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.

006.4 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.

006.5 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).

006.6 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.

Syphilis epidemiology

007.1 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.

007.2 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 multi-variable 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.