

What Factors Increase Syphilis Screening among People Living with HIV? Using HIV Medical Monitoring Project Data to Improve Practice



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Introduction

In Oregon, the rate of early syphilis has increased 14-fold among people living with HIV (PLWH; Figure).

In 2017, early syphilis was 260 times more likely among PLWH than those without HIV; however, PLWH are not routinely screened for syphilis.

The **study objective** was to estimate the prevalence of past-year syphilis screening among PLWH in Oregon and assess identify facility-level and individual-level factors associated with screening.

We examined 2015-2016 Medical Monitoring Project (MMP) interview and medical records data in Oregon and conducted supplemental interviews with participants' medical providers. We used generalized mixed effects models to identify factors associated with syphilis screening.

Methods

- We used **generalized linear mixed effects (GLME) models** to identify which individual-level characteristics to include in the full models. Separate models were fit for each of the 30 characteristics.
- Each **model included a random intercept by facility effect** to account for correlation among MMP participants within the same facility. Each facility had its own intercept. We estimated prevalence ratios using a log link with a Poisson distribution. Characteristics that were significantly associated with syphilis testing at the $p < .10$ level were included in the full models (Table 1).
- GLME models were used to examine the association between facility-level factors and syphilis testing, adjusting for the individual-level characteristics. Because the facility-level variables were highly correlated with each other, we **examined each facility-level variable separately**, fitting a total of four models. The models included fixed effect terms for individual-level characteristics.
- The **four different facility-level independent variables** included in the models were: whether a facility had a written STI screening policy (Model 1), whether a facility had written guidelines for taking a sexual history (Model 2), having identified barriers to implementing systematic STI screening (i.e., structural, provider, and patient) (Model 3) and whether the facility was in the three-county Portland metropolitan area (i.e., Multnomah, Washington, and Clackamas counties) (Model 4).
- We looked at **strength of association** of the main facility-level fixed effect and the log likelihood to determine which model was the best fit. We calculated the intraclass correlation coefficient (ICC) by dividing the between variance by the sum of the between variance and the within variance (Table 2).

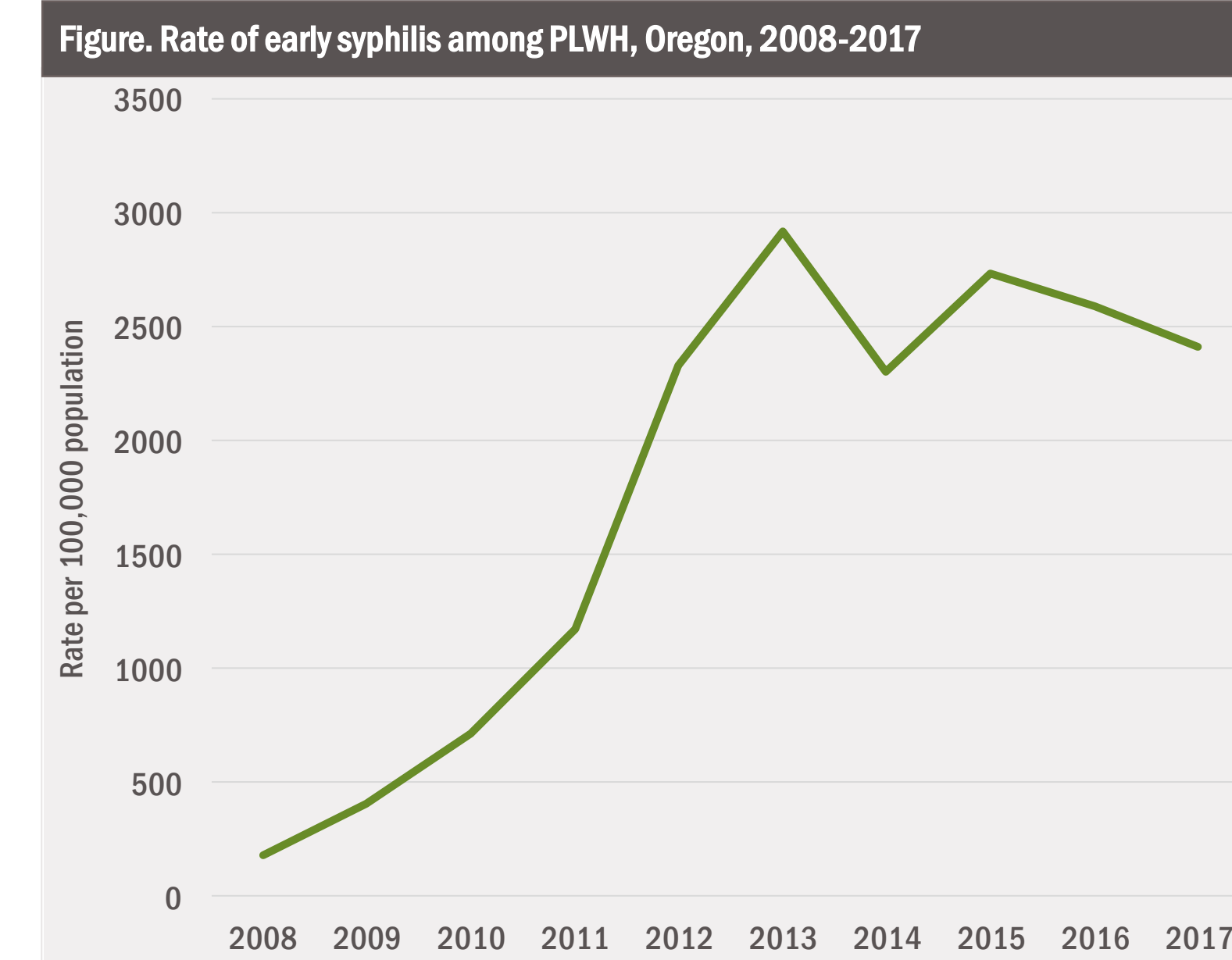


Table 2. Generalized mixed effects models of syphilis testing on facility-and individual-level variables, MMP, Oregon, 2015-2016

	APR	95% CI	APR	95% CI	APR	95% CI	3-county Portland Metro	APR	95% CI
Written screening policy	2.04	1.57	2.66						
Year	0.85	0.71	1.02						
Age	1.00	0.99	1.00						
Male	1.62	1.05	2.52						
Gay	1.10	0.97	1.24						
Employed	1.09	0.96	1.23						
Diagnosis in last 5 yrs	1.00	0.88	1.13						
Durable viral suppression	1.12	0.95	1.33						
# of sex partners, past 12m	1.00	1.00	1.00						
Met new sex partner at a public venue or online, past 12m	1.04	0.93	1.16						
Non-injection or injection drug use, past 12m	1.05	0.92	1.19						
ICC	0.15			0.35				0.29	0.32

APR=adjusted prevalence ratio, CI=confidence interval, ICC=intraclass correlation coefficient

Data

- Interview data** from the HIV Medical Monitoring Project, which produces nationally and locally representative data to assess the clinical and behavioral characteristics of PLWH.
- Supplemental interviews** with medical providers to identify facility-level policies and practices related to syphilis screening and sexual health.
- Medical record** abstraction to gather information on health conditions, medications, labs, health care usage, and the dependent variable, past-year syphilis testing.

Independent Variables

Sociodemographic - age, gender, race/ethnicity, sexual orientation, education, employment, receipt of SSDI, poverty status, nativity status, experience of past-year housing instability, and past-year prison/jail experience

Clinical - HIV diagnosis in last 5 yrs, lowest past-year CD4 count, durable viral suppression, whether all past-year CD4 counts were >500, #past-year provider visits, chronic pain, and lifetime prevalence of hepatitis B or C

Sexual behaviors (prior 12m) - sexually active (one or more anal or vaginal sex partners), new partners, number of partners, engagement in unprotected sex with an unknown or HIV-negative partner, and meeting new partners in a public venue/online

Substance use - binge drinking (prior 30d), smoker, and drug use (any use of marijuana, non-injection or injection drugs in prior 12m).

Mental health - Diagnosis/treatment for depression or anxiety

Table 1. Generalized mixed effects models of syphilis testing on individual-level variables, MMP, Oregon, 2015-2016

	N	%	PR	95% CI
Sociodemographic				
Age, median (IQR)	49	41–56	0.99	0.99 1.00
Male	332	86.7	1.72	1.14 2.60
Gay	224	58.3	1.23	1.04 1.46
Employed	197	47.2	1.13	0.99 1.29
Clinical & behavioral				
Diagnosis in last 5 years	54	13.8	1.16	0.98 1.37
Durable Viral Suppression	307	80.4	1.24	0.99 1.55
# of sex partners, past 12m (among those with >1 partner), median (IQR)	4	2.5–12	1.00	1.00 1.00
Met new sex partner at a public venue or online, past 12m	102	44.7	1.18	1.03 1.34
Non-injection or injection drug use, past 12m	138	35.7	1.13	0.99 1.29

PR=prevalence ratio, CI=confidence interval

Results

Individual-level

- 69% had past-year syphilis screening.
- Patients receiving care from facilities with written STI screening policies were far more likely to be screened than those receiving care from facilities without written policies (94% vs. 43%, $p < .001$).

Facility-level

- Most providers reported individual practices consistent with national screening guidelines; 72% reported systematically screening for syphilis and 88% self-reported taking sexual histories with all their patients.
- However, only 12% reported working in a facility with a written policy for systematic STI screening and 32% reported written policies for when and how to take a sexual history.
- More than half of providers (60%) reported barriers to implementing systematic STI screening with all patients; providers reported barriers whether or not they worked at a facility with a written STI policy.

Mixed effects (ME)

- The facility-level characteristics in three of the four ME models were significantly associated with increased prevalence of syphilis testing, after adjusting for individual-level characteristics—specifically, written STI screening policy, barriers to implementing systematic STI screening, and location in the Portland metropolitan area were all significantly associated with syphilis testing
- Male participants were more likely to have been tested, even after adjusting for facility-level characteristics.
- Clustering within facility accounted for 15-32% of the unexplained variability in the adjusted ME models.

Discussion

- Written STI screening policies at medical facilities are an important tool for ensuring syphilis screening occurs, with almost all (94%) participants from those facilities reporting past-year screening (vs. fewer than half of participants from other facilities).
- Oregon providers at facilities without a written STI screening policy may be selectively screening PLWH.
- Provider barriers to STI screening have been well documented in the literature, including lack of knowledge, lack of time, competing priorities, discomfort with taking a sexual history, and perceptions that their patients are not at risk.
- All of these barriers can be addressed through provider- and/or systems-level interventions (i.e., standardized risk assessment tools, nurse-led STI screening clinics, opt-out serological testing for syphilis along with viral load monitoring, and dried blood spot testing).
- It's unclear whether providers at facilities with written STI policies prioritized screening more than other facilities, despite their reported barriers, or whether these facilities differed in ways we did not measure and which may have facilitated adoption of written policies.
- Our results showed that receiving care at a facility with a written screening policy had the strongest effect in predicting syphilis testing for PLWH.
- Creating and adopting written policies and clinical performance indicators related to routine sexual history taking and HIV/STI measures can support providers in prioritizing routine sexual health dialogues with patients.

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