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A Missed Opportunity: Extragenital Screening for Gonorrhea and Chlamydia Sexually Transmitted Infections in People With HIV in a Southeastern Ryan White HIV/AIDS Program Clinic Setting

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Background. Guidelines recommend annual screening for gonorrhea/chlamydia in sexually active people with HIV at multiple sites (urogenital, oropharyngeal, rectal). In the first year of multisite screening at our Ryan White HIV/AIDS Program clinic, we studied (1) sexual history documentation rate, (2) sexually transmitted infection (STI) screening rate, (3) characteristics associated with STIs, and (4) the percentage of extragenital STIs that would have been missed without multisite screening.

Methods. Participants were ≥14 years old with ≥1 in-person medical visit at our clinic in 2019. Descriptive analyses were performed, and adjusting for number of sites tested, a log-binomial model was used to estimate the association between characteristics and STI diagnosis in men.

Results. In this cohort (n = 857), 21% had no sexual history recorded. Almost all STI diagnoses were among males (99.3%). Sixty-eight percent (253/375) received appropriate urogenital testing, 63% (85/134) received appropriate oropharyngeal testing, and 69% (72/105) received appropriate rectal testing. In male participants with ≥1 STI test (n = 347), Hispanic ethnicity and having a detectable HIV viral load were associated with an STI diagnosis. Of those diagnosed with an STI who had multisite testing, 96% (n = 25/26) were positive only at an extragenital site.

Conclusions. Screening rates were similar across all anatomical sites, indicating no obvious bias against extragenital testing. In males, STIs were more frequently diagnosed in people who identify as Hispanic and those with detectable viral loads, which may indicate more condomless sex in these populations. Based on infections detected exclusively at extragenital sites, our clinic likely underdiagnosed STIs before implementation of multisite screening.

Keywords. HIV/AIDS; gonorrhea; chlamydia; extragenital STI; STI screening.

Gonorrhea and chlamydia are among the most common bacterial sexually transmitted infections (STIs) in the United States [1]. In 2020, there were about 1.5 million cases of chlamydia and more than 670 000 cases of gonorrhea reported to the Centers for Disease Control and Prevention (CDC), making these the most common reportable conditions that year [1]. In one study from 2014, test positivity of gonorrhea and chlamydia screening in people with HIV (PWH) was reported as 6% at any anatomical site and as high as 17% at the anorectal site [2, 3]. Rates of

antimicrobial resistance in *Neisseria gonorrhoeae* have also been climbing worldwide, making detection and treatment of this organism particularly pressing [4]. STIs in PWH have been associated with an increased HIV viral load in the genital tract, which can increase the risk of transmission of HIV to a sexual partner [5–8]. If left untreated, gonorrhea or chlamydia can lead to multiple chronic and irreversible complications, including chronic pelvic pain and infertility in both men and women [6, 9, 10]. A challenge in diagnosing STIs is that they are often asymptomatic. Studies have shown that up to 70% of people diagnosed with an STI report no symptoms; therefore, screening based on sites of sexual contact is preferred over symptom-driven testing [3, 11, 12, 13].

The Ryan White HIV/AIDS Program (RWHAP) guidelines for comprehensive HIV care and the Centers for Disease Control and Prevention recommend screening for gonorrhea and chlamydia at all anatomic sites of sexual contact regardless of symptoms, which includes urogenital, oropharyngeal, and rectal sites [14–16]. Screening is recommended at least annually for all those who have been sexually active in the preceding year [14, 15]. Nationally, the rate of appropriate screening in PWH

varies from 39% to 72% at any site; however, screening at extragenital sites has been reported as only up to 12% [3, 17, 18, 19, 20]. Notably, these studies were performed before 2017 and may not reflect current screening practices. More recent data on extragenital gonorrhea and chlamydia screening in PWH are lacking. Screening is performed using NAAT to detect the presence of *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Samples can be collected using swabs of the rectal, oropharyngeal, and urethral/cervical/vaginal mucosa. Tests are also run directly from urine specimens. The NAAT tests (Abbott) our clinic uses are a multiplex assay with gonorrhea, chlamydia, and internal controls in each test.

The overarching aim of this study was to evaluate the first year of extragenital testing in our clinic so as to improve our own practices and provide an example of one clinic's successes and opportunities for improvement for other clinics and for research questions for STI researchers. To do this, we evaluated (1) the rate of sexual history documentation, (2) the rate of appropriate STI screening at each anatomical site, (3) what characteristics were associated with an STI diagnosis, and (4) the percentage of STIs that would have been undiagnosed without multisite testing. We hypothesized that we would have low rates of extragenital testing in our first full year of implementation but that extragenital testing would yield new diagnoses of gonorrhea and chlamydia that would have been missed before extragenital STI screening.

METHODS

Extragenital Screening: Initiation of In-House Testing and Education
Despite guidelines recommending extragenital gonorrhea and chlamydia testing, there were no Food and Drug Administration–approved options before 2019. The only testing options were bacterial cultures, which led to delayed diagnoses and were infrequently used. In response to this need, our microbiology lab worked on an off-label, internally validated NAAT in January 2019. In preparation for this, an HIV clinician at the RWHAP clinic at the University of Virginia (UVA) provided education about extragenital STI screening as part of a quality improvement project and raised awareness about the availability of in-house testing starting January 2019. Provider education included handouts on STI collection and self-collection, information about ordering tests on the electronic medical record, and email reminders on CDC STI treatment updates.

Study Population
The study population included PWH who were over the age of 14 and who had at least 1 in-person medical visit at the UVA RWHAP clinic from January 1, 2019 to December 31, 2019. We excluded PWH who solely had telemedicine visits in 2019. Individuals who identified as transgender were also excluded as the population was small (14 individuals) and could

potentially be identified. All participants had to have the following data available: age, sex assigned at birth and gender identity, self-reported race/ethnicity, zip code, annual income, primary health insurance, HIV transmission risk factor(s), a CD4 count in the study period, and an HIV viral load in the study period.

Patient Consent
The design of the work was reviewed and approved by the UVA Institutional Review Board for Health Sciences Research. Participant consent was not required because the UVA Institutional Review Board for Health Sciences Research deemed that the project met the criteria of exempt research under 45CFR46.104(d)(4)iii.

Data, Definitions, and Outcomes
For each participant, the following data were collected for January 1, 2019, to December 31, 2019 from query of the electronic medical record and by chart review: age, self-reported gender, self-reported race/ethnicity (defined as non-Hispanic White, non-Hispanic Black or African American, Hispanic, other), zip code, annual household income, primary health insurance, HIV transmission risk factor, first HIV viral load in the study period, first CD4 count in the study period, and dates of HIV medical visits. Zip code was coded into rural residence using the Rural-Urban Commuting Area (RUCA) [21]. For areas that were not categorized by RUCA, the National Center for Health Statistics data were used, which categorize counties/county-equivalent localities as urban if the average urbanicity score is <5 [21]. Household income was reported as a percentage of the Federal Poverty Level (FPL) [22]. HIV transmission risk factors were defined as men who have sex with men (MSM), heterosexual sexual contact, intravenous drug use (IDU), and "other," which included perinatal, blood transfusions, missing, or other risk factor. Participants could report more than 1 risk factor. Men who did not report MSM as a risk factor were assumed to be men who have sex with women (MSW). An undetectable viral load was defined as a viral load <200 copies/mL [23]. If someone had no viral load in 2019, the last viral load from 2018 was used. Using the HIV medical visit frequency quality metric from the Health Resources and Services Administration, engagement in care was defined as 2 medical visits in a year separated by at least 60 days [24].

The primary outcomes evaluated were (1) documentation of sexual history, (2) appropriate STI screening, (3) STI diagnosis, and (4) the number of STIs that would have been missed if only urogenital testing had been performed.

Documentation of Sexual History
Sexual history during the study period was documented using an HIV clinic–specific note template in the electronic medical record. The template included a specific area to document

Table 1. Study Participants' Characteristics

Characteristics	Participants (n = 857), No. (%)	Participants With Documented Sexual Histories (n = 677), No. (%)	Participants Without Documented Sexual Histories (n = 180), No. (%)	P Value
Age				0.003
14–24 y	49 (5.7)	42 (6.2)	7 (3.9)	
25–34 y	137 (16.0)	122 (18.0)	15 (8.3)	
35–54 y	409 (47.7)	319 (47.1)	90 (50.0)	
≥55 y	262 (30.6)	194 (28.7)	68 (37.8)	
Sex				0.8
Female	236 (27.5)	188 (27.8)	48 (26.7)	
Male	621 (72.5)	489 (72.2)	132 (73.3)	
Race/ethnicity				0.1
Non-Hispanic White	415 (48.4)	322 (47.6)	93 (51.7)	
Non-Hispanic Black	369 (43.1)	291 (43.0)	78 (43.3)	
Hispanic	46 (5.4)	43 (6.4)	3 (1.7)	
Other	27 (3.2)	21 (3.1)	6 (3.3)	
Residence rurality				0.4
Rural	612 (71.4)	479 (70.8)	133 (73.9)	
Urban	245 (28.6)	198 (29.2)	47 (26.1)	
Annual income				0.3
≤100% FPL	361 (42.1)	293 (43.3)	68 (37.8)	
101%–138% FPL	113 (13.2)	84 (12.4)	29 (16.1)	
139%–250% FPL	159 (18.6)	126 (18.6)	33 (18.3)	
251%–400% FPL	119 (13.9)	97 (14.3)	22 (12.2)	
≥401% FPL	105 (12.3)	77 (11.4)	28 (15.6)	
Primary health insurance				0.3
Medicaid	355 (41.4)	292 (43.1)	66 (36.7)	
Medicare & other Government insurance	217 (25.3)	161 (23.8)	53 (29.4)	
Private—employer	190 (22.2)	147 (21.7)	43 (23.9)	
Private—individual	95 (11.1)	77 (11.4)	18 (10.0)	
Heterosexual HIV risk Factor				1.0
Yes	322 (37.6)	254 (37.5)	68 (37.8)	
No	535 (62.4)	423 (62.5)	112 (62.2)	
MSM HIV risk factor				0.7
Yes	452 (52.7)	362 (53.4)	90 (50.0)	
No	405 (47.3)	315 (46.5)	90 (50.0)	
IDU HIV risk factor				0.6
Yes	69 (8.1)	52 (7.7)	17 (9.4)	
No	788 (91.9)	625 (92.3)	163 (90.6)	
Other HIV risk factor[a]				0.1
Yes	34 (4.0)	24 (3.5)	11 (6.1)	
No	823 (96.0)	653 (96.5)	169 (93.9)	
HIV-1 RNA viral load[b]				<0.001
Undetectable	727 (84.8)	559 (82.6)	168 (93.3)	
Detectable	130 (15.2)	118 (17.4)	12 (6.7)	
CD4+ count				0.8
<200 cells/mm³	87 (10.2)	72 (10.6)	15 (8.3)	
≥200 cells/mm³	770 (89.8)	605 (89.4)	165 (91.7)	
Engagement in HIV care[c]				0.1

Table 1. Continued

Characteristics	Participants (n = 857), No. (%)	Participants With Documented Sexual Histories (n = 677), No. (%)	Participants Without Documented Sexual Histories (n = 180), No. (%)	P Value
Engaged in care	741 (86.5)	593 (87.6)	148 (82.2)	
Not engaged in care	116 (13.5)	84 (12.4)	32 (17.8)	

Abbreviations: FPL, Federal Poverty Level; IDU, intravenous drug use; MSM, men who have sex with men.

[a]Other risk factors include perinatal transmission, transfusion, other reason not specified, or missing.

[b]Undetectable viral load is defined as <200 copies/mL.

[c]Engagement in care is defined as 2 office visits in a given year separated by at least 60 days.

sexual history. If sexually active in the past year, clinicians documented sexual practices as vaginal, anal insertive, anal receptive, oral given, and oral received. If someone had more than 1 clinic visit but sexual history was only documented during 1 visit, the documented history was used in the analysis. For those with no sexual history documented, it was assumed that the participant was not sexually active in the past year. This assumption that relies on documentation of sexual activity conservatively identifies the population that would qualify for recommendations for STI screening.

Appropriate STI Screening

For those who had a documented sexual history, appropriate screening for gonorrhea and chlamydia was determined using the RWHAP Clinical Care Guidelines, which recommend that all PWH who have been sexually active in the last year should undergo NAAT gonorrhea and chlamydia testing of urogenital, oropharyngeal, and/or rectal sites based on one's sexual practices [14]. All NAAT tests for gonorrhea and chlamydia were obtained from urine, urethral/vaginal, rectal, and oral mucosa. Only those with sexual activity in the past year were included because we could not determine appropriateness for those who did not have sexual history documented or had it documented as no sexual activity in the past year.

STI Diagnosis

All samples collected were tested via NAAT for both gonorrhea and chlamydia. If a test was positive for either gonorrhea or chlamydia or both, the test was counted as an STI diagnosis for that individual. Any test that was run within 30 days of a positive test result was excluded to remove tests obtained to confirm cure of a prior STI. Self-collected samples were included in this analysis.

Test Positivity

Test positivity was calculated by dividing the number of positive tests by the total number of tests performed regardless of
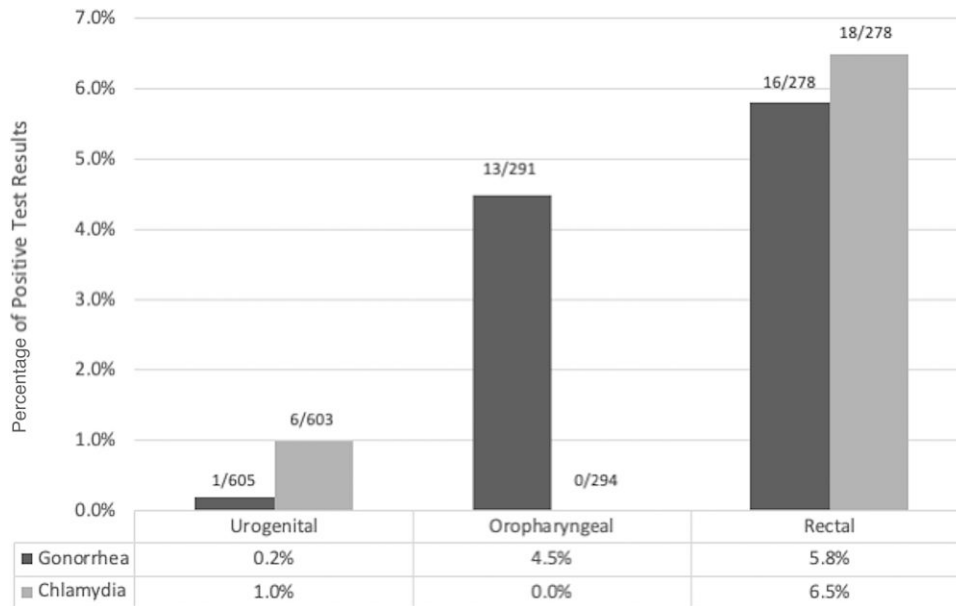
Figure 1. Gonorrhea (n = 1174)- and chlamydia (n = 1175)-positive (%) results by anatomical site in all PWH in our cohort. Abbreviation: PWH, people with HIV.

an individual's documentation of sexual history. We counted the total number of tests performed (some participants were tested multiple times). This was calculated for each anatomical site. This was also calculated separately for gonorrhea and chlamydia at each anatomical site.

Number of STIs That Would Have Been Missed if Only Urogenital Testing Had Been Performed

STI test results were queried for those who were sexually active, who had at least 1 extragenital and 1 urogenital site tested on the same date, and who were diagnosed with an STI at the extragenital site. Of those, we determined the number of participants who were positive at an extragenital site and negative at the urogenital site.

Statistical Analysis

Analyses were performed using R, version 4.0.2, and RStudio (R Foundation for Statistical Computing). Descriptive statistics were used to report frequency of documentation of sexual history, appropriate STI screening, and the number of STIs that would have been missed if only urogenital testing had been performed. Chi-square tests were performed to compare those with documented sexual histories with those without documentation. All rates reported are annual rates.

For those with documented sexual activity, we estimated the associations of select characteristics (age, race/ethnicity, HIV viral load, engagement in care, rural residence, income, insurance status, specific HIV risk factors, and CD4 count) with an STI diagnosis. These characteristics were chosen to include factors related to a person's HIV and sociodemographic background to better tailor the screening approach for providers

in our clinic and inform our pretest probability in the clinic. Because only 1 STI was diagnosed in females, this analysis was restricted to male participants. Adjusting for the number of sites tested, log-binomial regression was used to estimate crude risk ratios to assess the association of each covariate with an STI diagnosis. Covariates that had crude risk ratios with a *P* value of ≤0.25 were included in the adjusted model.

RESULTS

There were 857 individuals in the cohort. Six of 863 (0.7%) potential participants were removed for having incomplete data. In the cohort, 5.7% were younger than 25 years old, 16.0% were ages 25 to 34, 47.7% were between 35 and 54 years old, and 30.6% were older than 55 years old; 72.5% were male; 48.4% self-identified as non-Hispanic White, 43.1% self-identified as non-Hispanic Black, 5.4% self-identified as Hispanic, 3.2% self-identified as other than those categories. Most participants (71.4%) lived in a rural community; 42.1% had household incomes <100% of the FPL. Most participants had Medicaid as their primary health insurance (41.4%); 37.6% reported heterosexual sex as an HIV risk factor, 52.7% reported MSM as an HIV risk factor, 8.1% reported IDU as an HIV risk factor, and 4% reported a different HIV risk factor. Most of the cohort had well-controlled HIV with an undetectable viral load (84.8%) and had CD4 counts >200 (89.8%). Most participants were engaged in HIV care (86.5%) (Table 1).

Regarding documentation of sexual history, 79% (n = 677/857) had a sexual history documented. This population was slightly younger and had more detectable viral loads compared with those without documentation (*P* = .003 and <.001,

Table 2. For Men, Factors Associated With Being Diagnosed With a Sexually Transmitted Infection With HIV: Frequencies and Results of Univariable and Multivariable Log-Binomial Model

Characteristic	Participants (n = 347), No. (%)	STI Test Positive, %	Crude RR (95% CI)[a]	Crude P Value	Adjusted RR (95% CI)[b]	Adjusted P Value
Age				0.04		0.74
14–24 y	28 (8.0)	32.1	3.88 (1.12–13.44)		1.63 (0.40–6.57)	
25–34 y	83 (24.0)	14.5	2.14 (0.68–6.76)		1.36 (0.40–4.61)	
35–54 y	151 (43.5)	4.6	0.94 (0.28–3.22)		0.86 (0.25–2.98)	
≥55 y	85 (24.5)	4.7	Ref		Ref	
Race/ethnicity				<0.001		0.01
Non-Hispanic, non-Black	203 (58.5)	4.9	Ref		Ref	
Black	122 (35.2)	11.5	2.27 (1.01–5.14)		2.14 (0.88–5.17)	
Hispanic	22 (6.3)	36.4	6.62 (2.61–16.79)		6.12 (2.11–17.71)	
HIV-1 RNA viral load[c]				0.25		0.05
Undetectable	279 (80.4)	8.2	Ref		Ref	
Detectable	68 (19.6)	13.2	1.60 (0.74–3.46)		3.38 (1.00–11.4)	
Engagement in care[d]				0.20		0.08
Engaged in care	300 (86.5)	10.3	Ref		Ref	
Not engaged in care	47 (13.5)	2.1	0.33 (0.04–2.48)		0.23 (0.03–1.76)	
Residence rurality				0.28		
Rural	251 (72.3)	8.8	0.65 (0.30–1.40)			
Urban	96 (27.7)	10.4	Ref			
Annual income				0.47		
≤100% FPL	112 (32.3)	6.2	Ref			
101%–138% FPL	50 (14.4)	6.0	1.30 (0.33–5.11)			
139%–250% FPL	71 (20.5)	14.1	2.24 (0.85–5.88)			
251%–400% FPL	57 (16.4)	12.3	0.94 (0.30–2.98)			
≥401% FPL	57 (16.4)	8.8	1.47 (0.47–4.64)			
Primary health insurance				0.43		
Medicaid	135 (38.9)	9.7	Ref			
Medicare & Other gov insurance	70 (20.2)	4.2	0.44 (0.12–1.53)			
Private—employer	89 (25.6)	12.4	1.11 (0.50–2.49)			
Private—individual	53 (15.3)	9.4	1.11 (0.39–3.15)			
Heterosexual HIV Risk factor				0.96		
Yes	53 (15.3)	5.7	1.03 (0.30–3.53)			
No	294 (84.7)	9.9	Ref			
MSM HIV risk Factor				0.88		
Yes	279 (80.4)	10.0	0.92 (0.31–2.75)			
No	68 (19.6)	5.9	Ref			
IDU HIV risk factor				0.84		
Yes	20 (5.8)	5.0	0.81 (0.11–6.06)			
No	327 (94.2)	9.5	Ref			
CD4+ cell count				0.54		
<200 cells/mm^3	27 (7.8)	7.4	Ref			
≥200 cells/mm^3	320 (92.2)	9.4	1.52 (0.36–6.48)			

Abbreviations: FPL, Federal Poverty Level; gov, government; IDU, intravenous drug use; MSM, men who have sex with men; RR, risk ratio; STI, sexually transmitted infection.

[a]Crude RRs have been adjusted for number of STI tests performed.

[b]Adjusted model included number of STI tests performed and variables with a crude P value <.25.

[c]Undetectable viral load was defined as <200 copies/mL.

[d]Engagement in care was defined as 2 medical visits in a given year separated by at least 60 days.

respectively) (Table 1). Of those with documentation of sexual history, 55.7% (n = 377/677) reported being sexually active in the past year and 44.3% (n = 300/677) reported not being sexually active in the past year. Of the 377 participants who reported being sexually active, 375 (99.4%) reported genital intercourse (categorized as anal insertive, vaginal, or receptive oral intercourse), with 67% (253/375) receiving appropriate urogenital STI screening based on this documentation. One hundred thirty-four participants (n = 134/377, 35.5%) reported performing oral intercourse, with 63% (85/134) receiving appropriate oropharyngeal STI screening. One hundred five participants (n = 105/377, 27.9%) reported receptive anal intercourse, and 69% (72/105) received appropriate rectal STI screening.

A total of 2349 tests (1174 gonorrhea and 1175 chlamydia tests) were performed for 491 participants, with 54 STIs diagnosed in 33 participants. The rate of positive tests was 2.3% (54/2349). Test positivity was lowest at the urogenital site, at 0.6% (n = 7/1208). One of 605 (0.2%) tests was positive for gonorrhea, and 6 of 603 (1.0%) tests were positive for chlamydia. For oropharyngeal testing, overall test positivity was 2.2% (n = 13/585), with 13 of 291 (4.5%) tests positive for gonorrhea and 0 of 294 tests positive for chlamydia. Test positivity was highest for rectal testing at 6.1% (n = 34/556) overall, with 16 of 278 (5.8%) tests positive for gonorrhea and 18 of 278 (6.5%) tests positive for chlamydia (Figure 1). There was a discrepancy in the total number of gonorrhea and chlamydia tests performed because some primers for gonorrhea or chlamydia failed to amplify. Test positivity was highest among MSM at 3.1% (49/1577), followed by MSW at 2.0% (4/197). Women had the lowest test positivity at 0.2% (1/575).

One STI was diagnosed in a female. For male participants with at least 1 STI test(s) performed (n = 347), Hispanic ethnicity was associated with an STI diagnosis (36.4% prevalence; adjusted risk ratio [aRR], 6.1; 95% CI, 2.1–17.7; P = .01) (Table 2), as was a detectable viral load (13.2% prevalence; aRR, 3.4, 95% CI, 1.0–11.4; P = .05) (Table 2). Of those with at least 1 extragenital test and a concurrent urogenital test and who tested positive for an STI (n = 26), 96% (n = 25) were positive at only an extragenital site and negative at the urogenital site.

DISCUSSION

In our cohort, we found that urogenital screening alone would have failed to diagnose an STI in the majority of male participants who were screened at multiple anatomic sites (n = 25/26, 96%). If the prevalence of extragenital gonorrhea and chlamydia has been roughly stable in our clinic population, this means that we were likely missing extragenital infections before implementation of multisite screening. Though these data are specific to our clinic population's sexual activity, STI acquisition rate, and STI screening rate and are not necessarily generalizable to other populations, other RWHAP clinics should consider that extragenital gonorrhea and chlamydia infections are being underdiagnosed if multisite testing is not implemented as a standard of care. Notably, 24 out of 26 of these participants screened at multiple sites and diagnosed with an STI were MSM. This may suggest a bias in screening MSM more proactively at extragenital sites compared with other groups including women and men who have sex with women. We also found that test positivity was greatest at rectal and oropharyngeal sites (6.2% and 2.2%, respectively) compared with urogenital sites (0.6%). These findings are supported by a study by Tuddenham et al. that determined that the number needed to screen to detect 1 gonorrhea or chlamydia infection in a cohort

of MSM with HIV was as low as 5 at the rectal site and 8 at the oropharyngeal site in young men [25].

Among male participants, self-reported Hispanic ethnicity and a detectable HIV viral load were 2 characteristics associated with an STI diagnosis at any site. This may indicate more condomless sex in these populations, which could imply a lack of knowledge about safer sex practices, lack of access to condoms, or lack of condom use for other reasons. Additionally, this finding could reflect undertesting, leading to higher STI prevalence and greater risk of exposure. For these populations, our clinic has an opportunity to improve our communication about safer sex practices. A mixed methods study in 2020 based in our clinic found that Spanish-speaking PWH with limited English language were dissatisfied with their care due to language and cultural barriers between patients and clinicians [26]. Therefore, language barriers accompanied by inadequate interpreter services may play a role in our clinicians' communication and discussions about safer sex practices with Hispanic men with HIV. Of note, given the small sample size, the strength of this finding may be limited. For those with detectable viral loads, comorbid gonorrhea or chlamydia infections can increase the risk of transmitting HIV to sexual partner(s) [7, 8, 27]. In fact, a recent study by Jones et al. found that about 10% of HIV infections among an MSM cohort were attributable to comorbid gonorrhea/chlamydia infections [28]. Therefore, our results raise concern for our community given their implications for HIV transmission.

For participants who reported sexual activity, appropriate screening at each anatomical site was performed 63%–69% of the time. Nationally, rates of annual STI screening at any anatomic site vary from 39% to 72%; however, extragenital screening in particular remains low at <15% [3, 17, 19, 29, 30]. Though there is still a gap in screening among those who are sexually active, these findings also suggest that there was no bias against extragenital STI screening from the participant or the provider. This is particularly encouraging as rectal and oropharyngeal swabs are usually more time consuming and can be perceived as more invasive tests compared with urine testing and could be declined more readily by a patient for this reason. However, these findings could also be because clinicians who document a sexual history may be more likely to perform appropriate testing. Ways to improve extragenital screening further could include implementing sample self-collection as this technique has been studied and found acceptable and favored by patients compared with clinician-collected samples in both PWH and MSM without HIV [2, 31, 32].

Nearly a quarter of participants had no sexual history documented, which is an opportunity for improvement in our clinic. There are likely multiple reasons for this. It is possible that clinicians had conversations about sexual activity but did not update their note. There are a number of clinician and patient barriers to disclosing sexual histories that have been noted in

qualitative studies, such as time constraints, clinician fear of alienating or embarrassing patients, or gender, age, or cultural differences between clinicians and patients, which could play a role in our clinic environment as well [33–35].

Only 1 woman was diagnosed with gonorrhea or chlamydia at any site in our cohort. This is similar to findings by Dionne-Odom et al., who found gonorrhea and chlamydia test positivity of about 1% in women with HIV [36]. Lower rates of extragenital screening may be one of the reasons for a lower prevalence of STIs in women in our cohort. In a review article by Chan et al., the authors found a wide range of STI test positivity in women at different anatomical sites, ranging from 1.7% to 2.1% at the oropharyngeal site and 1.9% to 8.7% at the rectal site; these prevalence rates were lower compared with MSM [11]. They also noted that a significant number of women diagnosed with an STI at a rectal site reported no anal receptive intercourse, which suggests that vaginal bacterial STIs can spread to the rectal mucosa without direct exposure and/or that women may underreport anal receptive intercourse [37–39]. In fact, women without HIV are also considered at higher risk of rectal STIs, as evidenced by a recent CDC update recommending rectal STI screening in women based on reported sexual behaviors [40]. Therefore, it is possible that women in our cohort may have underreported sexual practices or were underscreened, in particular at extragenital sites.

This study's strengths include recent and detailed data on PWH's documented sexual activity and STI screening in an RWHAP clinic setting. Notably, this is one of the few US-based studies to examine test positivity in PWH with relatively high rates of appropriate STI screening. Some limitations of this study should be noted as well. Documentation of sexual history had several limitations. First, we did not evaluate free text in the body of clinic notes, which could have had additional information. We also could not tell if sexual history was carried forward in a note from a prior note or was updated during that clinic visit. We were only able to analyze STI tests performed at our institution and not those performed elsewhere. Transgender individuals were excluded from our analysis due to small sample size and the risk of identifying participants. Studies have shown that this group in particular could be at higher risk of STIs; therefore, including them in our analysis would have been helpful in determining if transgender patients in our clinic community are at higher risk [41]. Finally, this study was done at a rural Southeastern RWHAP clinic in Virginia and is not necessarily generalizable to other clinic populations around the country.

To improve extragenital screening, clinics can consider increasing clinician and patient education about screening guidelines, implementing sample self-collection, employing automated electronic reminders, or offering other innovative and patient-centered approaches [2, 32, 42]. Overall, the results of this study highlight the importance of extragenital STI screening in PWH. Multisite screening has the potential to increase case detection, thereby eliminating complications of chronic untreated infections and decreasing the risk of transmitting gonorrhea, chlamydia, and HIV.

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