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.

006.2 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.

006.3 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.