. Patients are now only treated if CT NAAT-positive, symptomatic and unable to wait for results, or a sexual contact of CT/GC within the preceding 2 weeks. We hypothesised the new service would result in more rapid treatment of CT/GC infections. We evaluate the effect on time to CT treatment.

Methods:

All new CT NAAT-positive cases attending over a 2-month period, 1 year before and 1 year after the introduction of the new service were evaluated (01/01/2018-28/02/2018 and 01/01/2020-28/02/2020). Dates of NAAT testing and treatment were obtained from electronic patient records. The one-sided Mann-Whitney U-test was used to compare time to treatment before and after service introduction.

Results:

134 CT-positive patients were diagnosed before and 116 were diagnosed after service introduction. Of these, 2 (1.5%) and 8 (6.9%) respectively were treated elsewhere and excluded. Average time to treatment decreased from 6.5 to 4.1 days ($p = 0.09$). When we excluded patients treated as contacts of CT (before NAAT result was available) the time to treatment decreased from 8.7 to 5.1 days ($p < 0.001$). The reduction in time to treatment decreased significantly more in women; 11.3 to 6.1 days ($p < 0.001$) than men; 6.8 to 4.7 days ($p = 0.27$).

Conclusions:

Introduction of a rapid STI service significantly reduced time from testing to treatment of CT. Availability of microscopy for symptomatic men allows immediate treatment of urethritis, a common presentation of CT in men. This probably explains why men were treated earlier than women. Earlier treatment is expected to reduce both asymptomatic CT transmission, and risk of CT complications, particularly in women.

Potential effects of antibacterial mouthwash on *Neisseria gonorrhoeae* transmission among men who have sex with men: a mathematical modelling study

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Background Three randomised controlled trials have either reported that mouthwash may increase the susceptibility of the oropharynx to *Neisseria gonorrhoeae* or potentially decrease its transmissibility. We modelled these potential impacts on gonorrhoea incidence.

Methods: We calibrated a susceptible-infected-susceptible compartmental model to examine the effectiveness of antibacterial mouthwash on the transmission of *Neisseria gonorrhoeae* in men who have sex with men (MSM). Four scenarios include: (1) mouthwash had no effect; (2) mouthwash increased the susceptibility of the oropharynx to *Neisseria gonorrhoeae*; (3) mouthwash reduced the transmissibility of *Neisseria gonorrhoeae* from the oropharynx; (4) we combined the effect of mouthwash from scenarios 2 and 3.

Results: Under scenario 1, the overall incidence of gonorrhoea was 44 (95% CI: 37-50)/100 person-years (PY). Site-specific incidence/100 PY at the oropharynx, anorectum and urethra were 26 (22-31), 9 (8-11) and 8 (5-12). Under scenario 2, with between 20-80% mouthwash coverage in the MSM population, the incidence increased at all three anatomical sites by between 7.4% (5.9-60.8%) and 136.6% (108.1-177.5%). Under scenario 3, with the same coverage, the incidence decreased at all anatomical sites by between 11.6% (10.2-13.5%) and 99.8% (99.2-100%). Under scenario 4, changes in the incidence depended on the efficacy of mouthwash on the transmissibility and susceptibility with both leading to large increases of nearly 130% or large declines of almost 100%.

Conclusions: The effect of mouthwash on gonorrhoea incidence is largely predictable depending on whether it increases the susceptibility to or reduces the transmissibility of *Neisseria gonorrhoeae*, highlighting an urgent need for further empirical investigation.

Predicting the diagnosis of HIV and sexually transmitted infections among men who have sex with men using machine learning approaches

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Background: We aimed to develop machine learning models and evaluate their performance in predicting HIV and sexually transmitted infections (STIs) diagnosis based on a cohort of Australian men who have sex with men (MSM).

Methods: We collected clinical records of 21,273 Australian MSM during 2011–2017. We compared accuracies for predicting HIV and STIs (syphilis, gonorrhoea, chlamydia) diagnosis using four machine learning approaches against a multivariable logistic regression (MLR) model.

Results: Machine learning approaches consistently outperformed MLR. Gradient boosting machine (GBM) achieved the highest area under the receiver operator characteristic curve for HIV (76.3%) and STIs (syphilis, 85.8%; gonorrhoea, 75.5%; chlamydia, 68.0%), followed by extreme gradient boosting (71.1%, 82.2%, 70.3%, 66.4%), random forest (72.0%, 81.9%, 67.2%, 64.3%), deep learning (75.8%, 81.0%, 67.5%, 65.4%) and MLR (69.8%, 80.1%, 67.2%, 63.2%). GBM models demonstrated the ten greatest predictors collectively explained 62.7–73.6% of variations in predicting HIV/STIs. STIs symptoms, past syphilis infection, age, time living in Australia, frequency of condom use with casual male sexual partners during receptive anal sex and the number of casual male sexual partners in the past 12 months were most commonly identified predictors.

Conclusions: Machine learning approaches are advantageous over multivariable logistic regression models in predicting HIV/STIs diagnosis.

The impact of COVID-19 on the sexual health of youth in the Netherlands

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Background: Coronavirus disease (COVID-19) changed people's life drastically, due to restrictions to reduce transmission such as social distancing and the limited number of social contacts. The objective is to gain insight in the impact of the COVID-19 pandemic on the sexual health of youth in the Netherlands.

Methods: We conducted two cross sectional surveys targeting Dutch youth aged 16-20 year old during the pandemic. Recruitment occurred via social media and a youth sexual health website (sense.info). Both studies included a questionnaire about dating, relationships, sexual- and help seeking behavior and mental health. We identified 4 different time periods: (i) 6 months before the pandemic (pre pandemic), (ii) first lockdown, (iii) between lockdowns, and (iv) second lockdown.

Results: The samples consisted of 5218 and 4091 participants. The study showed that less singles had sex during the first (40%) and second (52%) lockdown period compared to pre lockdown (67%). Singles who continued to have sex more often reported casual regular partner during the first (58%) and second lockdown (60%), than pre lockdown (28%) and between lockdowns (33%). STI testing uptake decreased from 9% pre-lockdown to 1% during the first and 3% during the second lockdown. Self-tests were used almost twice as often during the pandemic (13%) as before (7%). Among the reasons for not testing, corona-related reasons (e.g., STI clinics are closed, or health care providers are too busy) decreased between the first (47%) and second lockdown (27%). Furthermore, youths mental health has weakened since the first lockdown up until the end of 2020.

Conclusion: COVID-19 pandemic significantly impacts the sexual health of Dutch youth, especially during lockdown periods, but also in periods of relaxation of pandemic control measures. Therefore, it is extremely important for healthcare providers to make their facilities accessible and find for alternatives for face-to-face testing.

Behaviour or Identity? Differences in HIV testing by sexual identity among MSM in high-income countries: an individual participant data meta-analysis

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Background: HIV testing guidelines recommend MSM test at least annually. However, heterosexual- and bisexual-identifying MSM (heterosexual-MSM; bisexual-MSM) may be less likely to test for HIV than gay-identifying MSM (gay-MSM). We hypothesised that differences in HIV testing may reflect differences in sexual behaviour and the extent to which MSM engage with gay communities.

Methods: We harmonised individual participant data (IPD) of 155,205 MSM not previously diagnosed with HIV (heterosexual-MSM: 900; bisexual-MSM: 20,409; gay-MSM: 133,896) from four cross-sectional behavioural surveys conducted in Western Europe (2010; n=94,294), Australia (2010-2017; n=46,965), New Zealand (2008, 2011, 2014; n=7,673), and Canada (2015; n=6,273). We conducted IPD meta-analysis using multilevel modified Poisson regression to calculate adjusted prevalence ratios (APRs) comparing heterosexual-MSM and bisexual-MSM with gay-MSM for reporting HIV testing (past year), stratified by reporting of behavioural indicators for more frequent testing (i.e., reporting condomless anal intercourse with non-steady partner(s) and/or >10 male partners in past year). We then examined the impact of gay community engagement.

Results: Overall, testing was more common among gay-MSM (52.4%) than bisexual-MSM (38.5%, APR=0.75 (95%-CI:0.70-0.80)) and heterosexual-MSM (29.6%, APR=0.60 (95%-CI:0.51-0.71)). More gay- and bisexual-MSM reported behavioural indicators for testing than heterosexual-MSM (45.8% and 43.3% vs 36.3%, respectively) but this did not explain testing disparities, with similar differences in testing observed when focusing on these 'higher risk' groups (gay-MSM: 61.7%; bisexual-MSM: 44.9%, APR=0.76 (95%CI:0.72-0.80); heterosexual-MSM: 35.9%, APR=0.66 (95%CI:0.55-0.78)). Gay community engagement was associated with an increased testing likelihood of up to 104% among heterosexual-MSM and 57% among bisexual-MSM.

Conclusion: Differences in sexual behaviour do not fully explain testing disparities by sexual identity among MSM. In contrast, greater engagement with gay communities is linked to increased testing likelihood regardless of sexual identity. Capitalising on this knowledge for MSM whose lives do not intersect these communities is likely to be challenging, however further investigation is warranted.

“If they ask, I will tell them”: Attitudes towards accessing sexual healthcare among heterosexual-identifying MSM in England

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Background: STI/HIV testing is lower among heterosexual-identifying men who have sex with men (heterosexual-MSM) than bisexual or gay men. We aimed to understand attitudes towards sexual healthcare among heterosexual-MSM in England, to improve service design and uptake among this overlooked population.

Methods: Semi-structured individual interviews were conducted with 15 heterosexual-MSM in England in January-March 2020. Participants ranged in age from 22-69 years. All but one reported current or previous relationships with women. Data were analysed using an inductive thematic analysis.

Results: Frequency of STI/HIV testing varied widely between participants, reflecting how some men felt they lacked sufficient or accurate information about testing guidelines and options, including the possibility of home-sampling/testing. Among men with female partners, concern for the health and wellbeing of these partners was a motivator for testing. However, privacy and discretion were important factors in the use of home-sampling/testing kits for men living with female partners or family; their ability to use these services was limited when their privacy needs were not accommodated. Their heterosexual identity meant some felt services intended for gay and bisexual men were not appropriate for them. If asked by sexual health clinicians, most heterosexual-MSM interviewed reported feeling comfortable disclosing the sex they have with men, describing the impersonal nature of consultations and perceptions of non-judgement and discretion as facilitators for disclosure. However, this comfort with disclosure did not always extend to GPs, due to fears their behaviour would be exposed to others.

Conclusion: For the heterosexual-MSM in this study, privacy and discretion were of utmost importance. These must be guaranteed by sexual healthcare services, whether in-clinic or home-sampling/testing, to appeal to MSM regardless of their personal circumstances. Trust in clinician confidentiality and non-judgement facilitate disclosure. Further work is needed to identify ways for sexual health services to appeal to, and reach, this population.

Test and treat, or test and wait?:
managing sexual partners at risk for STI

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Background

Treatment of sexual partners notified for Chlamydia trachomatis (CT) or Neisseria gonorrhoeae (NG) is needed to prevent ongoing transmission. To prevent the emergence of Anti-Microbial resistance, antibiotics should be used prudently. Therefore, in 2020, the STI clinic of the Public Health service of Amsterdam (STI clinic) went from treating all confirmed notified sexual partners (before test results) to a selection of the notified partners i.e. only those who received confirmed notification from a steady sex partner, with whom they had sex in the last 2 months. We evaluated STI outcomes before and after implementation of this policy.

Methods

Routine data from confirmed notified partners attending the clinic for CT/NG from 01-09-2019 to 01-03-2020 were compared with similar data from 01-03-2020 to 01-10-2020.

Results

CT: of the 132 partners notified before policy change, 64% (84/132) had a negative test result, all received treatment before results were available. After policy change 71% (163/230) had a negative result, 17% (39/230) of them received treatment before results were available and 14% (32/230) positive for CT had to return to the clinic to receive treatment.

NG: of the 131 partners notified before policy change 72% (94/131) had a negative test result, all received treatment before results were available. After policy change 71% (215/304) had a negative test result, 27% (59/215) of them received treatment before results were available and 57% (51/89) of the patients positive for NG had to return to the clinic for treatment.

Discussion

Unnecessary treatment with antibiotics decreased substantially when introducing the new policy. A limited amount of partners had a delay in treatment and had to return to the clinic. The cost of a second visit and the delay to treatment will be assessed in order to improve services and decrease the risk of distribution of CT/NG by untreated partners.

Reaching sexual partners at risk for STI through social media

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Background

At the STI clinic of the Public Health service of Amsterdam (STI clinic) partner notification (PN) seems successful in the early diagnosis and treatment of STI's in sexual partners. Together with the healthcare staff, and upon consent of the index patient, sexual partners at risk are identified and the PN methods discussed: patient or provider referral, by phone, mail or an online PN service. However, in a substantial number of cases, contact details are missing because of the anonymity of the partner, e.g in case of social media (SM) use. We therefor explored the willingness and opinion of patients to use SM for online PN.

Methods

From December 17 2020 to February 1 2021 we invited all patients visiting the STI clinic for treatment to fill in an anonymous online questionnaire on the use of SM for online PN: 1) using SM for meeting and notifying sexual partners, and 2) to be approached themselves as a notified partner. Lastly, they were asked to comment on a series of potential texts messages to be used for online PN.

Results

180 patients participated in the study: 68% males, 32% females and 0,6 % transgender persons. 80% indicated they met a sexual partner via SM and 57% of them only had SM contact details. 59% would like to use a message via SM for PN purposes, and 73% would want to receive a PN via SM. 40 % would want to be informed when involving HIV. The majority would choose a format containing the logo of the public health service and the online PN service because this appeared more trustworthy.

Discussion

Preliminary analyses show the potential of online PN through SM. However safety and trustworthyness are concerns when developing the intervention and effectiveness should be analysed.

Development and external validation of a prognostic model for survival of people living with HIV/AIDS initiating antiretroviral therapy

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Background: The aim of this study was to develop and externally validate a prognostic model for survival in people living with HIV/AIDS (PLWHA) initiating ART based on two large population-based cohorts in China.

Approach: The derivation cohort consisted of PLWHA treated between February 2004 and December 2019 in a tertiary center in Guangzhou, South China, and validation cohort of patients treated between February 2004 to December 2018 in another tertiary hospital in Shenyang, Northeast China. We assessed 20 candidate predictors for an endpoint of death from all causes. The prognostic model was developed from a multivariable cox regression model with predictors selected using the least absolute shrinkage and selection operator (Lasso). To assess the model's predictive ability, we quantified the discriminative power using the concordance (C) statistic and calibration accuracy by comparing predicted survival probabilities with observed survival probabilities estimated with the Kaplan–Meier method.

Outcomes: The derivation cohort included 16481 patients and the external validation cohort comprised 5751 participants. The final model included 10 predictors: age, body mass index, route of HIV acquisition, coinfection with tuberculosis, coinfection with hepatitis C virus, haemoglobin, CD4 cell count, platelet count, aspartate transaminase, and plasma glucose. The C-statistic was 0.84 (95% confidence interval 0.82–0.85) in internal validation after adjustment of optimism and 0.84 (0.82–0.87) in external validation, which remained consistently above 0.75 in all landmark time points within five years of follow up when using time-updated laboratory measurements. The calibration accuracy was satisfactory in both derivation and validation cohorts.

Innovation and significance: We developed and externally validated a model to predict long-term survival in PLWHA on ART, which could be applied to individualized patient counseling and management during treatment, and future innovative trial design.

Demographic and behavioural characteristics of patients diagnosed with early versus late syphilis at Western Sydney Sexual Health Centre, 2015-2019

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Background

Western Sydney Sexual Health Centre (WSSHC) provides a free sexual health service for its culturally-diverse population. As local syphilis incidence is increasing, we determined demographic and behavioural characteristics associated with early syphilis infection at WSSHC.

Methods

We conducted a 5-year retrospective study of WSSHC's syphilis cases (2015-2019). Patient and laboratory data were extracted from medical records for analysis. The study definition of early syphilis (ES) included cases of primary syphilis, secondary syphilis, early latent infection (<2 years) and latent syphilis of unknown duration (VDRL titre $\geq 1:4$). Late syphilis (LS) included both cases acquired >2 years previously and latent syphilis cases of unknown duration (VDRL titre $\leq 1:2$). Statistical methods employed the Chi-square test for trend (diagnoses over time) and univariate/multivariate logistic regression analyses to identify ES-associated variables. The study received local Ethics Committee approval.

Results

557 cases of syphilis, including 380 (68%) ES and 177 (32%) LS cases, were diagnosed in 553 individuals (454 men, 99 women). Syphilis diagnoses increased over time; early syphilis cases increased 26% annually ($p < 0.001$). Median age (years) was 32 (IQR=19-17) for ES patients and 39 (IQR=20-86) for LS patients. ES patients, when compared with LS patients, were more likely to be male (338/380 [89%] vs. 120/177 [68%]; OR 3.82, 95%CI=2.44-6.00), <35 years old (226/286 [79%] vs. 154/271 [57%]; OR 2.86, 95%CI=1.97-4.15), Australia-born (213/380 [56%] vs. 43/177 [24%]; OR 3.97, 95%CI=2.67-5.92), previously infected with syphilis (66/380 [17%] vs. 10/177 [6%]; OR 3.51, 95%CI=1.76-7.01), chemsex-users (72/380 [19%] vs. 4/177 [2%]; OR 10.11, 95%CI=3.63-28.17), PrEP-users (70/327 [21%] vs. 6/170 [4%]; OR 7.44, 95%CI=3.16-17.54) and HIV co-infected (53/380 [14%] vs. 7/177 [4%]; OR 4.83, 95%CI=2.14-10.89). Multivariable regression modelling indicated that these same ES-associated variables remained significant in men ($p < 0.05$).

Conclusions

Male gender, age <35 years, Australia-born, use of chemsex or PrEP, HIV co-infection and previous syphilis infection are risk factors associated with ES at WSSHC.

Influence of the COVID-19 pandemic on the epidemiology and resistance of *Neisseria gonorrhoeae* in Austria

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Background: Gonorrhoea is a health threat, infection levels and drug resistances increased over the last decades. The COVID-19 pandemic that hit Austria in 2020 led to several lockdown events such as closing of bars, clubs, hotels and the order to stay at home. The current study was designed to elucidate the influence of these measures in order to curtail the pandemic on the number of *N. gonorrhoeae* diagnosed and their respective resistance patterns.

Methods: Retrospective data of patients positive for *N. gonorrhoeae* and resistances to ceftriaxone, cefixime, azithromycin and penicillin were compared using data from 2019 and 2020 collected in and sent to the Outpatients Centre for Infectious Venero-dermatological Diseases in Vienna. Resistance testing was carried out by means of the Etest®; MIC values were interpreted according to EUCAST guidelines.

Results: Numbers of patients tested positive for *N. gonorrhoeae* declined dramatically from 639 in 2019 to 381 in 2020. The most prominent reduction was during the first lockdown (March to May 2020), with half as many gonococcal infections compared to this period in 2019. The second lockdown (November/December 2020) did not result in significantly lower numbers of gonococcal infected patients. In both years, no ceftriaxone-resistant isolate was detected. However, 2.3% of isolates from women showed borderline susceptibility (MIC = 0.094 and 0.125 µg/ml), compared to 0.4% of isolates from men. During the two years of evaluation, cefixime and azithromycin resistant strains decreased (4% to 0% and 19% to 7%, respectively), while penicillin-resistant strains increased from 9% to 20%.

Conclusion: The first lockdown resulted in a decrease of 62.7% of infected individuals. A remarkable decrease of resistant gonococcal strains to azithromycin and no resistance to cefixime occurred in 2020. This is in contrast to an increase of resistances until 2019. Increasing numbers of isolates of women approached the MIC breakpoint for ceftriaxone.

Clinical presentations of syphilis diagnosed at Western Sydney Sexual Health Centre, 2015-2019.

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Background

Correct syphilis staging requires attentive history-taking and clinical examination; this assists with optimal patient management. We describe the clinical presentations of syphilis cases diagnosed at Western Sydney Sexual Health Centre (WSSHC) over a five-year period.

Methods

We undertook a retrospective descriptive study of syphilis presentations at WSSHC between January 2015 and December 2019. Paper and electronic medical records were reviewed for 557 syphilis cases managed during this period. Clinical data were extracted and entered into an Access database for subsequent analysis. The Chi square test for trend was used to analyse incident infections over time. Ethics Committee approval was obtained.

Results

During the study period, there were 203 symptomatic (93 primary, 110 secondary) and 354 asymptomatic (351 latent, 3 late neurosyphilis) syphilis cases. Primary and secondary syphilis cases increased over time ($p=0.038$ and $p=0.004$, respectively). Most primary (91/93, 98%) and secondary (99/110, 90%) cases were in men. Ulceration was a feature of 92/93 (99%) primary syphilis cases; one additional patient presented with isolated inguinal lymphadenopathy. Locations of syphilitic ulceration were as follows: penile (68, 74%), anal (19, 21%), male genital skin (4, 4%) and oral (4, 4%). Most ulcers were solitary (65/93, 70%) although 30% (27/92) were multiple. Most of the secondary syphilis cases presented with a rash (84/110, 76%); the rash was demonstrable on palms/soles in 34/84 (40%) cases and on the trunk in 73/84 (87%) cases. Palmoplantar rash alone occurred in 7/84 (8%). Oral lesions and condylomata lata were documented in 16 (15%) and 10 (9%) of secondary syphilis patients, respectively. Six (5%) secondary syphilis patients also had CSF-confirmed neurosyphilis; three were symptomatic (headache, $n=2$; neck stiffness, $n=1$; blurred vision/photophobia, $n=1$; reduced hearing, $n=1$).

Conclusions

Syphilis presents in many different ways and correct staging requires careful examination in order to inform clinical management and partner notification practice.

What makes Sense? Strategical use of eHealth technology to stimulate self-care in public sexual health care

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Background

The 24 Sexual Health Clinics (SHCs) at the municipal public health centres covering The Netherlands provide sexual health care for key-populations and provide about 150.000 consultations annually. Adolescents 12-25 years can anonymously contact the SHCs free-of-charge for personal consultations on sexual health subjects including STI-testing. However financial restrictions result in prolonged waiting times. Moreover, specific high-incidence populations (e.g. multicultural, low SES) are insufficiently reached. The SHCs and the national sexual health institutes developed and implemented eHealth interventions to increase the accessibility and efficiency of sexual health services and to stimulate self-care.

Approach

A stepped care model (SCM) approach was used to reshape Dutch public sexual health care for young people (www.sense.info). Important principle is that clients do not receive more care than is necessary. Not all clients need the same type - or level - of care: some may be helped by an online self-assessment tool in combination with a home STI testing package, others need (immediate) support by a health professional.

Outcomes/Impact

The SCM approach leads to a re-organization of public sexual health care in the Netherlands for young people. The steps in the cascade refer to different types of consultations: on- and off-line, including, video-consultations and referral to (commercial) self-testing. The SCM increased the accessibility of the health system by allocating the scarce capacity of medical professionals to those who really need it and stimulated eHealth support and self-care by others.

Innovation and significance

The SCM approach proves to decrease fragmentation of sexual youth services and eHealth solutions by offering one nationwide online sexual health platform. This increases the findability of the information, and greatly enhances efficiency. It promotes self-care and relieves the workload of public health care professionals. This systematic, efficient and blended approach provides a sound basis for cooperation between SHCs and national institutes and enables developing a strategical agenda for innovations and eHealth solutions.

High prevalence of sexually transmitted infections among young African women in REACH study of oral emtricitabine-tenofovir and dapivirine vaginal ring

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Background: With antiretroviral (ARV)-based HIV prevention, the hidden epidemic of sexually transmitted infections (STIs) is being uncovered. Most STIs are asymptomatic and not treated by syndromic case management, the standard of care in Africa. There are limited data on STI prevalence among African adolescent girls and young women (AGYW) who are at risk for sequelae from untreated STIs.

Methods: MTN-034/REACH is a randomized, open label, crossover study assessing the safety of and adherence to the dapivirine vaginal ring and oral emtricitabine-tenofovir in Cape Town and Johannesburg, South Africa, Kampala, Uganda and Harare, Zimbabwe. Sexually active HIV-negative AGYW ages 16–21 years were enrolled and tested for *Chlamydia trachomatis*/Neisseria gonorrhoeae (CT/GC) by nucleic acid amplification, *Trichomonas vaginalis* (TV) by rapid test, and syphilis by serology. AGYW with positive test results received treatment. Descriptive statistics were used to summarize STI prevalence at baseline and selected characteristics by STI status.

Results: Among 247 AGYW enrolled in REACH, 34% were 16-17 years old, 87% single, and the median number of sexual partners in the prior 3 months was 1 (IQR 1-2). At enrollment, 87 (35%) tested positive for any STI with 17 (7%) with >1 STI: 71 (29%) for CT, 21 (8.5%) for GC, 12 (4.9%) for TV and 6 (2.4%) for syphilis. Of AGYW diagnosed with an STI, 90% were asymptomatic. The prevalence of any STI varied by site: 47% in Cape Town, 37% in Johannesburg, 32% in Kampala, and 25% in Harare. STI prevalence was higher among 18-21 year olds versus 16-17 year olds (37% vs 32%).

Conclusion: STI prevalence among AGYW initiating oral or topical PrEP was alarmingly high and most were asymptomatic, highlighting the limitations of syndromic STI management. There is an urgent need and imperative to provide diagnostic STI testing to AGYW with the delivery of HIV prevention methods.

Laboratory capacity assessment for serological detection of syphilis in Guangdong, China

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Objective: To investigate and identify the detection capability of syphilis in the STD (sexually transmitted disease) laboratories in Guangdong, China.

Method: An External quality assessment (EQA) of syphilis tests was performed and an online questionnaire surveys on tests and screening algorithms were conducted. Three positive and two negative EQA panels were prepared for qualitative or quantitative test of Nontreponemal tests (NTT) and Treponemal test (TT). The samples were distributed to all participants in October 2019 and the results were reported within one month and analyzed by Guangdong Central STD Laboratory through an online quality assessment software.

Results: A total of 838 laboratories participated in the program, which come from different STD clinics, including primary, secondary and tertiary general hospitals, Maternal and Child Health Care Hospitals and CDC from the provincial, prefecture and county levels in Guangdong. The results showed that overall coincidence rate of the 838 participated laboratories was 98.0%. The coincidence rate of NTT were that 99.3% of qualitative test and 96.7% of quantitative test. Coincidence rate of qualitative TT were 99.3%. There were 286 laboratories reported the quantitative TT results, with an overall coincidence rate of 94.7%. Tolidine red unheated serum test (TRUST) was the most used NTT, and Treponema pallidum particle assay (TPPA) popularly chosen as Treponemal test. There were 273 laboratories returned a second survey on syphilis screening algorithms. Among them, 118(43.2%) laboratories adopted the traditional screening, 81(29.7%) laboratories adopted the reverse screening, and 64(23.4%) laboratories employed two algorithms simultaneously. Moreover, 10(3.7%) laboratories adopted the ECDC (European Centre for Disease Control and Prevention) algorithm .

Conclusion: Laboratories in Guangdong Province have great capabilities of syphilis diagnosis, especially in the CDC and the Maternal and Child Hospitals. Traditional screening is the most used algorithm, while the use of reverse screening is increasing.

The performance of laboratory-based diagnostic assays to diagnose primary syphilis cases at Western Sydney Sexual Health Centre, 2015-2019.

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Background:

Treponema pallidum subsp. *pallidum* infection (TP) may be diagnosed either directly by dark-field microscopy (DFM) or polymerase chain reaction (PCR) assay, or indirectly by serology. TP PCR and serology are currently the mainstay of laboratory-based diagnosis due to technical challenges associated with DFM. We describe the performance of TP PCR and serology in the diagnosis of primary syphilis at Western Sydney Sexual Health Centre (WSSHC).

Methods:

This is a retrospective study of primary syphilis cases diagnosed at WSSHC over a five-year period (2015-2019). Medical case records were reviewed to extract laboratory results. Patients without a prior history of syphilis were screened with either an enzyme-linked immunosorbent total antibody assay (EIA, WSSHC-associated laboratory) or a chemiluminescent microparticle immunoassay (CMIA, private laboratories). The non-treponemal Venereal Disease Research Laboratory (VDRL) assay was used to screen patients previously-treated for syphilis. An in-house PCR assay tested ulcer-derived DNA extracts for TP. The study received Ethics Committee approval.

Results:

93 primary syphilis cases (92 with ulceration, 1 with inguinal lymphadenopathy) were diagnosed in the study period. TP PCR was performed in 84/92 (91%) cases and positive in 76/84 (90%) cases. Overall, syphilis serology detected 79/93 (85%) primary syphilis cases. 75/93 (81%) cases had no laboratory evidence of prior syphilis; 18 cases (19%) had previous reactive treponemal serology. Treponemal antibodies were present in 63/75 (84%) first-episode syphilis cases; 12/75 (16%) had non-reactive treponemal serology. Most cases with previously-treated syphilis had reactive VDRL tests (16/18, 89%). There were 64 PCR positive/serology reactive cases, 12 TP PCR positive/serology non-reactive cases, 7 PCR negative/serology reactive cases and one clinically-diagnosed case (negative TP PCR/non-reactive serology). Serology was reactive in all 9 cases where TP PCR was not performed (8 EIA reactive, 1 VDRL reactive).

Conclusion:

Primary syphilis is best diagnosed using a combined approach with TP PCR and syphilis serology.

The vaginal microbiome and development of pelvic inflammatory disease: a prospective study using 16S rRNA long-read sequencing.

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Background

A low diversity vaginal microbiome dominated by Lactobacilli, may be associated with lower risk of pelvic inflammatory disease (PID). However, disruption to this balance through an increase in diversity, particularly dominated by *Gardnerella vaginalis*, may lead to increased susceptibility. Not all lactobacilli are equally protective, species that produce higher proportions of D(-) isomer lactic acid (*L. crispatus*, *L. jensenii*, and *L. gasseri*) have proven protection against *Chlamydia trachomatis* (CT) infection, an important cause of PID, however *Lactobacillus iners*, which produces predominantly L(+) isomer lactic acid, may be less protective. We investigated the relationship between “baseline” microbiome and the subsequent risk of acquiring PID, using stored vaginal samples from participants in the Prevention of Pelvic Infection chlamydia screening trials.

Methods

16S rRNA long-read nanopore sequencing was carried out on vaginal samples from 37 women who subsequently developed clinically defined PID during 12 months of follow-up, and 111 frequency-matched controls who did not. Samples were matched on age, ethnicity, CT status at baseline and number of sexual partners.

Results

Three main taxonomic clusters were identified which were dominated by *L. iners*, *L. crispatus*, and *G. vaginalis*. Microbiomes dominated by *G. vaginalis* were associated with black ethnicity ($p=0.002$), age ≥ 20 ($p=0.048$) and bacterial vaginosis ($p<0.0001$), but not with subsequent development of PID or CT infection at baseline. Lower rates of D(-) isomer lactic acid producing lactobacilli were not associated with PID ($p=0.53$) or concurrent CT ($p=0.38$) infection, but were associated with bacterial vaginosis, as expected ($p<0.0001$).

Conclusion

We found no association between baseline vaginal microbiome composition and subsequent development of PID, nor between quantities of D(-) isomer lactic acid producing lactobacilli and concurrent CT infection.

A new measure of sexual wellbeing for community surveys: Development and Validation of the The Natsal-SW

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Background

Sexual wellbeing is intrinsic to public health but long-standing conflation of sexual health and sexual wellbeing has limited our ability to address everyday sexual issues. This study proposed a seven-domain model, and developed and validated a brief measure for community surveys.

Method

Domains of sexual wellbeing were determined through critical engagement with wide-ranging literature and 40 semi-structured interviews to explore resonance with lived experiences. Measure development involved 7 cognitive interviews and two web-based surveys of general population samples (n=590, n=814), to assess performance of individual items, conduct exploratory and confirmatory factor analysis, and examine whether the resultant measure was associated with external variables as hypothesised. A sub-sample (n=113) completed the survey again after two weeks to test re-test reliability.

Results

We proposed seven domains of sexual wellbeing: security and safety; respect; self-esteem; resilience; forgiveness of past sexual experiences; self-determination and comfort. Semi-structured interviews confirmed the relevance of these domains to lived experiences of sex and sexuality. Drawing on the semi-structured and cognitive interviews we drafted a 25-item measure to capture these domains. Based on individual item assessment and exploratory and confirmatory factor analyses, we trimmed the measure to 13-items. The confirmatory factor analysis indicated that a 'general specific model' had best fit (RMSEA: 0.064; CFI: 0.975, TLI: 0.962), and functioned equivalently across age groups, genders, sexual orientation and relationship status. The final measure was associated with external variables in the directions hypothesised (all $p < 0.001$), including sexual functioning (coefficient = 0.924), mental wellbeing (0.454), self-esteem (0.564), sexual esteem (0.563), body image (0.232), depression (-0.384), anxiety (-0.340), sexual satisfaction (0.680) and sexual distress (-0.615) and demonstrated good test-retest reliability (ICC = 0.78).

Conclusion

Our conceptual model and 13-item measure distinguishes sexual wellbeing from sexual health and enables sexual wellbeing to be quantified and understood within and across populations.

Assessing Sexual Health Services at a public university in the United States

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Background: The American National College Health Association reports that college students have frequent, condomless sex. Student health and wellness clinics (SHWC) offer sexual health services, but few have dedicated sexual health clinics (SHC). We evaluated screening service use at a university SHWC after implementation of a SHC two half-days per week.

Methods: This was a retrospective analysis of data from patients receiving sexual health screening at the University of Alabama at Birmingham (UAB) SHWC from 2015 to 2019. Demographic variables and rates of STIs were extracted from the electronic medical record and were compared by clinic (SHC vs. SHWC). Univariate models were fit, and multi-variable models will be fit, selecting variables with p values of 0.1 or less. Odds ratios with corresponding 95% confidence intervals for univariate analysis are presented.

Results: A total of 5025 STI screenings were performed. Males (OR 4.13; 3.61-4.72), undergraduates (OR 1.33; 1.15-1.54), and persons reporting sex with the same sex (OR 1.88; 1.56-2.28), were significantly more likely to seek care at the SHC. Students with symptoms were more likely to seek care at the SHWC (OR 0.53; 0.47-0.61), while persons who reported contact with STIs were more likely to seek care at the SHC (OR 2.88; 2.22-3.74). The overall percentage of positive screenings was 9.3% for chlamydia (CT), 3.0% for gonorrhea (GC), 0.8% for trichomoniasis (TV), 0.7% for syphilis, and 0.3% for HIV with higher percentages of positive for CT (OR 1.60; 1.30-1.96) and GC (OR 2.02; 1.44-2.85) in the SHC.

Conclusion: Embedding a dedicated SHC within a university SHWC may expand populations reached for STI screening. With higher percentages of patients testing positive for CT and GC, a SHC may allow for greater diagnosis and treatment of STIs in general screening and persons presenting as contacts.

Optimized methods to model *Mycoplasma genitalium* reproductive tract infection in pig-tailed macaques

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Background:

Mycoplasma genitalium (MG) is a sexually transmitted bacterial pathogen implicated in urogenital disease of both men and women. Of importance, MG is associated with upper reproductive tract sequelae in women such as pelvic inflammatory disease (PID). In earlier studies, we have defined pig-tailed macaques as a suitable animal model for chronic lower reproductive tract infection, though only a subset of the primates remained persistently infected after cervical inoculation. Building on our previous findings, we refined our inoculation methods to increase infection rates, extended the course of infection, and measured the ascension of MG to the upper reproductive tract to model PID.

Methods:

Three female pig-tailed macaques were infected with an MG inoculum (2×10^9 genomes) prepared to minimize cell aggregates. Lower reproductive tract specimens were collected over 18 weeks. MG infection status was determined by culture in SP4 broth, Vero cell co-cultures, and qPCR. Humoral and cervical antibody responses to MG whole-cell lysates were analyzed through immunoblots.

Results:

All three primates were persistently infected, one for 8 weeks and two for >14 weeks. Primates that cleared the infection were re-infected to promote ascension to the upper reproductive tract. Humoral and cervical antibodies to the immunodominant MgpB and MgpC adherence proteins were detected after three weeks but were unable to clear MG infection.

Conclusion:

In prior experiments, MG persisted in only 4/9. In this pilot study, all three primates maintained persistent infection. MG-specific antibodies detected from both serum and cervical specimens will provide an important resource for the optimization of serologic tests that may elucidate immune mechanism of evasion in the genital tract. Future experiments will discern MG pathogenesis, including upper reproductive tract sequelae, as well host-pathogen interactions in a relevant animal model.

Single gene targeted nanopore sequencing for simultaneous identification and antimicrobial resistance detection of sexually transmitted infections

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Background

World Health Organization guidelines to treat sexually transmitted infections (STIs) with the right antibiotic, at the right dose and the right time are undermined by spread of antimicrobial resistance (AMR). Accurate and rapid diagnostics simultaneously predicting antibiotic susceptibility and diagnosis may help address this challenge. We report early data from a novel approach using single gene targeted nanopore sequencing for simultaneous STI identification and AMR detection among female sex workers (FSWs) in Ecuador.

Methods

Real-time PCR (RT-PCR) was performed on vulvo-vaginal swab samples from 200 FSWs to identify *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), *Mycoplasma genitalium* (MG) and *Trichomonas vaginalis* (TV) infections. Samples positive and negative (controls) for these STIs were amplified and barcoded by PCR, targeting genes: *gyrA* (NG), *ntr6* (TV) and 23S rRNA (MG), which confer resistance to fluoroquinolones, metronidazole and macrolides respectively, and *omp1* (CT). A DNA library, constructed from a pool of these barcoded samples, was sequenced on Oxford Nanopore Technologies (ONT) MinION sequencer controlled by the smartphone operated "MinIT" hand-held processor. Data were analysed using ONT AMR workflow, with manual BLAST confirmation.

Results

Among PCR positives analysed, 25/26 of CT, NG or MG infections were clearly distinguishable from controls using sequence read counts, but discrimination of TV positives from controls was challenging as many had low pathogen loads (RT-PCR: cycle threshold >35) with associated low sequence read counts. Manual BLAST confirmed 3/3 NG, 2/10 TV, and 0/11 MG had fluoroquinolone, metronidazole and macrolide resistance-associated mutations respectively. Overall library preparation and sequencing time took approximately about five hours.

Conclusions

Single gene targeted nanopore sequencing for diagnosing and simultaneously identifying key AMR markers for four common STIs shows promise. Further work to optimise accuracy, reduce costs and improve speed may allow sustainable approaches for managing STIs and emerging AMR in resource poor and laboratory limited settings.

Vaginal microbiome profiling in Indian women with and without bacterial vaginosis.

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Background: Bacterial vaginosis (BV), a common condition among reproductive age women is associated with an imbalance of vaginal microbiota composition. It has been implicated in numerous adverse reproductive outcomes and increased risk of sexually transmitted infections. The vaginal ecology varies widely among women from various geographic and ethnic backgrounds. Our study aimed to explore the spectrum of bacterial communities in Indian women with and without BV and the association of individual species with Amsel's clinical diagnostic criteria.

Methods: 16S rRNA gene PCR and V3-V4 sequencing were performed on vaginal swabs from 38 women with BV (mean age= 30.84 years, Nugent score ≥ 7) and 16 healthy controls (mean age= 28.25 years, Nugent score ≤ 3). BV was assessed by Amsel's clinical criteria and confirmed by Nugent scoring of Gram stained vaginal smears. Taxonomic classification was performed using SILVA reference database.

Results: The vaginal community composition of women with BV was highly heterogeneous and characterized by species diversity and richness. Women with BV harbored high concentrations of *Gardnerella vaginalis* (>99% women), *Atopobium* spp (81.6%), *Prevotella timonensis* (73.7%), *Sneathia amnii* (73.7%) and *Sneathia sanguinegens* (63.2%). On the contrary, in healthy women with no evident symptoms of vaginitis, *Lactobacillus* species dominated the vaginal flora wherein *L iners* and *L gasseri* were the two most frequently detected species. Interestingly, *L iners* was noted in all women, irrespective of their BV status. The presence of *Atopobium* spp., *Sneathia* spp., *P timonensis* and *Eggerthella* spp., were strongly associated with all four clinical signs defined by Amsel's criteria.

Conclusion: *Lactobacillus* species including *L iners* and *L gasseri* are the predominant vaginal species found in the vaginal tract of Indian women of reproductive age. A heterogeneous vaginal community marked by the presence of *G vaginalis*, *Sneathia* spp., *Atopobium* spp., *Prevotella* spp., *Eggerthella* spp., is associated with BV and its clinical symptoms.

Changes in MSM's sexual activity, PrEP use, and access to HIV/STI testing during and after the first Dutch COVID-19 lockdown

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Background The COVID-19 pandemic and associated lockdowns have impacted MSM's sexual activity and access to HIV/STI-related services. This study among MSM in the Netherlands assesses COVID-19-induced changes in numbers of sex partners, condomless anal intercourse (CAI), PrEP use, and HIV/STI testing.

Methods From July 20th to September 11th 2020, MSM were recruited via social media to complete an online survey. 2182 respondents (Mage=40 years) provided data on their sexual activity in 3 bimesters before the first lockdown (T1 Jan.–Feb.), during the lockdown (T2 mid-March–mid-May) and after the lockdown (T3 June–July). PrEP use and HIV/STI testing were reported per semester.

Results The mean number of sex partners decreased by 39% between T1 and T2 and remained 12% lower at T3 than at T1. The number of CAI partners decreased by 36% between T1 and T2, and at T3 was similar to T1. A majority (62%) of PrEP users stopped using PrEP at some point because of COVID-19, of which 73% subsequently resumed PrEP. A fifth (20%) of respondents postponed/missed appointments for STI testing and 16% postponed/missed appointments for HIV testing. Only 39% of these respondents caught up on missed testing. Self-sampling/testing accounted for 1% of HIV testing and 1.2% of STI testing in the last semester before COVID-19 (past 7-12 months), and 5.5% and 2.7% respectively in the first semester with COVID-19 (past 0-6 months).

Conclusion Sexual behaviours that put MSM at risk of STI or HIV acquisition were significantly reduced during the first lockdown. However, reengagement in sexual activity and CAI was rapid in the two months after the lockdown. Resumption of PrEP use after an interruption was more frequent than catching up on HIV/STI testing. Further promoting self-sampling/testing may contribute to mitigating the adverse impact of a succession of lockdowns and periods of easing of restrictions.

Impact of increased asymptomatic testing for gonorrhoea among MSM on PrEP on the transmission and development of antimicrobial resistance

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Background: In many countries, men who have sex with men (MSM) using pre-exposure prophylaxis (PrEP) are routinely three-monthly tested and treated for *Neisseria gonorrhoeae* (gonorrhoea), which might increase antimicrobial resistance (AMR). However, there is uncertainty about how AMR emerges. We investigated the impact of frequent testing and treating on gonorrhoea prevalence and AMR assuming different ways of AMR emergence.

Methods: We developed a compartmental model, which included three sexual activity classes that differed in unprotected sex partner numbers and testing uptake. AMR to ceftriaxone was incorporated as stepwise increases in minimum inhibitory concentrations and eventual resistance (MIC drift) in three separate ways: direct selection pressure through ceftriaxone treatment; indirect selection pressure through antimicrobials treatment for other reasons; or imported infection. Each model was calibrated to the ceftriaxone MIC curve from the Dutch Gonococcal Resistance to Antimicrobials Surveillance program (2015–2019). We estimated the impact of three-monthly testing of high-risk MSM on overall and AMR prevalence in 2030.

Results: Overall gonorrhoea model prevalence was 3.4% (95% uncertainty interval 3.2%–3.5%), and 14.3% (11.7%–18.0%) in high-risk MSM. Three-monthly testing resulted in 66%–93% reductions in overall prevalence for all three ways in which AMR development was modelled. AMR prevalence was low in 2030 for all three mechanisms, but increased fastest with direct selection compared to indirect or imported. With direct selection, AMR prevalence was 1.7 (1.3–2.0) times higher than with indirect selection and 8.2 (2.7–16.1) times higher than through imported infection. When high-risk MSM increased numbers of unprotected sex partners, three-monthly testing reduced overall prevalence less and AMR prevalence increased, especially with direct selection.

Conclusion: With frequent testing of MSM, direct selection pressure through treatment leads to more gonococcal resistance than indirect selection or imported infection. This study highlights the need to increase our understanding of mechanisms of AMR emergence in *N. gonorrhoeae*.

Access to HIV-prevention in female sex workers in Ukraine between 2009 and 2017: coverage, barriers and facilitators

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Background: The comprehensive prevention package (PP) is an important intervention in reducing the burden of HIV amongst female sex workers (FSW) worldwide. According to the UNAIDS 90-90-90 goal, 90% of people at risk of HIV infection were to have access to the PP by 2020, however, in 2015 and 2017, only 46% and 48% of Ukrainian FSWs accessed the PP. Hence, we aimed to identify the barriers and facilitators associated with the access to HIV prevention amongst Ukrainian FSWs between 2009 and 2017.

Methods: We began by conducting a comprehensive literature review to develop a literature-informed conceptual framework. We then conducted a document analysis to identify the items of the Ukrainian prevention package (PP). Identified by our conceptual framework, we then conducted descriptive analyses using the Integrated Bio Behavioural Surveillance Surveys, to explore PP coverage from 2009 to 2017 and the influence of factors associated with access to the PP.

Results: Our conceptual framework illustrates that most thematic clusters which influence access to HIV prevention operate at the macrostructural level. 24 prevention items were included in the PP in 2012 and 2013, however this dropped to 7 items in 2014. Access to the Ukrainian PP increased from 2009 to 2013, where it peaked at 67.42%, however dropped to 32.10% in 2017. Our analyses of the IBBS identified that being a client of a non-governmental organisation, street and highway solicitation, non-condom use, and knowledge of HIV were associated with access to HIV prevention in the Ukrainian context.

Conclusions: Our novel study calls for colleagues designing future HIV prevention interventions to strongly consider the barriers and facilitators identified in our conceptual framework and the multiple structural levels on which barriers and facilitators operate. Colleagues can draw upon our findings to bolster the level of access for FSWs in their own countries.

Gender and sex - what should be measured and how? Learnings from Britain's National Survey of Sexual Attitudes and Lifestyles

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Background

Many social surveys have purported to measure 'sex', but this has been through interviewers' observation of outward appearance (e.g. clothing, name). In previous rounds of the decennial large-scale probability sample surveys of the British general population (www.natsal.ac.uk), this approach was used to make assumptions about the respondents' anatomy in the rest of the questionnaire. This is not appropriate and results in some misclassification. Although often used interchangeably, sex and gender refer to different concepts, and can differ. Here, we consider what aspects of sex and gender are relevant for a sexual health survey, and how these can be measured in a way that captures diversity, is acceptable, and is comprehensible to the general population. This informed development of questions for Natsal-4.

Methods

First, we reviewed international literature for questions about gender/sex in social surveys, censuses and sexual health research, including national (BASHH) recommendations. Second, we conducted stakeholder engagement. Third, we synthesised the findings from both activities into questions deemed appropriate for use with general population samples. Finally, questions were cognitively tested among 30 members of the general population (including three people who identified as trans/had a trans history).

Results

Several questions from the literature had undergone general population testing, however, there were no definitive or 'harmonised' questions. No existing set of questions captured the elements of sex and gender most relevant for a sexual health survey. Few studies addressed how to tailor detailed sexual partnership questions to account for trans partners. Our developed questions were found to be well understood and accepted by both trans and non-trans people in cognitive testing.

Discussion

We used a multi-stage process to identify a set of questions that seem to balance the needs of a diverse group of participants. These questions are subject to further piloting before being finalised for inclusion in Natsal-4.

Early impacts of COVID-19 on sex life and relationship quality: Findings from a large British quasi-representative online survey (Natsal-COVID)

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Background: By regulating behaviour at household level, COVID-19 restrictions drastically altered relationships. Given strong links between intimate relationships and health, we investigated how the pandemic impacted relational and sexual aspects of steady relationships in Britain in the 4-months following first national lockdown (23/3/2020).

Methods: 6,657 participants aged 18-59 years completed a web-panel survey questionnaire between 29/7-10/8/20. A quasi-representative population sample was achieved via quotas and weighting. We analysed sexual activity by age, gender and cohabitation status, and used descriptive statistics and logistic regression to explore self-perceived changes in sex and relationship quality among those in steady relationships (n=4,271).

Results: Of the full sample, 64.2% were in a steady relationship, mostly cohabiting (88.8%). Following lockdown, 48.9% of those in cohabiting relationships and 36.4% in non-cohabiting relationships reported sex (anal/vaginal/oral) at least weekly. Frequency of sexual activity varied by age, gender and cohabitation status. The majority reported no change in their sex life and relational quality compared with the months pre-lockdown. Among those perceiving change, quality of sex life was more commonly reported to deteriorate, whereas quality of relationship was more commonly reported to improve. Change – both positive and negative – was more commonly reported by younger people. Overall, 7% reported deterioration to a 'lower quality' relationship, with deterioration more commonly reported by those: in mid-life (35-44 vs. 45-59) (men, AOR:2.31; 95%CI:1.45-3.66; women, AOR=1.63; 95%CI:1.03-2.56); living in an urban area (among men) (AOR:2.61; 95%CI:1.15-5.90); and not living with a partner (among women) (AOR:2.01; 95%CI:1.28-3.16). Deterioration was associated with poor health and with decline in sexual aspects of the relationship.

Conclusion: COVID-19 led to an early net gain in relationship quality but net loss in quality of sex lives in steady relationships in UK. A sizeable minority of steady relationships were adversely affected with implications for sexual – and wider – wellbeing.

Exploring Freddie: Lessons from a Novel Virtual HIV PrEP Care Model in Canada

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Background/Purpose: To combat the HIV Epidemic, the concept of pre-exposure prophylaxis (PrEP) has gained considerable traction since demonstrating efficacy in 2012 and approval in Canada in 2016. Unfortunately, this HIV prevention method has not been ubiquitously taken up by those most at risk for many reasons, including difficulty in accessing care. Innovation, and necessity during the COVID pandemic, has increased the use of technology with new care models providing 100% of PrEP care virtually.

Approach: This presentation will focus on the impacts and early findings of Freddie, a novel and entirely virtual PrEP care model in Canada focused on gender and sexual minority communities. This online health program connects those most at risk of HIV transmission with affirming prescribers across multiple provinces to break down physical and social barriers to PrEP initiation and ongoing use.

Outcomes/Impact: Freddie has reached the benchmark of 1,000 patients in Canada, the majority of which have never been on PrEP before, representing a quick uptake in virtual PrEP services in Canada. The observations made thus far affirm theories that inclusive virtual care models can lead to increased access to STBBI prevention methods.

Innovation and significance: Presenters will discuss the innovative components of Freddie's virtual care model, explore findings as they relate to PrEP uptake and initiation by speaking to its initial successes and challenges, as well as how it addresses PrEP access barriers in Canada. This includes Freddie's focus on LGBTQ2S+ Canadians who are known to be at higher risk of HIV and historically have faced extraordinary barriers accessing sexual health care in inclusive settings. The intervention explored in this presentation continues to address such barriers through an innovative and accessible care model.

Etiology of cervicitis – are there new agents in play?

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Background

Considering the changing causative and resistance pattern of agents implicated in Sexually Transmitted Infections (STIs), etiological diagnosis is imperative especially in countries practicing syndromic management. This study was designed to diagnose cervicitis and to identify etiological agents associated with cervicitis.

Methods

Female STI clinic attendees presenting with cervico-vaginal discharge were examined for presence of cervicitis as per standard protocol. Endocervical swabs were collected for gram staining and Real time PCR was performed for various bacterial and viral STI agents in patients presenting with cervical discharge and clinical signs of cervicitis. A vaginal swab was also evaluated for bacterial vaginosis by Nugent's criteria.

Results

Of 64 patients with clinical cervicitis, 26.6% and 12.5% patients complained of genital itching and lower abdominal pain respectively. Mean of 36.6 pus cells/hpf were observed, appreciably greater number in patients with N.gonorrhoeae (NG) and C.trachomatis infections (p value 0.0063 and 0.0032 respectively). Pus cells were high (mean 68 pus cells/hpf) in patients with U.urealyticum, though this may be attributed to coexisting NG. Agents isolated from endocervix were Ureaplasma parvum 26(40.6%), N.gonorrhoeae, 17(26.6%), Mycoplasma hominis 11(17.2%), HSV2, 9(14.1%), Ureaplasma urealyticum 5(7.8%), T.vaginalis 4(6.3%), HSV1 and C.trachomatis, 1 each(1.6%) and Mycoplasma genitalium(0%). Bacterial vaginosis was diagnosed in 14(21.9%) patients. Multiple, two, three, four and five agents were isolated in 10, 6, 6 and 1 patients respectively. Isolation of M.hominis and U.parvum was significantly associated with bacterial vaginosis (p value 0.04 & 0.003 respectively). Non-usage of condoms predisposed to cervicitis.

Conclusion

Few C.trachomatis isolates, absence of M.genitalium and increasing prevalence of HSV, highlights the changing etiological pattern of cervicitis. Though U.parvum and M.hominis are usually commensals their high isolation, association with bacterial vaginosis and propensity to cause diseases in preterm infants and extragenital infections puts forth the need for further studies and regular monitoring of agents implicated in cervicitis.

Early impacts of the COVID-19 pandemic on sexual behaviour in Britain: findings from a large, quasi-representative survey (Natsal-COVID)

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Background: COVID-19 has impacted all aspects of life, including people's sex lives, via experience of the disease and measures to prevent transmission. We examined sexual behaviour in Britain during the initial national 'lockdown' (≥23/3/2020) and compared this to the 3 months pre-lockdown.

Methods: We analysed weighted web-panel survey data from a quota-based sample of 6,654 people in Britain. The questionnaire, fielded 29/7-10/8/2020, included questions about sexual activities pre- and during lockdown, and perceived changes in frequency between these timeframes. We used descriptive statistics and multivariable regression to examine independent associations with relationship status, age, gender, and health.

Results: Altogether, 91.2% of sexually-experienced participants reported any sexual activity during lockdown; 85.7% reporting 'in-person'/physical partnered activities. Around half reported no change in frequency of partnered-sex versus pre-lockdown, however, those not cohabiting were more likely than those cohabiting to report changes (75.6% versus 35.1%) - typically declines. Masturbation (62.0%) and virtual/digital activities (54.3%) were less commonly reported during lockdown, although they were more commonly reported in those not cohabiting versus cohabiting (69.2% versus 57.9%, 67.4% versus 46.7 %, respectively). Changes in reported frequency of virtual/digital activities were more common (66.4%) than in-person activities, with increases as likely as declines, except for porn use, where twice as many perceived an increase than a decrease. After adjustment, those reporting a decline in sex were more likely to be: non-cohabiting (AOR:1.68,95%CI:1.45-1.95), aged <25 years (AOR:1.99,1.57-2.51), male (AOR:1.17,1.02-1.35), to report depressive/anxiety symptoms (AOR:1.63,1.41-1.89) or COVID symptoms/diagnosis (AOR:1.24,1.01-1.52).

Conclusions: Most people reported some form of sex during lockdown and around half had not experienced changes in partnered-sex compared to pre-lockdown. However, considerable differences existed for certain populations (e.g. young people) that may exacerbate, or be exacerbated by, COVID-19's wider detrimental effects on physical and mental health. This potential intersectionality needs consideration when designing individual and public health interventions.

What are the risk factors for Chlamydia in women attending an abortion service in the UK?

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Background

The 2019 NICE abortion guidance suggested that prophylactic antibiotics should no longer be routinely given for medical abortions and instead recommended individual risk assessment.

Untreated Chlamydia trachomatis is an important cause of severe infection post abortion. In 2002, 75 (7.5%) of 998 women having an abortion tested chlamydia-positive using a nucleic acid amplification test (NAAT). Women attending our abortion service have been tested for Chlamydia using a NAAT. We wished to obtain contemporary estimates of Chlamydia prevalence and examine associated risk factors.

Methods

Data from 13,427 women aged 15-50 years having an abortion between April 2010 and March 2020, was retrospectively analysed (SPSS, IBM). Ethics approval was sought and all data was anonymised.

Results

Of 12,772 women with Chlamydia NAAT results available, 4.2% (565) were Chlamydia-positive. Chlamydia was associated with younger age ($p < 0.0001$, Chi-square) as 7.1% (164/2135) of 15-19 year olds, 5.5% (222/3782) of 20-24 year olds and 4.2% (560/6948) of women over 24 years were Chlamydia-positive. Chlamydia detection was associated with 2 or more partners within the past year in women aged 20-24 years, 8% (94/1181) vs 4.6% (106/2304) ($p < 0.0001$, OR 1.8; 95%CI, 1.35-2.39) and women over 25 years old, 4.2% (53/1270) vs 2.1% (95/4507) ($p < 0.0001$, OR 2.0; 95% CI 1.44-2.85) but not women aged 15-19 years old, 7.8% (50/643) vs 6.1% (83/1367) ($p = 0.13$ OR 1.3; 95% CI 0.91-1.9). For women who had a new partner in the last 3 months, findings were similar regardless of age.

Conclusion

Chlamydia prevalence in women undergoing an abortion is lower than that observed in 2002 but is higher than the general population. Although Chlamydia was associated with 2 or more partners in the previous year in women aged over 19 years, the association is weaker than that observed in the general population and no association was observed with partner change in women aged 15-19 years old.

Combination HIV/HCV/HBV/STIs prevention among MSM and use of mobile applications/social networks at the COVID-19 conditions in Ukraine

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Background/Purpose:

Restrictions of COVID-19 pandemic have made it more difficult to provide HIV testing and PrEP services to MSM in large Ukrainian cities. The purpose of the intervention is to maintain the effectiveness of the provision of these services during COVID-19 and to implement new/innovative and more mobile interventions in this regard.

Approach:

The methodology consists of conducting two national campaigns aimed at MSM recruiting in 3 largest cities of Ukraine, for conducting of HIV/STI/HCV testing, as well as to attract to the PrEP program, through targeted advertising on gay dating applications and social networks for directing to web-resources <https://gettest.com.ua> and <https://prep.com.ua>, for passing of testing and/or to receive equal counseling on PrEP, at Alliance.Global's testing points. All confirmed HIV-positive MSM have been provided a social support to receive ART; for HIV-negative MSM, we proposed to become a member of the free PrEP program.

Outcomes/Results:

Thanks to advertising on two web resources, during September-December 2020, 841 MSM registered for HIV/HCV/STI testing through the GetTest website and 80% of them were tested (the number of HIV-positive results was approximately 4%). 3244 MSM have learned about the PrEP program during this period, approximately 300 new MSM have been attracted to the PrEP program (the coverage of the PrEP intervention in 2020 amounted about 1,300 MSM).

Innovations/Conclusions:

Thanks to the introduction of two advertising campaigns on the Internet, at the COVID-19 conditions, as well as such innovative interventions as delivery of clients by taxi to receive PrEP in a medical institution, receiving the free premium accounts in the mobile gay application Hornet, compliance with sanitary norms (free masks, disinfectants, etc.) and mandatory pre-registration (to avoid queues), we were able to successfully save services, and increase the intensity of testing and staging to PrEP for MSM compared to the first half of 2020.

Integrating care for trans people: The Transclinic, a collaboration between Trans United Europe and the Public Health Service of Amsterdam

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Background/ Purpose:

Although public health based STI/HIV services are without costs available to key populations in the Netherlands, a gap in reaching some specific key communities is present, such as transgender people of the black, indigenous and people of color (BIPOC) community, especially those who have limited access to healthcare (due to homelessness, refugee-status, or sex workers). Additionally, these communities struggle to gain access to hormone replacement therapy (HRT). Combining STI/HIV services with reliable HRT can better engage these communities to public health services.

Approach:

In 2021, community-led transgender organisation Trans United Europe (TUE) started a collaboration with the sexual health department of the Public Health Service (PHS) of Amsterdam. TUE is organised by and for the transgender BIPOC community, and advocates for better transgender rights and healthcare policies. In 2017, TUE developed a transgender social center, operated by transgender sex workers, including a Transclinic to provide HRT. Limitations at the Transclinic were the lack of laboratory testing possibilities and limited support from health care professionals. By uniting the Transclinic with the services of the PHS, we are able to provide multidisciplinary services, including social support, patient-empowerment, HRT, STI/HIV testing and provision of pre-exposure prophylaxis.

Outcomes/ Impact:

By reaching this previously unsuccessfully engaged population, several public health concerns can be addressed, including prevention and early detection of HIV, improving linkage to care for those living with HIV, prevention of STI transmission and of harm caused by informal HRT. Strong community-led social support encourages patient-empowerment and trust in available medical health services.

Innovation and significance:

Fusing peer-to-peer organisations with professional healthcare organisations may result in increased access to key communities and improved health outcomes. Combining services from TUE and the PHS of Amsterdam resulted in the first alliance in the Netherlands between a public health service and a transgender-led organisation.

Relationship between three novel bacterial vaginosis (BV) associated bacteria and nongonococcal urethritis in men who have sex with women

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Background: Bacterial vaginosis associated bacteria (BVAB) have been detected among cisgender men who have sex with women (MSW) and may be associated with clinical syndromes in men. We evaluated the frequency and correlates of three BVAB in MSW and their association with nongonococcal urethritis (NGU). **Methods:** MSW without *Neisseria gonorrhoeae* attending an urban STD clinic from 2014-2018 completed a computer-assisted self-interview, clinical interview and examination. NGU was defined as ≥ 5 polymorphonuclear leukocytes/hpf on a urethral Gram stain plus urethral symptoms or visible discharge. Urine specimens were tested for *Chlamydia trachomatis* and *Mycoplasma genitalium* using Aptima (Hologic, Inc.) and for BVAB2, *Mageeibacillus indolicus*, *Sneathia* spp., *Trichomonas vaginalis*, *Ureaplasma urealyticum*, herpes simplex virus, and adenovirus using quantitative PCR (qPCR). A subset of men contributed serial monthly specimens over 6 months.

Results: Of 317 MSW ages 17-71, 67 (21.1%) had *Sneathia* spp., 36 (11.4%) had BVAB2, and 17 (5.4%) had *M. indolicus* at enrollment. Co-colonization with >1 BVAB was observed in 50% (36/71). No demographic and few behavioral characteristics were associated with these BVAB; only having multiple partners (≥ 3 past two months) was more common among men with than without these BVAB (BVAB2: 47% vs. 23%, *M. indolicus*: 53% vs. 24%, *Sneathia* spp: 42% vs. 22%, $p \leq 0.03$ for all). *Sneathia* spp. were associated with lower odds of prevalent NGU (adjusted Odds Ratio [aOR]=0.36, 95% CI=0.13-0.97) whereas neither BVAB2 nor *M. indolicus* were associated with prevalent NGU (aOR=0.62; 95% CI 0.15-2.55; aOR=3.12; 95% CI=0.63-15.54). In 34 men with serial samples, persistence was common and not significantly different between BVAB (median persistence for BVAB2=2 months (range=2-6); *M. indolicus*= 4 months (range=3-5); *Sneathia* spp.=3 months (range=2-8); $p \geq 0.20$ for each comparison).

Conclusions: BVAB2, *M. indolicus*, and *Sneathia* spp. were frequently detected in MSW attending an STD clinic, but not associated with increased risk of prevalent NGU.

Characteristics of pregnant women, partners, and partner treatment preferences among women undergoing sexually transmitted infection screening, Rawalpindi, Pakistan

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Background: This study sought to characterize dyads of pregnant women and their partners in Rawalpindi, Pakistan, and to understand STI partner notification and treatment preferences in this population.

Methods: We enrolled pregnant women seeking antenatal care at Holy Family Hospital from September to December 2019 and performed STI testing. We used interviewer-administered surveys to collect medical, social and sexual histories, and partner treatment preferences. Participants testing positive for STIs and their partners were treated.

Results: We enrolled 1001 women seeking antenatal care in Rawalpindi, Pakistan. Of those participants, nearly all were married (99.7%) and unemployed (95.6%), while 92.7% of their partners worked full time. A majority achieved an equal (38.6%) or higher (27.9%) level of education than their partner. Within these dyads, 40.6% reported rarely or never being asked for permission before sex, and only 9 participants reported initiating sex (0.9%). The majority reported never using condoms before (87.8%) or since (95.5%) becoming pregnant. Nearly all participants would be comfortable disclosing the results of their STI test to their partner (99.9%) and would inform their partner of a positive result (98.4%). Of those who were diagnosed with an STI (11) and were not lost to follow-up (6), 100% of partners received treatment via expedited partner therapy, although 0% of partners sought further care.

Conclusion: In this population of pregnant women from Rawalpindi, Pakistan, participants were largely married, unemployed, and educated to at least an equal level as their partner. STIs were rare despite lack of consistent condom use, and participants were willing to notify partners of STI results. Nearly half of participants testing positive for an STI were lost to follow-up, raising concerns for adherence; the remainder, however, successfully delivered treatment to their partner, suggesting that antenatal screening programs in this setting would be successful despite low case positivity rates.

PrEP Care Continuum: Perceptions and Experiences of Black Same-Gender-Loving Men from a Southern U.S. City

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Introduction: U.S. HIV/AIDS Strategy has prioritized men who have sex with men (MSM) and people in the Southern U.S. as key populations for HIV prevention interventions. We—a community-academic partnership—conducted formative research on the PrEP care continuum with Black same-gender-loving men (BSGLM) in a Southern U.S. city.

Methods: We conducted six focus group discussions (FGDs) with 35 BSGLM; most had never used PrEP. We explored PrEP awareness and acceptability—the continuum’s first stage. We also conducted 18 in-depth interviews (IDIs) with BSGLM who have taken or discussed PrEP with a provider. The IDIs focused on PrEP uptake—the continuum’s second stage—and adherence and retention in care—the final stage. All FGDs/IDIs were recorded, transcribed, and analyzed using applied thematic analysis.

Results: FGD—participants said BSGLM are generally aware of PrEP, but misinformation exists and knowledge of PrEP-related services is limited. Perceived risk influences PrEP interest—participants explained that BSGLM consider their receptive or insertive role when evaluating HIV vulnerability and BSGLM who do not identify as gay are less interested in PrEP. Fears are also common, including fear of facing consequences of past risky behaviors, others learning of one’s PrEP use, and talking to providers about sexual behaviors. Participants also described existing discrimination and stigma toward BSGLM from multiple sources, including the Black community and the broader MSM community, and concerns about PrEP-related stigma. IDI—participants said PrEP provides a “peace of mind” but acknowledged challenges with pill taking. Several also described experiencing PrEP-related stigma as well as stigma from the Black community for being a Black gay man.

Conclusion: We need multi-level interventions that support BSGLM at each stage of the PrEP care continuum. BSGLM need information to make informed decisions about PrEP and supportive community environments to use PrEP for as long as risk persists.

Episodic PrEP Use among Young Women in Siaya County, Kenya

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Introduction: The DREAMS Initiative provides PrEP to young women (YW) in Siaya County, Kenya, to combat the region's high HIV incidence. Women must take PrEP consistently for three weeks for full protection; episodic use may diminish PrEP's effectiveness. We describe findings on episodic PrEP use from participatory-based research to identify multi-level factors influencing YW's PrEP use.

Methods: Using photovoice, YW and four groups in their social ecology—female peers, male peers/partners, family, and community members, including healthcare providers—participated in four iterative activities. First, participants photographed factors influencing YW's PrEP persistence. Second, participants discussed photographs with their own group (e.g., YW discussed with other YW). Third, YW and members in other groups (e.g., female peers) discussed each other's photographs and answered questions on themes from previous discussions. Fourth, YW shared individual experiences on themes during in-depth interviews. All discussions/interviews were audio-recorded, simultaneously translated/transcribed, and analyzed using applied thematic analysis. We focus on data from YW and female peers.

Results: During group discussions, YW and female peers (n=27) explained that YW perceive male partners as the primary source of HIV risk. As a result, YW commonly stop taking PrEP when partners are away for a few days to several weeks; they start taking PrEP again the day their partners return. Participants stressed that taking PrEP consistently for three weeks may be difficult for some because YW are unaware of their partners' return date and husbands' unwillingness to delay sex. Among YW interviewed (n=18), nearly all their partners traveled, and about one-third reported stopping PrEP during their partners' absences. Reasons two-thirds continue include not knowing partners' sexual behaviors when traveling, and because PrEP provides HIV protection in case of accidents or rape.

Conclusion: Counseling on PrEP persistence during partners' short absences is essential for PrEP to be most effective among YW in Kenya.

Chlamydia trachomatis and Neisseria gonorrhoeae DNA stability in preserved first-void urine

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The aim of this study was to evaluate the performance of UCM (Urine Conservation Medium, Novosanis) for Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) DNA preservation at room temperature (RT).

To compare the stability of CT and NG DNA in unpreserved and UCM-preserved samples, five urine samples were spiked to obtain 99 CT and 75.5 NG DNA copies/μL in the final aliquot. For UCM-preserved samples, UCM was spiked and urine was added in a 2:1 (urine:UCM) ratio to mimic real-life use of Colli-Pee containing UCM. A total of 30 aliquots were analyzed using the Abbott Real-Time CT/NG assay after storage at RT for 1, 8 and 15 days. Mixed-effect regression analysis was used to estimate the effect of UCM on CT and NG Ct values at each timepoint, with urine samples as random effects.

After 15 days of storage, all UCM-preserved samples were positive for CT and NG, while only one and three unpreserved samples remained positive for CT and NG respectively. Ct values where samples were negative for CT and/or NG were defined as the cut-off values (cut-off 8d: CT=39.66, NG=39.93; cut-off 15d: CT=39.56, NG=39.92). At each timepoint, Ct-values for CT and NG were significantly lower for preserved compared to unpreserved samples. At 1, 8 and 15 days of storage UCM-preserved samples showed an estimated differences of -6.03, -5.91 and -4.60 cycles for CT, and -6.91, -7.20 and -7.36 for NG respectively. All effects are statistically significant with $p < 0.01$.

UCM-preserved urine sampling enables preservation of CT and NG DNA for 15 days of storage at RT. The use of Colli-Pee, whereby the collector tube is prefilled with UCM, allows for immediate mixing of urine and preservative. This offers opportunities for home-based testing where sample quality is maintained during storage and sample shipment to the laboratory by regular postal mail.

A wide variety of intravaginal practices should be considered in research studies in rural South Africa

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Background. The vaginal microbiome and genital tract inflammation play an important role in HIV transmission and birth outcomes in South Africa. Intravaginal practices (IVPs) such as cleansing may influence the microbiome and levels of inflammation. IVPs are commonly practiced by women in South Africa, however, studies generally only include collection of data on cleansing and insertion of herbs.

Methods. We conducted an exploratory study to obtain insight in the variety of IVPs practiced by women in the rural Eastern Cape province of South Africa. Group discussion was held with participants (n=10) in an STI workshop and additional information was obtained through snowballing. Participants were two medical doctors, two project managers, two nurses, and four counsellors/social workers. IVPs that participants were aware of or had heard about were recorded.

Results. Other than intravaginal cleansing and insertion of herbs, participants had knowledge of women inserting a variety of substances in their vagina such as snuff (tobacco powder), ice cubes, toilet refreshener, Chinese pills, uvutha wabafazi (a traditional vaseline-like ointment), Indian holy ash, soft drinks and Vicks VapoRub. Intravaginal use of live organisms (Kombucha aka Amoeba mabhebeza, frogs and snakes) was also known. In addition, genital steaming practice is common using water with salt, onion, avocado seeds, guava leaves. Finally, external and internal sanitary packs created of potato sack or newspaper are used. The purpose of all these practices was to enhance male sexual pleasure, genital health, for sexual fortune and energy, and for traditional healing purpose.

Conclusion. Studies of genital tract microbiome and inflammation in women in rural South Africa should take a wide range of IVPs into account. Further research is required to document the frequency and geographic spread of these practices, and their impact on genital health.

Performance characteristics of the PlexPCR® VHS assay for detection of *Treponema pallidum* and other pathogens in genital and extragenital lesions

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Background:

Syndromic management for STIs can result in treating for several pathogens, which can lead to mistreatment and/or overtreatment. We implemented the PlexPCR® VHS, a qualitative real-time PCR assay for simultaneous detection of four pathogens: *Treponema pallidum* (TP), herpes simplex virus (HSV) types 1/2, and varicella zoster virus (VZV) in genital and extragenital lesions of STI-clinic users diagnosed with early syphilis.

Methods:

We enrolled patients presenting early syphilis in Lima and Pucallpa, Peru. From any lesions, we collected lesion exudate with a dacron swab in a microtube with 500µl of lysis buffer, followed by DNA extraction and amplification using a conventional PCR assay to detect tp0574 and tp0548 target genes for TP. DNA samples were also amplified using the PlexPCR® VHS kit (SpeedX, Australia). We assessed the performance of the PlexPCR® VHS kit TP component and conventional PCR compared to clinical diagnosis.

Results:

We screened 51 lesions, most (86%) from patients with primary syphilis, 17% were atypical syphilis lesions (painful ulcers). PlexPCR® VHS detected only TP among 31/51 (61%), only HSV-2 among 7/51 (14%) and four (8%) co-infections (two of HSV-1/TP and two of HSV-2/TP). Nine (17%) were negative for all pathogens (four without detectable DNA) and none were VZV positive. The PlexPCR® VHS kit detected TP in 35/51 (69%) lesions compared to 29/51 (57%) detected by conventional PCR, indicating the percent agreement with clinical diagnosis. Among the nine atypical lesions, PlexPCR® VHS found four TP positive and three HSV-2 positive, while conventional PCR detected only three TP positive. Among the cases of primary syphilis, 32/44 (73%) had detectable TP DNA using PlexPCR® VHS and 27/44 (61%) using conventional PCR.

Conclusions:

The PlexPCR® VHS kit increases the accuracy of TP detection from lesion samples. Other STI pathogens were also detected in lesions.

The Impact of the COVID-19 pandemic on STI services in the Eastern Cape Province of South Africa

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Background. The coronavirus disease-2019 (COVID-19) pandemic has severely impacted South Africa. Healthcare service provision and utilisation have been affected by socio-economic factors, reduced mobility, and reprioritisation as well as interruption of services. The impact of the COVID-19 pandemic on STI services is unclear.

Methods. In this non-randomised study, we used the male urethritis syndrome (MUS) quarterly data from the clinical surveillance sites in the Eastern Cape (EC) province of South Africa. MUS is the main proxy measure of STI services in South Africa. MUS data were compared for a 12-month period before COVID-19 (April 2019–March 2020) and a 9-month period during the COVID-19 epidemic (April–December 2020) in each of the 8 districts. MUS data were related to the magnitude of the COVID-19 epidemic at the end of December 2020 as defined by the number of laboratory-confirmed COVID-19 cases over the population size.

Results. The quarterly number of MUS cases dropped by 30% overall in the EC province, from 13072 before COVID-19 to 9142 cases during the COVID-19 epidemic ($p < 0.001$). The reduction in quarterly MUS cases varied between districts, with 11% for the smallest and 45% for the largest reduction. The COVID-19 burden ranged from 0.72% to 4.19% between districts. There was a clear positive association of reduction in reported MUS cases and the burden of COVID-19, with districts with the largest COVID-19 burden showing the largest reductions in MUS cases (R-square 0.83, F 30.057, $p = 0.002$).

Conclusion. These data demonstrate a clear reduction in STI services resulting from the COVID-19 epidemic in the rural Eastern Cape Province of South Africa. Although underreporting may have occurred, taking reports of higher population vulnerability and increased rates of unprotected sex into account, the reduction in reported MUS cases suggest that COVID-19 may have increased the burden of untreated STIs in our community.

Estimating adult gonorrhea prevalence in Brazil

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Background: Brazil has a nationwide antimicrobial susceptibility surveillance program for *Neisseria gonorrhoeae*. Gonorrhoea, however, is not a notifiable disease and there are limited data on the burden of infection in the country.

Methods: We searched Embase PubMed, LILACS, Scielo for studies in any language providing data on the prevalence of urogenital gonorrhoea in 2000 or later in Brazil, with a sample size of 50 or more, and that used an internationally recognized diagnostic test on urine, urethral, or cervicovaginal specimens. The latest search was done on 10 November, 2020. In addition, we searched abstracts from the Brazilian STI congress (years 2010 to 2019) and Ministry of Health reports. The Spectrum-STI statistical model was used to estimate prevalence trends in 15–49 years-old men and women in the general population (excluding STI patients, HIV-positive populations and Transgender women). Prevalence trends were estimated for sexually active women and men, female sex workers and men who have sex with men. For populations with 3 or fewer prevalence data points Spectrum-STI uses time constant prevalence ratios from the WHO 2016 global STI estimates. Population size estimates were from Brazil's National Survey of Knowledge, Attitudes and Practices of HIV and other STIs (PCAP-2013).

Results: We identified 48 studies that met the study entry criteria providing 47 data points for women and 7 for men. After excluding studies done exclusively in HIV positive individuals or individuals seeking STI treatment we had 29 data points for women and 6 for men. The Spectrum-STI national prevalence estimate for 2020 for adult women was 0.63%(0.13-2.23) and for men 0.70%(0.16-2.44).

Conclusion: The prevalence of urogenital gonorrhoea in Brazil appears to be low. Data on the prevalence in men, however, are very limited. The results from this study are being used to inform the design and prioritization of new surveillance surveys.

High Prevalence of Macrolide and Quinolone-Resistance Mediating Mutations in *Mycoplasma Genitalium* Among Gay and Bisexual Men (GBM) in Montréal, Canada

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Background

Mycoplasma genitalium (MG) easily develops resistance to azithromycin and moxifloxacin, currently recommended first- and second-line treatments, respectively. Population-based data on prevalence of MG resistance mutations (macrolide and fluoroquinolone) are lacking. We estimated this prevalence among GBM.

Methods

The Engage study used respondent-driven sampling (RDS), to recruit sexually active cisgender and transgender men, ≥16 years. Participants completed a computer-assisted self-interview. Pharyngeal, urine and rectal specimens collected at cohort study visits between 11/2018-11/2019 were analyzed using Seegene Allplex™ CT/NG/MG/TV assay. MG positive samples were further analyzed using Seegene Allplex™ MG & AziR and Allplex™ MG & MoxiR assays.

Results

MG infection was detected in 44/717 participants. Resistance assays were performed on samples from 41 participants; median age=31yrs, 78% identified as gay, 17% were HIV-positive, and 20% reported C. trachomatis or N. gonorrhea infection over the past 6 months. Information on symptoms at study visit was available for 33 participants; all were asymptomatic. Sites of infection were rectum (n=23), urethra (n=16) or pharynx (n=2). Macrolide-resistance mediating mutations (MRMM) in 23S rRNA gene were found in 31 samples (A2058G, n=4; A2059G, n=27); 6 were wild-type and 4 failed to amplify MG. Prevalence of MRMM was 31/37 (84%). Quinolone-resistance mediating mutations (QRMM) in parC gene were found in (G248T, n=10; G248A, n=1; A247C, n=1); 25 were wild-type and 4 failed to amplify MG. No QRMM in gyrA gene was found. Prevalence of QRMM was 12/37 (32%). Combined mutations in 23S rRNA and parC genes was found in 11/35 MG-positive samples (31%).

Conclusions

Among asymptomatic MG-infected GBM in Montreal, almost one-third were infected by MG strains harboring resistance mutations to both antibiotics currently used to treat symptomatic infections. It is important that clinicians be aware of this high level of circulating resistance, have increased access to MG testing, and adjust their treatment strategies accordingly.

Is syndromic management approach of STI adequate among HIV positive Key population? Systematic data review in Nairobi Kenya

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Back ground

Sex workers Outreach Program (SWOP) is an STI/HIV research center serving 35000 female sex workers (FSW) through outreach services with 18000 seek HIV/STI services from the seven SWOP facilities spread across Nairobi Kenya. Program analysis showed high use of STI syndromic management antibiotics compared to budgetary allocations. This study was done to identify the gap

Methodology

Systematic data review of HIV positive FSW attending SWOP clinics and having been treated STI through syndromic management was done for the last two years 2020 and 2019. Data was pulled for all female sex workers who had been managed for STI syndromically, HIV status was checked and those who had a HIV diagnosis were retained in the study data base (this is because the HIV positive frequent the sites at least four times in a year compared to HIV negative FSW) Data was then separated into one time STI treatment and revisits with the same signs and symptoms for more than once in one year. Data on consistence condom use was also extracted

Results

Out of the 17,900 Female sex workers accessing SWOP facilities for key population services, 3038(16.9) were HIV positive. Of this HIV positive at least 4% (122) were treated for STI through syndromic management with highest 66% (81) reporting low abdominal pains with vaginal discharge. 52% (64) come back with same symptom twice of which 79%(51) reported consistent condom use, while 23% (15) come back at least more than twice with the same complains within a year with 89% reporting consistent condom use.

Conclusion

Given the nature of work, female sex workers have a high possibility of STI misdiagnosis. Hence countries should strive to invest in laboratory screening of STI among female sex workers to improve on correct diagnosis and treatment to reduce unnecessary use of antibiotics

Association of *Chlamydia trachomatis* bacterial load with the presence of symptoms in STI patients

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Urogenital infection with *Chlamydia trachomatis* is the most frequently diagnosed sexually transmitted infection (STI) worldwide. The term bacterial load refers to the measurable quantity of bacteria, typically in a clinical sample. This quantity has been associated with transmission ability and the clinical course of a number of infections. In this study, we set out to determine whether the presence of urogenital symptoms of *C. trachomatis* infection in women correlates with their quantified bacterial load.

Data from a cohort of 226 women patients (Public Health Service of Amsterdam, Infectious Diseases Department, STI outpatient clinic, Amsterdam, The Netherlands) who tested positive for urogenital *C. trachomatis* infection were used in this study. Patients were also tested for other concurrent STIs to exclude symptoms based on other common urogenital infections. In performing quantification of the Chlamydial load using quantitative PCR approach, the following primers were used: single-copy *OmpA* gene (MOMP), coding for the major outer membrane protein, and primers targeting the MHC class II antigen (HLA-DQA1) single-copy gene for eukaryotic cell determination. Quantification of HLA gene allowed for normalization of the sample (CT/cell determination). All values for MOMP and plasmid were normalized by means of endogenous control gene HLA. Exclusion criteria were unsuccessful amplification or presence of symptoms in samples with less than 0.01 MOMP/100 cells or and/or plasmids/100 cells that were simultaneously positive for other microorganisms. The latter criterium was introduced in order to ensure that the observed symptoms are not triggered by another urogenital pathogen.

The cohort comprises *C. trachomatis* serogroups B (51%), C (14%) and intermediate (27%). The remaining patient cases were mixed (8%). Currently we are in the process of finalizing the remaining analyses. Preliminary results show there is a relation with CT load and symptoms, as a function of the Cp PCR value, the HLA load and the performed correction.

Risk, Culture, and Needs Correlated to HIV Program for Youth in Kota Kupang, East Nusa Tenggara (A Qualitative Study)

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Background

Young people of age 20-49 years were the biggest proportion (70's%) of cumulative Indonesian People Living With HIV AIDS (PLWHA). Kupang City as capital of East Nusa Tenggara is the entrance for development and has consequences to HIV and STIs. We conducted qualitative research about HIV and ART for pregnant women. The risk, culture, and needs related to the youth arise as concern; therefore we accomplished separated data analysis. This paper aim is to describe the risk, culture, and needs correlated to HIV program for the youth in Kupang City, East Nusa Tenggara.

Method

A qualitative research was accomplished in 2017 through in-depth interview and Focus Group Discussion with 55 informants. Discussions were about conditions, risk, culture, and needs that related to HIV programs. Themes that come up then combined to be concluded.

Results

Youth in Kupang City have early sexual debut because lack of knowledge about reproductive health, which is considered taboo, while inhabit public lodgings as urbanite due to lack of schools in villages. Sex was trade for lifestyle and economic influences, while shaman provide access for abortion. Traditional marriage is very strongly held, while civil marriage delayed until the dowry fulfilled. Women position is lower and men higher position must be restrained. Increasing tourism area also increases the risks. Needs expressed were character reinforcement began on parents by alarming the community into being careful in preventing HIV transmission, fighting stigma by giving social positions to PLWHA, and intensive health promotion must be given at school.

Conclusion

The risks of youth in Kupang City to HIV and STIs arise from lack of knowledge, separation from parents, delayed civil marriage, increasing tourism, and influence of lifestyle and economic needs. Approaches to improve HIV program for the youth need to respect the culture and tackle multidimensional problems.

Acceptability of self-collected samples for diagnosis of sexually transmitted infections among transgender women in São Paulo cohort study

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Background: As a component of an ongoing cohort study measuring the incidence of HIV among transgender women in São Paulo, Brazil, this study assessed the acceptability of introducing self-collected sampling for the etiological diagnosis of sexually transmitted infections (STIs). Etiological diagnosis would require sampling potential anatomical infection sites, including oropharyngeal, anorectal, urethral, neovaginal and urine samples.

Methods: A convenience sample of 23 participants during a scheduled study visit were recruited to this study between October and November 2018. All participants reported being assigned male sex at birth and identified with a feminine gender identity at time of study, with one participant having gender-affirmative surgery to remove their male genitalia. Data collection was through a short investigator-led questionnaire in Portuguese, and included presentation of investigator-designed, gender-neutral instructional diagrams for self-sampling. Three supplemental focus group discussions guided by semi-structured script were conducted in Portuguese between September and October 2019.

Results: All participants (100%; n=23) indicated willingness to provide samples for STI screening during a future study visit. Participant preference was for self-collection of urine samples (82.6%; n=19), urethral swabs (81.8%; n=18), and anorectal swabs (77.3%; n=17). A lower preference for self-collection of oropharyngeal swabs (47.8%; n=11) was observed. Most respondents (78.3%; n=18) indicated that they would not prefer sampling to be collected by a health professional, mainly due to 'more privacy' (72.2%; n=13). All participants (n=20; 3 missing) indicated that they would feel comfortable to provide a self-collected sample based on instructional diagrams shown.

Conclusion: This study suggested acceptability among transgender women of introducing self-collected sampling for etiological diagnosis of STIs from potential infection sites. Novel gender-neutral instructional diagrams received positive responses of understanding to enable self-collected samples, with further development and testing warranted. Uptake and usability will be explored in TransOdara, a cross-sectional STI prevalence study of transgender women in Brazil.

STI incidence after STI treatment among women at risk for HIV exposure initiating safer conception care in southwestern Uganda

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Background: Sexually transmitted infection (STI) recurrence contributes to the high global STI burden. We introduced STI screening and facilitated partner notification (PN) and treatment among women participating in a safer conception study in southwestern Uganda to understand impacts on STI incidence.

Methods: A parent study enrolled women planning for pregnancy with a man with HIV or of unknown serostatus to assess pre-exposure prophylaxis use for safer conception. STI screening began after study-start, and all eligible women completed screening for chlamydia, gonorrhea, and trichomoniasis via GeneXpert nucleic acid amplification testing and syphilis via immunochromatographic testing and rapid plasma reagin. Multivariable Poisson regression was used to determine incident STI correlates.

Results: Of 134 women in the parent study, 94 underwent enrollment STI screening, of whom 23 were positive. Median age was 31 (IQR 28-35) years. All participants with STIs received counseling and treatment; 21/23 participants accepted PN cards and 18/23 accepted patient-delivered partner medications. By the six-month study-visit, 81 participants repeated STI testing (N=66 at that visit, N=15 at incident pregnancy visit; whichever came first); 13 participants were lost to follow-up. Of those with enrollment STIs, 19/23 returned for follow-up at six months; 18 reported delivering PN cards and discussing STIs with partner(s) and 14 reported medication delivery to partner(s). Incident STIs occurred in 17/81 participants with 42.57 person-years of follow-up (incidence rate 40/100 person-years). STI incidence was associated with enrollment STI (incidence rate ratio [IRR] 3.39, 95% confidence interval [CI] 1.22-9.43) and alcohol consumption (IRR 3.18, 95% CI 1.15-8.85).

Conclusions: We demonstrate a high STI prevalence and incidence among women planning for pregnancy in Uganda despite partner treatment promotion efforts. These infections are likely driven in part by re-infection from untreated partners. Novel STI PN interventions are needed to decrease the STI burden, especially among women planning for and with pregnancy.

Mycoplasma genitalium-reactive antibodies in serum and urethral specimens of persistently infected men

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Background: Mycoplasma genitalium (MG) is a sexually transmitted pathogen associated with acute and chronic genital tract infection in men and women. Although MG-reactive antibodies have been detected in cervicovaginal specimens of infected women, antibodies at the site of infection in men have not been characterized. We compared MG-reactive antibodies in serum and urethral swabs of MG positive and negative men with urethritis to better understand the immunopathogenesis of MG.

Methods: Paired urethral swab and serum specimens were collected from men enrolled in a double-blinded study comparing azithromycin and doxycycline for treatment of non-gonococcal urethritis conducted from 2007-2011. Among 22 MG-positive men, antibody reactivity to MG was determined by immunoblot for specimens collected at enrollment and the last MG-positive visit (15-86 days later). Paired specimens from 13 MG-negative men served as controls.

Results: In serum specimens, MG-reactive antibodies were detected in all 22 MG-positive men. In 10 men, increasing reactivity to the MgpB and MgpC immunodominant adherence proteins occurred over time. In comparison, sera from MG-negative men reacted poorly (7/13) or not at all (6/13) to these proteins. In urethral specimens, MG-specific antibody was detected in 22/22 MG-positive men demonstrating these antibodies are present at the site of infection. Surprisingly, antibody reactivity in urethral specimens decreased over time in 12/19 patients despite the persistence of antibodies in serum and MG in the urethra. Among MG-negative men, 8/13 had detectable MgpB/MgpC reactive antibody in urethral specimens but reactivity was very low.

Conclusion: Serum antibodies to MG correlated well with infection status, but local antibodies did not. Despite the persistence of MG in the urethra, antibody reactivity at the site of infection diminished over time. Whether this reduced reactivity reflects reduced bacterial load over time, or whether diminution of local antibodies contributes to persistent infection should be examined in future studies.

Detection of treponemal tp47 and tp0548 genes in lesion swabs from syphilis patients

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Background:

Typical syphilis ulceration (chancre) can appear at the site of sexual contact during primary syphilis, and this lesion can be swabbed for detection of *Treponema pallidum* DNA. Two well-known gene targets for syphilis detection are tp47 and pol A with sensitivities between 60-70%. The use of *T. pallidum* PCR in primary and secondary syphilis diagnosis and confirmation are recommended in European and CDC guidelines respectively. We evaluated tp47 and tp0548 as molecular screening targets; either target, if present, would indicate the presence of *T. pallidum* in the sample.

Methods:

Participants with syphilis clinical diagnosis were enrolled in a cohort study in Peru in 2019 and 2020. All participants were clinically examined to determine the presence of lesions. Lesion exudate was collected with a dacron swab and stored in a vial with 500ul of lysis buffer. *T. pallidum* DNA was extracted and tested using specific primers in conventional polymerase chain reaction (PCR) to amplify tp47 and tp0548 target genes.

Results:

Overall, 61/162 participants presented with lesions, and 27 (43.5%) of them had *T. pallidum* DNA detected by either tp47 or tp0548 targets. The frequency of finding both targets in the same sample was 15/27 (55.6%). Only 1 sample was positive for tp47 but negative for tp0548, while 34 samples were negative for both *T. pallidum* targets. Additionally, only tp0548 was detected in 11 samples. We found tp47 in 16/61 (26.2%) samples and tp0548 in 26/61 (42.6%) samples. Adding the tp0548 screening target, increased the detection of *T. pallidum* by 69%.

Conclusion:

tp0548 may help as a screening target to increase the detection of *T. pallidum* in lesions. Thus both markers are necessary to increase sensitivity of detection *T. pallidum* DNA in lesions.

Secreted Proteolytic Activity of Bacterial Vaginosis-Associated Bacteria

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Bacterial vaginosis (BV) is a prevalent dysbiotic vaginal condition associated with increased risk for acquisition/transmission of sexually transmitted infections (STIs). While the microbes present in women with BV are highly variable, functional features such as increased catabolism of peptides/amino acids are relatively conserved. To date, the bacterial proteases initiating this process and identity of host protein targets remain undefined. We hypothesized that broad-acting proteases are secreted by BV-associated bacteria and modulate host factors relevant to STI acquisition.

Bacterial suspensions and cell-free supernatants from select BV-associated species were evaluated for proteolytic activity using the universal protease substrate, casein, in agar plates and fluorometric assays. Degradation of collagen was explored using zymography or fluorophore-conjugated collagen with or without inhibitors. Fibrinogen/thrombin degradation was explored through clot inhibition assays and protein gel electrophoresis.

Our investigations reveal that BV-associated bacteria including *Prevotella amnii*, *Prevotella bivia*, *Porphyromonas asaccharolytica*, *Porphyromonas uenonis*, *Sneathia amnii*, *Sneathia sanguinegens*, *Gardnerella vaginalis*, and *Gardnerella piotti* produce secreted proteases with broad substrate specificity. However, only select species degrade specific host protein polymers, namely collagen. Further investigation of *Porphyromonas* enzymes revealed that metallo- and cysteine proteases coordinate broad activity. Both species secrete three collagenases, which were fully abrogated by metalloprotease inhibitors in *P. uenonis*, but not *P. asaccharolytica*. Finally, both species degrade fibrinogen and thrombin to abrogate blood clotting.

These studies reveal proteolytic activity is conserved among numerous vaginal bacteria with important roles in BV pathogenesis. However, modulation of specific host targets is more variable. Vaginal *Prevotella* and *Porphyromonas* species increase risk of HIV acquisition and our findings show *Porphyromonas* species exhibit proteolytic activities through diverse and redundant enzymes. These activities could induce barrier disruption and microhemorrhage in the cervicovaginal niche, thereby increasing the risk of STI acquisition. Further characterization of secreted proteases and their targets could identify new therapeutics for BV and STIs.

Maintaining Services, Responding to Need: The Kingston (Ontario) Quick Test Clinic

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Background: In early 2020, routine STI clinical services ground to a halt across Canada as a result of COVID-19 shutdowns, yet the need for STI screening, testing, and treatment continued unabated. We report on an innovative model for maintaining high-volume, low-barrier STI services during the pandemic.

Approach: The Quick Test Clinic was established in June, 2020 by Kingston, Frontenac and Lennox & Addington (KFL&A) Public Health to facilitate nucleic acid amplification testing (NAAT) for gonorrhea (GC) and chlamydia (CT). Operating two half-days per week, the clinic invited clients to complete an intake form and submit a self-collected urine or swab specimen [rectal, meatal, vaginal, pharyngeal] without seeing a healthcare provider. Results were communicated by telephone, and persons with documented infection were promptly treated.

Outcomes/impact: During the first six months of operation (19 June 2020 – 18 Jan 2021), the clinic provided 383 STI screenings to 347 unique individuals (mean age 27.9 years [IQR 21.0-32.0]) and a total of 864 self-collected specimens were tested. GC was detected in 13/184 (7.0%) males vs. 4/163 (2.5%) females ($p = 0.47$). CT was detected in 30/184 males (16.3%) vs. 17/163 (10.4%) females ($p = 0.11$). A total of 4 persons were co-infected with GC and CT. Overall positivity with either GC or CT was 5.8%. Sample site positivity was highest for self-collected rectal specimens (6/46, 13.0%), followed by genital (55/664, 8.3%) and pharyngeal (5/88, 5.7%) specimens.

Innovation and significance: Findings demonstrate the ongoing need for sexual health services during the COVID crisis, and the feasibility of no-exam, drop-off testing of self-collected specimens. Gonococcal and chlamydial positivity rates exceeded that of standard pre-COVID clinic operations, supporting wider expansion of the Quick Test Clinic model. Future innovations may include text messaging and web-based applications for results notification and treatment referral.

SEXUALLY TRANSMITTED INFECTIONS IN GOMBE, NORTH-EASTERN NIGERIA

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BACKGROUND:

Sexually Transmitted Infections (STIs) have remained major sources of social and public health concern globally with worsening indices in developing countries and especially linked to the growing menace of antimicrobial resistance and poor infection prevention and control (IPC) measures. Diagnosis and treatment of STIs in low resource settings is still sub-optimal due to limited availability and or poor laboratory support with dearth of expertise in relevant disciplines. Many sexually transmitted pathogens are either fastidious or atypical thereby making their detection/identification more demanding. Establishment of special treatment clinics which are primarily concerned with managing STIs have been practiced with great successes across different parts of Nigeria. We for the first time present the pattern of STIs among patients attending the Special Treatment Clinic (STC) in Federal Teaching Hospital Gombe (FTHG) Nigeria.

METHODS:

This was a hospital based cross sectional study in which sociodemographic and clinical/laboratory findings of 422 patients who presented at the STC of FTHG between 2015 and 2020 were analysed. The STC in FTHG is primarily concerned with management of STIs with in-built consulting/treatment room, side laboratory and records subunits.

RESULTS:

Of the 422 patients, majority are married (73.7%) and predominantly within the sexually active age group of 21-40 years (80.7%). Female patients are more (62.3%) than males and vaginal discharge is their most common (76.7%) clinical presentation. Most common diagnoses among the patients are vulvovaginal/perineal candidiasis (24.9%) and bacterial vaginosis (19.9%). Others include genital ulcer disease; GUD (12.9%), non-gonococcal urethritis; NGU (12.9%), genital warts (9.6%) and gonococcal urethritis/cervicitis (5.0%).

CONCLUSION:

Vulvovaginal/perineal candidiasis and bacterial vaginosis are the most common diagnoses at the STC in Gombe Nigeria. The STC provides a convenient and effective avenue for the management of genital tract infections while hoping for expansion and improvement for better patient care and satisfaction.

Factors associated with interest in bacterial sexually transmitted infection vaccines among young HPV-vaccinated Canadian women

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Background: Rates of bacterial sexually transmitted infections (STIs) are increasing globally, and these infections result in a large global burden of detrimental sexual, reproductive, and maternal-child health outcomes. Currently, the only prophylactic vaccines available against STIs are those for human papillomavirus (HPV) and hepatitis B. The objective of this study was to plan for future programme implementation by exploring acceptability, perceived barriers, and attitudes towards bacterial STI vaccines among young HPV-vaccinated Canadian women.

Methods: A 20-item questionnaire was available from 06/2019-06/2020 to participants of the Canadian Quadrivalent HPV Vaccine Evaluation Study (QUEST). Multivariable logistic regression models assessed interest in chlamydia, syphilis, and gonorrhea vaccines using a priori clinically relevant variables and covariates significant at $p \leq 0.05$ in bivariate analysis.

Results: Surveys from 1092 respondents were analyzed, with 82% indicating interest in receiving one or more STI vaccines. 75% of respondents identified as white/European descent, with a median age of 19.6 years (range 17.5-23.0). In adjusted analyses, intent to engage in positive health behaviors was associated with vaccine interest for syphilis (OR = 5.76, 95% CI [4.03-8.27]), chlamydia (OR = 5.27, 95% CI [3.66-7.63]), and gonorrhea (OR = 5.96, 95% CI [4.15-8.60]). Willingness to pay for an STI vaccine was also associated with vaccine interest for syphilis (OR = 2.02, 95% CI [1.29-3.19]), chlamydia (OR = 2.41, 95% CI [1.50-3.90]), and gonorrhea (OR = 2.29, 95% CI [1.44-3.63]). Ever having sexual intercourse and identifying as LGBTQ was significantly associated with vaccine interest in all adjusted models.

Conclusion: Results indicate strong interest in receiving bacterial STI vaccines among young HPV-vaccinated Canadian women. Findings on acceptable cost, preferred age of administration, and anticipated health behaviours will allow for informed implementation of future bacterial STI vaccine programmes. Further exploration of STI vaccine acceptability among diverse populations in research and practice will inform effective vaccine rollout.

Evaluation of the in vitro efficacy of cefixime, dalbavancin, isoniazid, and pyrazinamide against *Treponema pallidum*

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Background

The shortage in the supply of benzathine penicillin G (BPG) and other limitations associated with BPG use underscore the need for new therapeutic options for syphilis treatment. Until recently, *Treponema pallidum* (*T. pallidum*), the syphilis agent, could not be cultured in vitro, making the screening of antibiotics only possible in vivo, and hence difficult, time-consuming, and expensive. Because a cultivation system for this difficult pathogen is now available, we used an in vitro minimum inhibitory concentration (MIC) assay to screen antibiotics with the potential to provide new treatment options for syphilis.

Methods

T. pallidum was cultured in vitro in the presence of multiple concentrations of cefixime, dalbavancin, isoniazid, and pyrazinamide in independent experiments. All these antibiotics have adequate pharmacokinetic and pharmacodynamic properties to treat syphilis based on previous data from humans studies in other infections. After seven days in culture, DNA was extracted from the culture wells and *T. pallidum* growth was compared to no-antibiotic culture wells using qPCR targeting the *tp0574* gene.

Results

Isoniazid and pyrazinamide, both antimycobacterials, had MICs of >500ng/ml and >64µg/ml, respectively. For cefixime, a cephalosporin, and dalbavancin, a glycopeptide antibiotic, the experimental MICs were <31.3ng/ml, and <0.13µg/ml, respectively.

Conclusion

Cefixime and dalbavancin appear to have marked microbicidal activity against *T. pallidum* with MICs that make them promising candidates for syphilis treatment in place of BPG. Isoniazid and pyrazinamide showed no significant treponemacidal activity in vitro at the concentrations tested.

PID Treatment and *Mycoplasma genitalium* (MG): The Impact of Vaginal Dysbiosis

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BACKGROUND: In a recent PID treatment trial, MG was recovered significantly less from women treated with a regimen that included metronidazole. Our objective was to determine if cervical MG at randomization and following treatment correlated with vaginal dysbiosis.

METHODS: This is a secondary analysis of the ACE Trial, a randomized trial comparing single dose ceftriaxone and two weeks of doxycycline, with either metronidazole 500 mg PO BID or placebo for 2 weeks. At enrollment and at 30 days following treatment, vaginal samples were evaluated for BV by Nugent criteria, and quantitative PCR was performed for anaerobic organisms. Endocervical swabs were tested for MG by NAAT.

RESULTS: At randomization, MG infection was detected in 41/233 (18%) women, but detection at follow-up differed for those who received metronidazole [4/94 (4%)] vs placebo [14/99 (14%), $p < 0.05$]. Women having MG at baseline had higher concentrations of four microbes (*Gardnerella vaginalis*, *Atopobium vaginae*, *Megasphaera lornae*, *Prevotella timonensis*) compared to women without cervical MG ($P < 0.05$ for each), and each of these microorganisms was associated with cervical MG after treatment ($P < 0.05$ for each). Although BV by Nugent criteria was not significantly associated with MG at randomization, women without BV following PID treatment were less likely to have MG infection than women with BV (4% vs 18%, $p < 0.01$).

CONCLUSION: MG infection following PID is uncommon among women treated with metronidazole along with ceftriaxone and doxycycline, despite limited activity of this regimen against MG. MG infection was associated with vaginal dysbiosis, as defined by higher densities of BV-associated bacteria. These results suggest that a PID regimen with oral metronidazole and eradication of BV pathogens might be key to eliminating MG in women. Whether women diagnosed with PID should be tested for MG and treated with targeted therapy if positive remains uncertain.

Predictors of PrEP adherence among men who have sex with men in Amsterdam, the Netherlands

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Background

Adherence is key to the effectiveness of pre-exposure prophylaxis (PrEP) for prevention of HIV. Knowing what factors are associated with adherence could help clinicians focus counselling efforts on individuals less likely to adhere.

Methods

Men who have sex with men (MSM) using daily PrEP within the Amsterdam PrEP demonstration Project (AMPrEP) at the Public Health Service of Amsterdam, provided dried blood spots (DBS) 12 and 24 months after PrEP initiation. From these DBS, we determined intracellular tenofovir diphosphate concentrations [TFV-DP] to measure adherence; [TFV-DP]>700 fmol/punch is considered sufficient. We assessed associations between [TFV-DP] and sociodemographic and behavioural characteristics among MSM using daily PrEP using multivariable linear regression.

Results

Of 263 participants who attended their 12- or 24-month study visit whilst using daily PrEP, 257 (97.7%) provided DBS at one or both visits (492 DBS in total). Median [TFV-DP] was 1299 (IQR 1021-1627) fmol/punch (12 months: 1332 [1087-1687]; 24 months: 1248 [929-1590]). Higher [TFV-DP] were associated with: older age (+95 fmol/punch/10 years; $p=0.0012$), not identifying as exclusively homosexual (+142 fmol/punch; $p=0.042$), condomless anal sex with a casual partner 6 months prior to PrEP initiation (+159 fmol/punch; $p=0.0089$), and using an extended mobile application (vs. standard mobile application; +143 fmol/punch; $p=0.020$). Lower [TFV-DP] were associated with longer duration of PrEP use (24 vs. 12 months; -100 fmol/punch; $p=0.0019$). Number of sex partners, diagnosed sexually transmitted infections (STI), and chemsex were not associated with [TFV-DP].

Conclusion

Overall [TFV-DP] were high among MSM, indicating good adherence, especially among participants who are older, not identifying as exclusively homosexual, and those who reported condomless anal sex with a casual partner 6 months prior to PrEP initiation. We recommend to pay extra attention to adherence when counselling younger PrEP users and those who have been using PrEP for a longer period.

Reclassification of *Atopobium vaginae* as three novel *Fannyhessea* species: implications for understanding their role in bacterial vaginosis

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Background:

Atopobium vaginae is a prevalent vaginal bacterium associated with bacterial vaginosis (BV). Molecular studies targeting its 16S rRNA gene have shown *A. vaginae* is a useful diagnostic indicator of BV and important secondary colonizer of the vaginal biofilm. Both *A. vaginae* and the vagina's primary biofilm-forming species, *Gardnerella vaginalis*, exhibit extreme genomic heterogeneity. This led to *Gardnerella*'s recent split into approximately nine genomospecies indistinguishable by their 16S genes. The objective of this work was to ascertain whether similar subdivisions should be made for *A. vaginae*.

Methods:

We performed comparative genomics on publically available *A. vaginae* whole genome sequences. We also genotyped 20 *A. vaginae* isolates from women participating in a BV treatment study and phenotypically characterized select strains to identify their biochemical properties (API/MIC tests) and virulence potential.

Results:

Three genomospecies were defined by cross-species nucleic acid identity <74%; each shares ≥99% 16S rRNA gene identity and belongs to the new genus *Fannyhessea*. Two species previously cultured and sequenced are *Fannyhessea vaginae* (CCUG 38953T, representing 85% of cultured isolates) and *Fannyhessea massiliense* (Marseille-P4126T, PB189-14T). These species differ in alkaline and acid phosphatase activity, as well as leucine arylamidase activity. Novel *Fannyhessea* species type 2 was distinguished by its inability to ferment sucrose or tagatose and its sensitivity to metronidazole. Colony morphology, Gram stain, and lack of detectable catalase, indole, sialidase, proteinase, and hyaluronidase activities were similar for all three species. Functional genomics revealed *F. vaginae* uniquely possesses sialic acid response machinery and several adhesion proteins.

Conclusions:

Genomic and functional differences support redefining *A. vaginae* as three novel *Fannyhessea* species. More work is needed to re-examine its role in BV in the absence of confounding by the other species, but our findings suggest *F. vaginae* may contribute to treatment failure and interact specifically with the *Gardnerella* biofilm and host epithelium.

Community-Informed, Academic-Public Health Collaboration to Develop an Online-Linked Mobile HIV/STI Testing Strategy for Gay, Bisexual and Other MSM in Maryland

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Background: Black MSM (BMSM) carry the greatest burden of new HIV diagnoses in the U.S. Ending the HIV epidemic (EHE) requires strategic and culturally-specific approaches to diagnosis, treatment and prevention. Increasingly, transmission is associated with online spaces where effective outreach strategies are limited. Through a community-informed, academic-public health collaboration, we developed, implemented, and evaluated the feasibility and acceptability of an online-linked mobile van HIV/STI testing approach tailored to BMSM (SSP – Safe Spaces and Places) in one urban area.

Methods: To assess feasibility of the Safe Spaces testing program, we compared populations recruited and testing outcomes to a public health mobile van HIV/STI testing program (PHD program) over 12 months. We also assessed participant acceptability of the SSP program through a survey assessing satisfaction and in-depth interviews.

Results: Over 12-months, SSP tested 151 MSM (76% Black; mean age=34, SD=10.2). 7% (10/148) were new HIV diagnoses and 17% (26/150) were diagnosed with >1 bacterial STI. The PHD program tested 53% (231) more MSM (70% Black; mean age=38, SD=13.9), but yielded a significantly lower positivity rate; 0.5% (1/201, p=0.00) MSM were new HIV diagnoses and 0.04% (1/219, p=0.00) were diagnosed with >1 bacterial STI. Of the 60% (90) of participants who completed a satisfaction survey, 83% (75) reported a positive experience and endorsed convenience, cost, and confidentiality as the most important reasons for choosing SSP. Twenty-five participants were interviewed and describing more privacy and less stigma concerns with SSP compared to other testing experiences.

Conclusions: Our findings suggest that SSP was feasible, acceptable and may be more effective compared to standard PHD mobile testing in reaching high transmission risk BMSM. Future research initiatives will determine feasibility and effectiveness of linking at risk BMSM identified through this approach to PrEP or HIV care, key pillars of the EHE strategy.

Evaluation of Community Based HIV/STI testing Program Tailored to Black MSM in a Southeast US City

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Background: Black MSM (BMSM) are disproportionately burdened by HIV and STIs in the US. Structural barriers to HIV/STI testing in clinical settings, including prior negative experiences, concerns about privacy/confidentiality and limited care access, compound disparities by contributing to delayed treatment and ongoing transmission. Testing modalities circumventing these barriers are needed for this priority population.

Methods: We recruited 25 MSM (mean age=35;SD=11; 88% Black) following their participation in Safe Spaces and Places (SSP) – a community-based, online-linked, mobile van HIV/STI testing modality in Baltimore, MD. Participants completed 60-minute semi-structured interviews exploring their perceptions of SSP relative to clinic-based testing experiences. Interview transcripts were doubled coded until there was group consensus and analyzed using a constant comparative approach.

Results: Participants described a preference for the SSP testing modality compared to their clinic-based testing experiences. Three themes related to this preference emerged from the interviews: 1) greater comfort with staff and testing environment – e.g. “it was like a different environment than being in a hospital. And everybody was real kind and polite;” 2) less concern with maintaining privacy/confidentiality – e.g. “I felt like the van is much more discrete and private... When you're in the [STD clinic], you're out there with a bunch of people...it's just really crowded;” and 3) increased accessibility – e.g. “I did really like the van being in the evening hours, being offered multiple days per week so that I could fit it in my schedule. I like that it shows up in different places in the community.”

Discussion: Our findings suggest this majority Black sample of MSM preferred the SSP testing modality because it removed barriers to HIV/STI testing for this priority population. Increasing access to HIV/STI testing in BMSM will require identifying barriers to testing in this population and developing modalities that attend to these barriers.

Factors Associated With Pre-Exposure Prophylaxis Usage among Men Who Have Sex with Men in Baltimore, Maryland

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Background: Men who have sex with men (MSM), particularly Black and adolescent/younger adult (AYA) MSM, are disproportionally impacted by the US HIV epidemic. PrEP may mitigate disparities, but uptake remains low among these populations. This study examines factors associated with PrEP usage in a majority Black and AYA MSM population.

Methods: Data from two behavioral surveillance studies in Baltimore, Maryland, BESURE (2017, venue-based time-location sampling) and Safe Spaces and Places (2018, online-based time-location sampling), was used to determine factors associated with PrEP usage among HIV-negative MSM reporting previous knowledge of PrEP, using bivariate and multivariable logistic regressions.

Results: 302 HIV-negative MSM were included in the analysis. The mean age was 33.1 (SD=9.64; range=19-68). The majority (67.6%) were AYA (18-34 years-old) and self-identified as Black (69.9%). Health care access was high with 17.9% reporting inability to afford needed care. 45.5% reported experiencing discrimination related to their sexuality. Using the CDC MSM risk index, a significantly lower percentage of Black vs. non-Black (38.4% vs. 53.9%; p-value=0.01), and higher percentage of AYA vs. older (47.6% vs. 33.7%; p-value=0.02) participants were PrEP indicated based on self-reported risk behaviors. 20.2% of all participants reported prior year PrEP usage with no significant differences by race or age. In bivariate analyses, higher education, PrEP indication, and experiencing discrimination were associated with increased odds of usage. In the multivariable model, only PrEP indication and higher education remained associated.

Conclusion: In this majority AYA and Black MSM sample, PrEP usage remains low despite increased HIV incidence compared to other populations. PrEP indication was associated with increased usage; however, PrEP indication was significantly lower among Black MSM. This suggests that the risk index may underestimate HIV acquisition risk among Black MSM and may be necessary but insufficient as a clinical tool for determining eligibility or promoting uptake in this population.

Development and Utilization of Antibodies Specific for Extracellular Loops of the *Treponema pallidum* outer membrane protein BamA (TP0326)

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Background: Researchers often generate antibodies (Abs) to epitopes on the surface of a protein or in a hydrophilic loop. It can be more difficult to isolate phage displayed antibodies (Abs) that bind preferentially at or near a specific amino acid on a protein or peptide. We used a phage-display method called "DPAC" to test the hypothesis that opsonic antibodies can be generated against extracellular loops (ECLs) of *Treponema pallidum* (Tp) outer membrane proteins (OMPs). As proof of concept, we focused on BamA-ECL4 which we previously showed is a target for opsonic antibodies.

Methods: A modified peptide incorporating a non-native amino acid (nnAA) at a desired site was designed for BamA-ECL4. Antibody phage display in vitro selection was used to isolate nnAA-specific and nnAA-preferred scFv binding phage. AXM Mutagenesis was then used for directed evolution to alter the specificity of several discovered nnAA-binding phage to (i) recognize the same peptide, but with a native amino acid at the nnAA site and (ii) have a lower binding affinity. Specific clones were converted from scFv to IgGs, expressed and then purified and retested for specificity and affinity. We validated our antibodies using a *Pyrococcus furiosus* thioredoxin (PfTrx) as a scaffold to present BamA ECL4.

Results: We successfully used the in vitro approach to derive site-specific anti-BamA ECL4 Abs and evolved non-synonymous native-specific Abs to significantly improve affinity. These antibodies bound PfTrx-BamA-ECL4 and did not bind control peptides, indicating that these Abs were ECL4-specific. Testing of these antibodies in a mouse opsonophagocytosis assay is underway.

Conclusion: When used in conjunction with OMP structural models, DPAC and PfTrx scaffolds are promising tools for identifying and characterizing antigenic ECLs. Identification of anti-ECL monoclonal antibodies with opsonic activity will provide evidence to support the selection of specific *T. pallidum* OMPs for vaccine development.

Asymptomatic trichomoniasis among women of childbearing age in south-western Nigeria

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Background: Trichomoniasis is a common sexually transmitted infection (STI) globally. The disease is complicated with an increased risk of STIs, infertility, adverse pregnancy outcome and postoperative infections. We evaluated the prevalence of trichomoniasis among women of childbearing age in Oyo state, South-western Nigeria.

Methods: This cross-sectional community-based study included a total of 222 women recruited from both urban and rural areas of two randomly selected Local Government Areas (LGAs) of Oyo State, South-western Nigeria. Pelvic examinations for signs of STIs were carried out on both symptomatic and asymptomatic participants. High vaginal swabs were collected from the sides of the vaginal wall to screen for the presence of sexually transmitted organisms. These swabs were subjected to DNA extraction using Quick-DNA mini Prep ZYMO kits. The extracted DNAs were analysed by CFX-96 Real-time PCR using the AllplexTM Assay system (Seegene, Seoul, Korea).

Results: The mean age of the participants was 37.0 years \pm 9.0 (range 18-55), 37.8% (84/222) were in their thirties and 80.6% were married. Most of them (45.9%) were educated to the tertiary level and 53.6% lived in urban areas. The mean calculated body mass index (BMI) was 26.9 \pm 5.5 (Range 14.7 – 46.6) and 65.8% were obese or grossly obese. At the time of enrolment, 106 (47.7%) were asymptomatic. *Trichomonas vaginalis* was the commonest organisms detected (36/222, 16.2%), followed by *Ureaplasma parvum* (26/222, 11.7%), *Mycoplasma hominis* (16/222, 7.2%), *U. urealyticum* (11/222, 5.0%) and *Mycoplasma genitalium* infection (0.5%). The prevalence of Trichomoniasis was commoner among asymptomatic participants (19/222, 17.9%/ 17/222, 14.9%), though not statistically significant (OR = 0.8 (0.4-1.6) $P > 0.05$,).

Conclusion: Routine testing for *T. vaginalis* infection is advocated in all women seeking care for genital-related diseases, in addition to screening for *T. vaginalis* in women at high risk of STI.

Advancing Sexual Harassment Prevention and Elimination in the Sciences: “Every ...health organization must do something similar.”

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Introduction

Sexual harassment is pervasive in science. A 2018 report by the National Academies of Science, Engineering and Medicine found that the prevalence of sexual harassment in academia in the United States is 58%. The objective of this manuscript is to describe an activity held at an international scientific congress, which was designed to advance sexual harassment prevention and elimination, and to provide a model for other scientific communities with similar goals.

Methods

A description of the plenary and key components as well as the data collection and analysis of selected outcomes are provided.

Results

Among 1,338 congress participants from 61 countries, 526 (39%) attended the #MeToo plenary session and the majority engaged in some way during the plenary session. Engagement included standing for the pledge (85%), engaging in the question and answer session (n=5), seeking counseling (n=3), and/or providing written post-it comments (n=96). The post-it comments were sorted into 14 themes within 6 domains including: (1) emotional responses, (2) barriers to speaking out, (3) public health priorities, (4) reframing narratives about the issue, (5) allyship, and (6) moving the issue forward. Respondents to a post-congress survey (N=388, 24% of all attendees) ranked the plenary as the number one plenary among 14 plenaries provided at the congress.

Conclusions

Scientific organizations, agencies, and institutions have an important role to play in setting norms and changing enabling policies towards a zero-tolerance culture of sexual harassment. The activity presented offers a model, which may be applicable to any scientific community seeking to advance sexual harassment prevention and empower binary and non-binary persons at risk for harassment, discrimination, and violence. The outcomes suggested that the plenary successfully engaged participants and had meaningful and measurable impact on the participants.

Is condomless sex associated with non-adherence to COVID-19 prevention behaviors among young Black men who have sex with women?

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Background: Health behaviors in young people tend to cluster. The objective of this study was to determine if condomless sex among young Black men who have sex with women was associated with non-adherence to COVID-19 prevention behaviors.

Methods: Men previously enrolled in a community-based chlamydia screening program for Black men who have sex with women, aged 15-24, were enrolled in a sub-study between May-June, 2020 and asked about adherence to the City of New Orleans requirements for proper hand-washing, mask-wearing, social-distancing, staying-at-home and condomless vaginal sex while COVID-19 restrictions were in place.

Results: Of 105 men included in analysis, the mean age was 20.5 (s.d.2.0) and 17.3% previously tested positive for chlamydia in the parent study. During COVID-19 stay-at-home orders, 37.1% engaged in at least one act of condomless sex and responded sometime/never to the following: hand-washing for 20 seconds (8.1%), physical-distancing (21.6%), mask-wearing (18.8%) and staying-at-home except for essential needs (24.3%). Some men were not able to get PPE (36.9%) or thought a homemade mask would subject them to discrimination (14.4%). Men who engaged in condomless sex were more likely than those who either did use condoms/did not have vaginal sex to not wash their hands properly (19.4% vs. 3.0%, $p<0.03$) and not wear a mask (30.8% vs. 10.6%, $p<0.02$); there was a trend for them to not physically distance (28.2% vs. 16.7%, $p<0.17$) and there was no association for not following stay-at-home orders (28.2% vs. 22.7%, $p<0.54$). Age, access to masks, and perception that mask-wearing could subject them to discrimination were not associated with mask-wearing ($p>0.40$).

Conclusion: Overall, adherence to disease prevention behaviors was high. Non-adherent behaviors such as condomless sex, lack of mask-wearing and lack of hand-washing were associated. Men with one non-adherent behavior may benefit from counseling in other potentially non-adherent behaviors.

Identifying subgroups at higher risk of infectious syphilis in major Australian cities: Analysis of national sentinel surveillance data 2011-2018

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Background: In Australia, infectious syphilis notifications have increased 234% in the past decade, from 1318 in 2008 to 4398 in 2017. Although historically concentrated among urban men who have sex with men and remote Indigenous communities, a rise in syphilis notifications among women in major cities and cases of congenital syphilis have been observed. We analysed trends in infectious syphilis positivity among women and heterosexual men in major Australian cities and identified associated risk factors.

Methods: De-identified patient data were extracted from 34 sexual health clinics within a national sentinel surveillance network (2011-18). All women and heterosexual men ≥ 15 years in major cities were included. Infectious syphilis positivity was defined as the proportion of attendees per 6-monthly calendar period with recorded syphilis testing who had recorded clinical diagnoses of infectious syphilis. Poisson regression determined annual trends in positivity and risk factors for infectious syphilis (rate ratios and 95% CIs).

Results: Of 100,230 patients attending the clinics, 50.8% were female (of whom, 96.1% were of childbearing age), 51.2% were aged 15–29 years, 1.7% were Indigenous and 7.4% were from culturally and linguistically diverse (CALD) backgrounds. Modelled positivity for infectious syphilis (2011-18) increased 85% in females from 2.41 (95%CI:1.67-3.14) to 4.48 (95%CI:3.53-5.43) per 1000 patients tested, and 76% in heterosexual males from 4.47 (95%CI:3.44-5.49) to 7.87 (95%CI:6.49-9.24). Factors associated with increased risk of infectious syphilis included: reporting a history of injecting drug use (RR:4.36;95%CI:3.26-5.83), using condoms inconsistently in the past year (RR:2.30;95%CI:1.10-4.79), being male (RR:1.80;95%CI:1.51-2.14), Indigenous (RR:1.70;95%CI:1.02-2.84), from CALD backgrounds (RR:1.90;95%CI:1.46-2.46), and older (30-39 years: RR:1.33;95%CI:1.08-1.65; 40-49 years: RR:2.95;95%CI:2.34-3.73; 50+ years:RR:3.59;95%CI:2.81-4.57). Lower risk was observed in bisexual females (RR:0.53;95%CI:0.30-0.94) and female sex workers (RR:0.43;95%CI:0.29-0.63).

Conclusion: Increasing syphilis in women and heterosexual men in major Australian cities requires enhanced prevention, including integration of sexual and reproductive health care into harm reduction programs.

Community context and individual behavior pathways to chlamydia infection among young Black men

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Background: Social-ecological models posit complex interactions between individuals and their environment. We examine associations between social and environmental factors, risk behaviors, and chlamydia positivity.

Methods: Black men aged 15-24 who have sex with women were enrolled in a community-venue based screening program for Chlamydia trachomatis in New Orleans, LA. Men completed surveys on past experiences, recent behaviors, and perception of neighborhood safety and everyday discrimination.

Results: Of 1872 men, 203 (10.8%) were chlamydia positive. Average age was 20.0 years (S.D. 2.5), 24.5% reported multiple recent sex partners, 32.1% substance use (binge drinking or drugs other than marijuana), 55.9% condomless vaginal sex, and 19.2% had spent time in a detention facility. There were positive direct and indirect effects between having spent time in a detention facility and chlamydia positivity. This relationship was positively mediated by increasing substance use, and condomless sex. Having spent time in a detention facility also increased everyday discrimination and perception of unsafe neighborhood. While there was no significant direct effect of higher everyday discrimination on chlamydia, there was a positive indirect effect mediated through increased substance use, condomless sex, and having multiple recent partners. Neighborhood safety had a significant negative direct effect on chlamydia, and while it did not significantly affect any risk behaviors, it was positively associated with increased everyday discrimination. The path model fit was good (SRMR<0.001; RMSEA<0.0001).

Conclusion: The relationships between past experiences and perception of discrimination and safety with chlamydia are complex and partly function through effects on risk behaviors. Interventions and policies that address incarceration, discrimination, and neighborhood safety as well as those focused on decreasing risk behaviors could maximize the benefits of efforts to decrease chlamydia in this population.

Modest monetary incentivized peer referral to increase chlamydia community-based testing among young Black men who have sex with women

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Purpose: The U.S. Centers for Disease Control and Prevention recommend screening young women for chlamydia but not young men. One reason young men have not been a focus for chlamydia screening is due to the perceived difficulty of accessing these men. Peers are among the most influential people in a young person's life. We hypothesized that incentivized peer referral (IPR) could assist in increasing enrollment in this screening study.

Methods: The Check it Program in New Orleans is a community-based screening program for young Black men aged 15-24. Peer referral was monitored between 3/7/2018-11/28/2020. IPR started on 8/29/2020 during which men enrolled in the parent study were offered \$5 for each peer they referred and were successfully enrolled in the study.

Results: Of 1457 men enrolled in the study, 44 were enrolled after IPR was initiated. The percentage of men who said they were referred by a friend was higher in the post-IPR compared to the pre-IPR period (40.9% vs. 20.0%, $P < 0.001$). Peer referral vouchers were claimed by 7 index men who successfully enrolled 9 men; two of the men referred 2 men. Those who said they heard about the study from a friend were: older (20.3 vs 19.9 years, $P < 0.02$), more likely to live in a dorm (21.7% vs 11.1%, $P < 0.001$), and to have prior chlamydia infection (13.9%, vs. 10.1%, $P = 0.06$). After adjusting for these factors, hearing about the study from a friend was higher in the post-IPR compared to the pre-IPR period with a 2.56 greater likelihood of enrolling (95% C.I. 1.38-4.78, $p < 0.01$)

Conclusion: Incentivized peer referral significantly increased study enrollment and can serve as a method for increasing screening rates in community-based chlamydia screening programs for young Black men who have sex with women.

A *Chlamydia trachomatis* inclusion membrane protein blocks interferon gamma stimulated immunity in humans and nonhuman primates

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Background: Epithelial cells that are stimulated with interferon gamma (IFN γ) carry out a potent immune response termed cell-autonomous immunity. While *Chlamydia trachomatis* is susceptible to murine cell-autonomous immunity, it evades this response in humans. The virulence factors underlying this evasion are unknown. A better animal model is needed to evaluate the importance of this defense pathway against *C. trachomatis* infection.

Methods: We leveraged a novel library of *C. trachomatis* x *C. muridarum* chimeras to identify candidate virulence factors. We assayed chimeras and follow-up mutants for their ability to evade inclusion ubiquitination in IFN γ -primed human cells. Growth restriction assays were performed in human cells in the presence or absence of IFN γ . We isolated primary fibroblasts from a macaque skin biopsy to test whether a similar response is induced by IFN γ -stimulation in the nonhuman primate (NHP) model.

Results: The inclusion membrane protein CT135 is required for evasion of cell-autonomous immunity. Organisms lacking a functional copy of this gene failed to block ubiquitin recruitment to their inclusions in IFN γ -primed human and NHP cells. This ubiquitination was associated with a severe growth defect in vitro. Retrospective analysis of a NHP study revealed an inoculum containing a CT135 mutant had poor fitness in vivo. We clonally isolated the mutant and confirmed it was susceptible to cell-autonomous immunity.

Conclusion: A historic paucity of genetic tools has hindered the identification of virulence factors that facilitate *Chlamydia trachomatis* pathogenesis. By leveraging a novel library of mutants, we identified a virulence factor that facilitates chlamydial subversion of cell-autonomous immunity in human and NHP cells. While this *C. trachomatis* gene is nonfunctional in the mouse model, our reevaluation of a previous study suggests it is required for in vivo survival in NHP. This work underscores the importance of NHP as model organisms to study chlamydia immunity.

TESTING AND TREATING SYPHILIS IN TRANSGENDER WOMEN – A POINT-OF-CARE APPROACH IN BRAZIL.

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Introduction: Sexually Transmitted Infections (STIs) disproportionately affect transgender women (TGW). This group faces barriers to accessing health care, especially due to stigma and discrimination. The literature is scarce on data of STIs among TGW in Brazil. We aimed to estimate the prevalence of syphilis and to analyze the completeness of treatment among TGW in two Brazilian cities.

Methods: A cross-sectional study was conducted in São Paulo (SP) and Salvador (SSA) from December 2019 to January 2021, as part of the TransOdara study. Participants aged 18 to 65 years old were recruited using Respondent Driven Sampling (RDS), completed a standard questionnaire and samples were collected for rapid syphilis testing. After laboratory and clinical evaluation by a doctor/nurse, a prescription for antibiotic treatment (oral or injectable) was given, if necessary.

Results: Of the 562 participants recruited, 71.7% (n=403) were from SP and 28.3% (n=159) from SSA. Most were 20-29 years old (45.1%), with brown skin color (47.5%), were living alone (76.2%), in rented residence (51.1%), had maximum level of high school education (47.9%), and have not legally changed their names (69.5%). The following data related to syphilis is presented for SP and SSA, respectively. Positive rapid test was 57.8% (233/403) (95% CI: 53.0-62.6) and 59.1% (88/159) (95% CI: 47.6-63.0). Of these, 24.9% (58/233) and 47.7% (42/88) received prescription (oral or injectable). Injectable treatment (benzathine penicillin G) was prescribed for 60.3% (35/58) and 97.6% (41/42). The completeness of treatment was assessed only for those who received injectable treatment, occurring for 51.4% (18/35) and 78.0% (32/41).

Conclusions: Active syphilis is highly prevalent among TGW in both cities. Even in a point-of-care program with active surveillance participants giving up treatment was observed. Our findings reinforce the need for a diversified and creative approach even with a point of care protocol.

Adherence to Screening and Follow-Up Recommendations for Syphilis in Pregnancy

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BACKGROUND

Incidence of sexually transmitted infections in Canada has been steadily rising for the past two decades, increasing the risk of vertical transmission among infected pregnant women. With 17 cases in 2018, the number of congenital syphilis across Canada has never been higher. The goal of this multicentre study was to assess practitioner's adherence to Quebec's syphilis screening and follow-up recommendations in pregnancy.

METHODS

Charts of all women having delivered at the Centre hospitalier de l'Université de Montréal between April 1st, 2018 and March 31st, 2019 as well as at the Hôpital Maisonneuve-Rosemont between April 1st, 2015 and March 31st, 2016, were reviewed to assess clinical and laboratory data. Both institutions are tertiary healthcare centres in Montreal.

RESULTS

Amongst 5245 pregnant women, 5148 (98.2%) were screened for syphilis at least once during pregnancy. Of these women, 5 (0.1%) were newly diagnosed with syphilis, all of whom received appropriate treatment according to the stage of syphilis. One woman had secondary syphilis, whilst the other four had late latent syphilis. Only four had a documented antenatal consult in infectious diseases. In terms of partner management, the partner of only one woman was screened, and no mention of partner treatment was available for all cases. Regarding follow-up serology testing, four had only one control serology at 3 months, whilst one woman had no available control serology.

CONCLUSIONS

In this cohort, the adherence to recommendations concerning syphilis screening during pregnancy was deemed adequate compared to other Canadian screening studies. However, documentation of the management of partners of women with a new syphilis diagnosis and follow-up serology testing need improvement. It would be interesting to repeat this study design amongst deliveries in 2020-2021 in order to assess the impact of the COVID-19 pandemic on pregnancy screening rates.

High burden of reproductive tract infections and poor sexual and reproductive health in pregnancy and postpartum in Papua New Guinea

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There is a pressing need for detailed knowledge of the range of pathogens, extent of co-infection and clinical impact of reproductive tract infections (RTIs) among pregnant women. We present prevalence and correlates of RTIs (*Mycoplasma genitalium*, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis*, *Treponema pallidum* subspecies *pallidum*, bacterial vaginosis and vulvovaginal candidiasis) in a longitudinal study of women in pregnancy and postpartum in Papua New Guinea (PNG).

699 pregnant women were recruited at their first antenatal clinic visit and followed up at childbirth, one, six and twelve months postpartum. Self-collected vaginal swabs were tested for *M. genitalium* using real-time PlexPCR® (SpeedX) which provides results for five point mutations associated with macrolide resistance. Urine samples or vaginal swabs were tested for *C. trachomatis*, *N. gonorrhoea* and *T. vaginalis* using GeneXpert. A vaginal smear was examined for BV and VVC. Routine antenatal services tested for syphilis using Alere Determine™ Syphilis.

Most pregnant women (74.1%) had at least one RTI, with a curable current sexually-transmitted infection (STI) detected in 37.7%. We found *M. genitalium*, an emerging pathogen in PNG, in 12.5% of pregnant women, decreasing to 6.1% at six months postpartum, with no evidence of macrolide resistance. Prevalence of other curable STIs (*C. trachomatis*, *N. gonorrhoeae* and *T. vaginalis*) were all high in pregnancy (19.1%, 5.5% and 20.1% respectively), with prevalence decreasing immediately postpartum but rising again by 12 months postpartum. Clinical symptoms missed at least 75% of infections and there was little use of contraception; 98.4% report never having used barrier contraception.

This study highlights a high prevalence of a RTIs in pregnancy and postpartum. Most of these infections are curable when diagnosis is made available and syndromic management alone is insufficient. This high prevalence of disease negatively affects sexual and reproductive health and these findings have important public health implications in PNG and the region.

Prevalence and risk factors for chlamydia and gonorrhea among transgender women in 2019-20 in São Paulo, Brazil

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Transgender women (TGW) in Brazil are disproportionately affected by HIV, but knowledge about others STIs is scarce. We estimated the prevalence of chlamydia and gonorrhea infections and investigated risk factors associated with infection in TGW in São Paulo, a part of a national survey.

TransOdara is a cross-sectional study which included TGW ≥ 18 years, recruited at CRT DST/AIDS in São Paulo, Brazil, from December 2019-October 2020. Participants were recruited from an ongoing cohort study, originally assembled using RDS. A structured interview collecting socio-demographic and behavioral information was followed by triple-anatomical site STI testing and an HIV test. Risk factors were assessed using multivariable logistic regression. The study was supported by Brazilian MOH and PAHO.

403 TGW participated; 52.1% were aged 18-33 years; mean 34.4 (SD ± 9.6); 57.6% had ≥ 12 years of formal education; 70% identified as black/ mixed race; 25.8% declared sex work as main source of income and 48.1% that their monthly income was below or equal to the Brazilian minimum wage. Prevalence of chlamydia and gonorrhea was, respectively, 10.2% (41/403) and 8.2% (33/403); coinfection was 2.4% (10/403). Most TGW testing positive had anal infections: 90.2% for chlamydia and 66.7%, gonorrhea. Prevalence of chlamydia or gonorrhea was slightly higher among individuals living with HIV (18% vs 15% among HIV-negative individuals, OR 1.21; 95% CI 0.67 – 2.19). After adjusting for schooling, sex work as main source of income, and monthly income, young age remained a risk factor for a chlamydia (aOR 2.78; 95% CI 1.34 - 5.74) and gonorrhea (aOR 2.21; 95% CI 1.02 - 4.79) diagnosis.

Chlamydia and gonorrhoea prevalence is high among Brazilian TGW, especially amongst the young. Comprehensive care and prevention programs, including sexual education and screening policies directed at TGW are urgently needed to reduce STI burden and to interrupt STI/HIV transmission.

The short-term immune impact of bacterial vaginosis treatment is unrelated to *Lactobacillus* spp. abundance

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Background: Bacterial vaginosis (BV) induces genital inflammation and enhances HIV acquisition risk, while vaginal *Lactobacillus* predominance is associated with mucosal immune quiescence and reduced HIV risk. BV treatment reduces vaginal proinflammatory cytokines, but it is unclear whether this is due to reductions in BV-associated anaerobes or an increase in *Lactobacillus* spp. We investigated the short-term impact of BV treatment on the vaginal immune milieu and microbiome.

Methods: Study participants comprised 48 women with BV, all of whom were treated with intravaginal metronidazole for 5 days before enrollment into a clinical trial of the live biotherapeutic LACTIN-V to prevent BV recurrence. Vaginal swabs were collected at baseline and within 48 hours of completing metronidazole treatment, prior to study product administration. Soluble immune factors were assayed from vaginal swabs by multiplex ELISA, relative bacterial abundance was assessed by metagenomic sequencing (NovaSeq), and absolute abundance of key bacterial species was assessed by qPCR.

Results: Immediately following treatment, there was a marked drop in the vaginal level of proinflammatory cytokines (IL-1a, IL-6), chemokines (IL-8, MIP-1b, MIP-3a) and a marker of epithelial barrier disruption (sE-cad; all $p < 0.01$). The vaginal microbiome was generally shifted from BV to community state types (CSTs) dominated by *L. iners* (49%) or *L. jensenii* (31%). However, these CST shifts were driven by a dramatic (7-12-fold) reduction in the absolute abundance of BV-associated Gram negative anaerobes (*Prevotella* spp., *Gardnerella vaginalis*, *Atopobium vaginae*, and *Megasphaera*; all $p < 0.001$), while there were minor or no increases in the absolute abundance of *L. jensenii* (2.9-fold increase, $p = 0.006$) or *L. iners* (0.6-fold reduction, $p = 0.245$).

Conclusions: Standard BV therapy reduced inflammatory cytokines/chemokines and enhanced epithelial integrity in the short term. Despite a shift to CSTs dominated by lactobacilli, these immune changes were linked to reductions in the absolute abundance of BV-associated anaerobes rather than to increased *Lactobacillus* abundance.

Experiences of internet-based testing for sexually transmitted infections: A qualitative study

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Introduction: Internet-based testing for sexually transmitted infections allows individuals to order a self-sampling kit online and receive their results electronically, reducing the need to attend a clinic unless for treatment. Its usage has grown rapidly in many high-income countries such as England, where it now accounts for over 20% of chlamydia tests taken by young people. Existing research has found internet-based testing to be acceptable however uptake remains low among some high-incidence populations and there is limited data on the experiences of service users.

Methods: Participants were recruited via sexual health clinics and the website of an internet-based testing service. Purposive sampling was used to ensure a diversity of genders, sexualities and ethnic backgrounds were included. Semi-structured interviews were conducted by phone, email and messenger services, and explored participants' perceptions and experiences of both internet- and clinic-based testing. Data underwent thematic analysis.

Results: A total of 17 participants were interviewed. Internet-based testing appealed to many due to the privacy and convenience it offered over clinic-based testing. Although most were positive about their experience of internet-based testing, many found the process of finger-prick blood sampling extremely challenging and this contributed to concerns that test results may be inaccurate. A minority of participants also missed the opportunity clinic-based testing offered to discuss symptoms or concerns with staff. Participants overwhelmingly found the process of receiving test results by SMS acceptable and preferable to alternatives.

Conclusions: Internet-based testing is viewed positively by most users but uptake may be improved if providers emphasise the privacy and convenience it offers, as well as the accuracy of self-sampling. Providers should also consider measures to address user concerns around blood sampling and the lack of specialist advice. Further research involving larger numbers of users, and focusing specifically on populations with low uptake of internet-based testing, would be worthwhile.

ESTABLISHMENT OF SPECIAL TREATMENT CLINIC FOR SEXUALLY TRANSMITTED INFECTIONS IN GOMBE NIGERIA: REALITIES AND PROSPECTS

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BACKGROUND/PURPOSE:

The medical, socio-cultural and religious perspectives in managing sexually transmitted infections (STIs) have expanded and made more critical the need for multidisciplinary/"one health" approach to tackling this global menace. Expertise, convenience and efficiency have remained the major considerations in selecting approaches and avenues for diagnosis and treatment of STIs. The understanding and acceptability of patients and other healthcare workers is cardinal in the success of any STI clinic. We present our experiences/observations of establishing and maintaining a new STI clinic in a low resource setting.

APPROACH:

The Federal Teaching Hospital Gombe (FTHG) Special Treatment Clinic (STC), was established in 2015 with sole aim of providing quality care for patients with genital tract infections from within and outside the hospital. Specialist consultations, confirmatory laboratory investigations and record keeping are all brought together under one roof for convenience and efficiency. Other requests for genital tract microbiological investigations from all parts of the hospital are also pooled to the clinic for both specimen collection and immediate processing.

OUTCOMES/IMPACT:

The clinic has now provided avenue of combining both clinical consultation and laboratory diagnosis within the limited available resources. It has gained the confidence of patients from the community and healthcare workers within the hospital. Majority (60.1) of patients seen at the clinic were self-referrals followed by those referred from the general outpatient clinics of the hospital (27.0%) and a few (3.8%) from outside FTHG. This has provided the most needed alternative to a growing menace of quackery in managing STIs by unqualified traditionalists.

INNOVATION AND SIGNIFICANCE

Improvement in confidentiality and efficiency has continued to make our clinic most preferred for consultations and treatment of STIs. The near obliteration of delays in specimen transportation with their immediate processing has made it possible to now identify pathogens such as *Neisseria gonorrhoeae*, *Trichomonas vaginalis*.

Screening Rates and Follow-up of Chlamydia trachomatis and Neisseria gonorrhoeae Infections During Pregnancy

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Introduction

Doubts concerning the efficacy of prophylactic ocular topic antibiotics on newborns for prevention of ophthalmia neonatorum (ON) and its decreasing incidence lead the Canadian Pediatric Society to no longer recommend its systematic use. They rather recommend that prevention of ON should focus on systematic prenatal screening of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) and treatment of infected women and their partners. This study's primary endpoint was to evaluate compliance with Quebec's provincial pregnancy screening, test of cure (TOC) and re-screening guidelines.

Methods

Charts of all women who delivered at the Centre hospitalier de l'Université de Montréal, a tertiary care hospital in Montreal, between April 1st, 2018 and March 31st, 2019 were reviewed to assess demographic, clinical and laboratory data.

Results

Among 2557 women, 2481 (97.0%) were screened for CT/NG at least once during pregnancy. For 2278 women (89.1%) a laboratory report was retrievable for analysis. CT infection was detected in 20/2278 women (0.88%) whose mean age was 33 years old (range from 18 to 39). Treatment was appropriate according to guidelines in 18 (90%), a test of cure (TOC) was performed in 18 (90%), and re-screening between 3 and 6 months after diagnosis was done in 14 women (70%). Treatment of sexual partners was documented for 16 women (80%). The only NG infection detected (0.04%) was wrongly interpreted as a false positive; no treatment was administered.

Conclusion

The proportion of pregnant women with at least one available CT/NG test result compares favorably to screening rates in other Canadian studies. However, the proportion of CT infected women for whom a TOC and re-screening was performed needs to be improved. The interpretation of positive NG tests in pregnant women and documentation of sexual partners management of infected women also needs improvement.

Risk of Chlamydia and Gonorrhea among young African American women with Persistent and Episodic Bacterial Vaginosis

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This study aimed to assess the influence of episodic and persistent bacterial vaginosis (BV) on incident Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) infection among young African American women in the US.

Data from 428 women, were included in this secondary data analysis. All women were asymptomatic for BV at baseline and tested for BV every two months. Persistent cases of BV were positive for BV at month two, four and six. Women who were negative for BV at month two, four and six were classified as no BV. All other cases were defined as episodic BV. Incident STI was defined as any new case of CT or NG at month eight. Factors associated with STI acquisition were assessed using Binary Logistic Regression. The final model was adjusted for age, education, women who have sex with women and BV status.

Most women were ≤ 21 years (55.8%) and completed some post high school/GED education (50.9%). There were 179 (41.8%) women with persistent BV, 204 (47.7%) women with episodic BV and 45 (10.5%) women with no BV. At month eight 8.6% of women tested positive for an STI. Bivariate analysis demonstrated a significant association between women with no BV and STI acquisition ($p=0.02$). Women with no BV did not acquire an STI, 7.3% of women with persistent BV acquired an STI and 11.7% of women with episodic BV acquired an STI. Women with high school or more than high school education compared to women with less than high school education had decreased odds of developing an STI (Adjusted Odds Ratio (adjOR): 0.38; 95% CI: 0.15-0.92; and adjOR: 0.31; 95%CI: 0.13-0.73).

At least a high school education was associated with increased odds of STI acquisition compared to less than high school education. STI acquisition was only observed among women with BV.

Correlates of immune protection in the rabbit model of syphilis vaccination

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Background:

An effective syphilis vaccine will be integral to efforts to eradicate this disease. Promising vaccine candidates are surface antigens of the syphilis spirochete, *Treponema pallidum* subsp. *pallidum* (T. *pallidum*). These antigens can be targeted by vaccination-induced opsonic antibodies and mediate pathogen immune clearance. Defining correlates of protection will aid in the identification of the best vaccine candidates. Here, we sought to investigate whether immunization with variants of the T. *pallidum* Repeat C (TprC) protein and the conserved NH2-terminus of the TprK induced protection and whether splenocyte proliferation and IFN- γ production correlated with protection.

Methods:

Rabbits were immunized with either a cocktail of three recombinant, full-length TprC variants, or the NH2-terminus of the TprK protein with a RIBI-like adjuvant. Animals were challenged with T. *pallidum* intradermally (10 sites; 10^5 bacteria/site). Treponemal burden and progression to ulceration were monitored. To assess for immunogen-specific splenocytes, pools of synthetic peptides corresponding to each immunogen were used to stimulate splenocytes collected ex-vivo in proliferation assays. Supernatants from stimulated splenocytes were used to quantify IFN- γ responses by ELISA.

Results:

Immunizations protected animals significantly albeit not completely. At day 35 post-challenge only 14.1% and 15.5% of lesions ulcerated in immunized rabbits compared to the 95% of lesions in unimmunized rabbits. At day 21, there was a 99.3% and 98.7% reduction in treponemal burden averaged across all challenge sites in TprC- and TprK-immunized rabbits compared to unimmunized animals, respectively. Lymphocyte proliferation and IFN- γ production correlated to reduction in both percent of ulcerated lesions and treponemal burden.

Conclusions:

Lymphocyte proliferation and IFN- γ release assays may serve as surrogates to assess for antigen-specific T-cell responses. TprK and TprC immunizations are able to stimulate cellular immunity in a TH2 environment, which is key to development of an effective syphilis vaccine.

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 according to presence and absence of learning difficulties and LD.

Results: Logistic regression models were used to assess the odds of global neurocognitive impairment (based on global deficit score). When depression, cognitive symptoms and LD were modeled together, both cognitive symptoms (OR: 1.08, 95% CI: [1.05, 1.10]) and diagnosis of a learning disability (OR: 1.77, 95% CI [1.06, 2.95]) were significant ($p < 0.01$).

Conclusions: Diagnosis of learning disability, but not academic difficulties, is associated with increased odds of neurocognitive impairment among people living with HIV, independently of depression and cognitive symptoms (both correlated; $r = 0.58$, $p < 0.001$) with cognitive symptoms also associated with the presence of neurocognitive impairment. Our results emphasize the importance of taking into consideration the diagnosis of learning disabilities when conducting assessment and diagnosis of HAND.

Rhein Inhibits Chlamydia trachomatis Infection by Regulating Pathogen-Host Cell Interactions

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Background: The global incidence of genital Chlamydia trachomatis (C. trachomatis) infection increased rapidly as the primary available treatment of C. trachomatis infection being the use of antibiotics; however, the development of antibiotics resistant strains and other treatment failures are often observed in patients. Consequently, novel therapeutics are urgently required. Rhein is a monomer derivative of anthraquinone compounds with an anti-infection activity. This study investigated the effects of rhein on treating C. trachomatis infection.

Methods: The cytotoxicity of rhein was examined by Cell Counting Kit (CCK) 8 assay. Rhein's inhibitory effect on C. trachomatis infection was detected by immunofluorescent staining, electron microscopy, and progeny infection titer assay. The protein levels of p-RSK, p-ERK, RSK, ERK, cHSP60 were detected by immunoblotting assays. Lastly, C. trachomatis infected mouse model was used to determine the in vivo anti-infection effect of rhein.

Results: Rhein showed significant inhibitory effects on the growth of C. trachomatis in multiple serovars of C. trachomatis, including D, E, F, and L1, and in various host cells, including HeLa, McCoy, and Vero. Rhein could not directly inactivate C. trachomatis but could inhibit the growth of C. trachomatis by regulating pathogen-host cell interactions. Host p-ERK and p-RSK were both down-regulated in the presence of rhein at 36 h and 48h post-infection. Combined with azithromycin, the inhibitory effect of rhein was synergistic both in vitro and in vivo.

Conclusion: We found rhein inhibited C. trachomatis infection regulating pathogen-host cell interactions. Together these findings suggest that rhein could be developed for the treatment of C. trachomatis infections.

Taking real issues to virtual conferences: the training of YKP to discuss social vulnerability measures in the covid-19 context

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Background: The COVID-19 pandemic persisted for most of 2020 and, although the government initially canceled thousands of events, the need for adaptation forced many of them to go online. Through various digital platforms, people found new ways to deal with social distance and, at the same time, to promote events.

Methods: A two-step approach was used for this analysis: 1) creation of a data collection form using Google Forms, and 2) transfer of data from the form to a spreadsheet using Google Spreadsheets.

Results: The Ministry of Health of Brazil (MoH Brazil) started hosting webinars and virtual meetings. Between July and December 2020, MoH Brazil held four thematic webinars focusing on the Young Key Populations (YKP). As a result, more than 600 YKP were trained to deal with social vulnerabilities, especially with mental health and behavioral issues.

Conclusion: The use of this post-event databank will help governments to identify ways to move forward with the presentation of information and to organize trainings based on YKP interests. These webinars also represent a virtual safe space that engage the youth in a healthy discussion regarding social protection measures that are adapted to the covid-19 context.

Rapidly rising epidemic of African plasmid/blaTEM-1 in penicillinase-producing *Neisseria gonorrhoeae* from Guangdong, China

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Background: Our previous study showed a recent increase in the incidence of African-type penicillinase-producing *Neisseria gonorrhoeae* (PPNG) in Guangdong, China. The aim of this study was to investigate the prevalence and molecular epidemiology of African plasmid in PPNG isolates in Guangdong in two time frames, 2013-2015 and 2018-2019.

Methods: A total of 864 isolates were collected in two cities in Guangdong. Minimum inhibitory concentrations (MICs) of seven antimicrobials were determined by the agar dilution method. The molecular epidemiological characteristics were determined by PPNG and tetracycline-resistant *N. gonorrhoeae* (TRNG) plasmids typing, Sanger sequencing of TEM β -lactamase (blaTEM) genes, NG_porB gene and *N. gonorrhoeae* multiantigen sequence typing (NG-MAST).

Results: Investigation by PCR showed that 31.02% (268/864) of the isolates were PPNG, of which 53.36% (143/268) contained the TRNG plasmid. The blaTEM genes of PPNG isolates were carried by African increased (18.42% to 66.67%), Asian decreased (81.58% to 28.89%), and Toronto/Rio increased (0 to 4%) plasmids. Further plasmid typing showed that PPNG isolates consisted of three major clusters, namely African plasmid/blaTEM-1 (128/268, 47.76%), Asian plasmid/blaTEM-135 (59/268, 22.01%), and Asian plasmid/blaTEM-1 (57/268, 21.27%). The percentage of isolates with the blaTEM-1-carrying African plasmid as predominant plasmid increased significantly from 13.16% (5/38) in 2013 to 66.67% (60/90) in 2019. Among the isolates carrying the African plasmid possessing blaTEM-1, NG-MAST sequence type (ST)5061, ST1927, ST17748 and NG_porB type 8, 13, 11, 12 were found to be the predominant STs in both periods, respectively, but which showed differences in two cities in two periods.

Conclusions: The proportion of African plasmid/blaTEM-1 PPNG has continuously increased since 2013, in association with clonal spread, which might contribute to the rising gonorrhoea epidemic in Guangdong. The possibility that African plasmid/blaTEM-1 was acquired requires careful follow-up and continuous monitoring of African plasmid/blaTEM-1 to ascertain whether it constitutes a step towards evolutionary change.

Prevalence of *Neisseria gonorrhoeae* in India: A systematic literature review

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Background: This paper provides an update the current state of knowledge on the status of *C. trachomatis* (CT) in India. CT is one of the most common Sexually Transmitted Infections (STIs) in the world, yet evidence on the burden in developing countries, as India is scarce.

Results: This paper includes all the studies containing *C. trachomatis* testing that were identified in the literature search for the literature review on gonorrhea in India. The papers were included from PubMed, EMBASE and Google Scholar. The studies that contained data on CT were considered for further inclusion. Studies were included in this review if they contained *C. trachomatis* testing data

Results: This paper provides 31 new studies that were not featured in the previous review. Prevalence of CT in the included studies ranges from 0.4% to 29%. The studies are classified in four patient categories namely: OPD and STI clinic attendees, Commercial sex workers and their clients, Men who have sex with men and Trans genders and population groups. The most commonly reported testing method was PCR. This paper helps to provide a broader picture regarding *C. trachomatis* in India by providing prevalence levels for some groups of high relevance for STIs, like Commercial Sex Workers (CSW) and Men who have Sex with Men (MSM). This review provides more ample background in the CT burden in India among the most vulnerable and fringe groups. This paper also raises the issue of referencing of research papers on STIs in India to facilitate review and research on the matter

Burden of *C. trachomatis* in India, an update on evidence from the literature

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Antenatal Chlamydia trachomatis and Neisseria gonorrhoeae testing to prevent adverse neonatal consequences in Gaborone, Botswana: Protocol for a cross-over study

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Background: Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) are common sexually transmitted infections (STIs) associated with adverse neonatal outcomes. In most countries, antenatal CT/NG infections are managed based on symptoms, missing asymptomatic infections. Our study evaluates the impact of CT/NG testing and treatment of asymptomatic pregnant women on adverse neonatal outcomes. It also assesses the relationship between maternal inflammation markers and neonatal outcomes.

Methods: Maduo (results in Setswana)-STI is a two-clinic, cross-over study in Gaborone, Botswana to compare CT/NG testing and treatment (at first antenatal care visit and a third trimester visit) with standard antenatal care (WHO-endorsed syndromic management). Eligibility criteria include: pregnant, first antenatal care visit, ≤27 weeks gestation, not treated for an STI in past 30 days, and asymptomatic for CT/NG. The primary outcome is vertical transmission of CT/NG. Secondary outcomes include: preterm birth (<37 weeks gestation validated by ultrasound), low birth weight (<2500g), miscarriage (pregnancy loss at <20 weeks gestation), and still birth (fetal death at ≥20 weeks gestation). We will assess immunologic factors associated with neonatal outcomes by examining: 1) cytokine concentrations in lateral vaginal wall swabs and plasma samples using the Luminex xMAP® 48-multiplex assay; and 2) the Xpert® CT/NG assay's pathogen-specific cycle threshold (CT) value and the frequency and distribution of Sample Adequacy Control (SAC) Ct values, possible markers for the burden of infection and tissue inflammation. We will also assess the cost-effectiveness of the intervention compared to the standard of care.

Conclusions: Maduo-STI is the first study to evaluate the effectiveness and cost-effectiveness of CT/NG testing and treatment focused on asymptomatic pregnant women. It also triangulates inflammation markers with CT/NG status to assess causes of neonatal outcomes. Results from this study will inform national and WHO guidelines related to managing asymptomatic CT/NG infections during pregnancy and could improve maternal and neonatal health.

Quality of Life of patients living with Human Immunodeficiency Virus Infection – Evidence from South India

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Introduction:

With anti-retroviral therapy (ART) for human immunodeficiency virus infection (HIV) coming into picture, quality of life (QOL) has gained importance. Knowledge on the factors affecting QOL would be helpful in making important policy decisions and health care interventions. The aim of this study is to assess the quality of life of people living with HIV (PLWH) and to identify the factors influencing their QOL.

Materials and Methods:

The study was done among 100 PLWH attending a tertiary care hospital, and three Non-Governmental Organizations at Calicut, Kerala, India, from June 2015 to May 2018. QOL was assessed using HIV specific World Health Organization Quality Of Life scale (WHOQOL-HIV) – BREF questionnaire which has six domains (physical, psychological, level of independence, social relationships, environment and spirituality/religiousness/personal belief). Social support and stigma were measured using “Multidimensional Scale of Perceived Social Support” and “HIV Stigma Scale,” respectively, using Likert Scale. Factors influencing QOL were identified using backward stepwise multiple linear regression with the six domain scores as the dependent variables.

Results:

Male: Female ratio was 1:1 and 58% were in early stage of the disease (stage I/II). Psychological and SRPB (Spirituality Religiousness and Personal Beliefs) domains were the most affected domains. All the regression models were statistically significant ($P < 0.05$). The determination coefficient was highest for the social relationship domain (57%) followed by the psychological domain (51%). Disease stage and perceived social support significantly influenced all the domains of WHOQOL. Younger age, female gender, rural background, shorter duration of HIV, non-intake of ART and greater HIV related stigma were the high risk factors of poor QOL.

Conclusion:

Interventions such as ART, family, vocational and peer counselling would address these modifiable factors influencing QOL, thereby improving the QOL of PLWH.

Health related quality of life among HIV affected Individuals-
A cross sectional study

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INTRODUCTION

Identifying the level of health related quality of life (HQoL) and their influencing factors in human immunodeficiency virus (HIV) positive people is of extreme importance in implementing an interventional program to support this group. This cross sectional study was an attempt to determine the level and factors associated with HQoL among the individuals affected with HIV.

METHODOLOGY

A convenient sample of 82 HIV-infected people from three NGOs and one Infectious Disease Hospital (IDH), were interviewed using an interviewer administered, semi structured questionnaire developed by adopting the "WHOQOL-HIV BREF instrument".

RESULTS

A majority of the respondents were with low Quality of Life (QoL) in all the domains of HQoL. The proportion of respondents with low QoL was highest in the domain of social relationship (64.6%) followed by psychological domain (59.8%), physical domain (58.5%), level of independence domain (56.1%), environmental domain (52.4%) and spirituality domain (52.4%) of HQoL. Bivariate analysis revealed that the overall perception of QoL was better in the respondents living in urban area, who were employed and asymptomatic of the centre for disease control (CDC) stage of HIV.

CONCLUSION

The perception of overall health was higher in females, all respondents less than 35 years of age, asymptomatic of the CDC stage of disease and with a current CD4 count greater than 200 cell/mm³. These findings highlight the need for enhanced socio-psychosocial support and a better environment for improving the health related quality of life among individuals affected with HIV.

A people-centered approach to develop intervention packages for HIV partner notification: Facilitators and barriers under a socioecological framework

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Background:

The rate of HIV infections among MSM in China has been on the rise in recent years despite public health efforts to reach key populations for HIV prevention. The limited acceptability and usage of partner notification services (PS) would be one reason. People-centered approach such as crowdsourcing, which collects ideas from the public to solve a certain problem, may be promising for developing more effective intervention packages in promoting PS.

Methods:

This study used mixed methods to develop PS intervention strategies and analyze emerging themes of facilitators and barriers for PS. First, we used a community-based participatory approach to organize a crowdsourcing contest that solicited innovative works for promoting PS among MSM in China. Second, descriptive analysis was used to examine the demographic characteristics of the participants and the features of the eligible entries. Finally, we conducted content analysis using inductive and deductive coding methods under a socioecological framework, to identify facilitators and barriers of PS.

Results:

77 people from 31 cities submitted a total of 92 submissions, of which 53 remained eligible. Among participants with eligible entries, 60% were male, more than half identified as homosexual or bisexual, and 11% disclosed as living with HIV. Content analysis identified novel strategies to facilitate PS, including differentiation of care and stepwise notification. In addition, people-centered principles were highlighted, as emerged themes from the submissions emphasized on index education and self-empowerment, and the necessity to provide safe and supportive disclosure services.

Conclusions:

The contest engaged a diverse population of participants to contribute to the development of people-centered PS for MSM living with HIV in China. Differentiation of care and stepwise notification could be valuable for the next-step design of a more comprehensive, integrated intervention package. The emphasis on people-centered PS is also insightful for HIV-related policy design in China