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Routine, Opt-out, Emergency Department Syphilis Testing Increases HIV PrEP Uptake

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Abstract

Background: Many people vulnerable to HIV do not perceive themselves at risk or consider pre-exposure prophylaxis (PrEP). This study hypothesizes that syphilis diagnosis through universal, emergency department (ED) screening would increase PrEP uptake.

Methods: This prospective cohort study enrolled patients tested for syphilis through ED screening between July 2019 and July 2021. Participants completed a survey about behaviors, HIV and PrEP knowledge and opinions at the time of enrollment. All were offered PrEP if they met CDC guidelines for PrEP use. Information about PrEP use and HIV status was collected six months later. Bivariate analysis was used to compare outcomes between groups testing positive versus negative for syphilis.

Results: The study enrolled 97 participants, 49 with syphilis and 48 testing negative. Overall, 11 (11.3%) started PrEP, all in the syphilis group, despite 28 (58.3%) in the negative group having indications for PrEP. Participants with syphilis less frequently reported low perceived HIV risk than syphilis-negative participants who reported HIV transmission behaviors (83.7% vs 92.9%). Participants reporting moderate to high HIV risk perception were significantly more likely to start PrEP (OR 10.5; 95%CI, 1.41–78.1, p=0.02). At 6 months, 3 participants remained on PrEP (follow up data available for 63.5% of PrEP-eligible participants).

Conclusions: Syphilis diagnosis was associated with increased perception of HIV risk and increased PrEP initiation. Individuals who otherwise might not seek testing for syphilis due to perceived low risk may be identified through routine screening, thus providing an important opportunity to link more people to HIV prevention and PrEP services.

Short Summary:

Patients diagnosed with syphilis through routine emergency department screening perceived their HIV risk to be higher and initiated PrEP at higher rates than syphilis-negative patients with similar behavioral risk factors.

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Keywords

PrEP; syphilis; emergency department screening; HIV

Introduction

Pre-exposure prophylaxis (PrEP) for HIV is known to be one of the most effective methods of preventing HIV transmission. However, identifying people vulnerable to HIV to start and continue PrEP has been an ongoing challenge.[1] Many people who would benefit from PrEP do not perceive themselves to be vulnerable to HIV and may not initiate treatment even if recommended.[2–4] A diagnosis of syphilis or other bacterial sexually transmitted infection (STI) is considered an indicator of elevated risk for HIV infection, and as such, the Centers for Disease Control and Prevention (CDC) recommends HIV PrEP for any HIV-negative individuals diagnosed with a bacterial STI.[5]

The emergency department (ED) has increasingly been recommended as a location for public health interventions such as HIV screening. The ED has access to large populations that are frequently affected by multiple social and structural factors that may lead to less access to or utilization of primary or specialty outpatient health care. In a large, urban ED with a routine HIV screening program, a pilot routine, opt-out syphilis testing program was implemented in May 2019. This program screens around 1300 patients per month, and has found rates of untreated syphilis as high as 1.1%.[6] This is substantially higher than locally reported rates,[7] likely due to many people with syphilis not being screened in the absence of symptoms or identified risk factors. As previously reported, more than 80% of people diagnosed with syphilis through this routine screening program did not visit the ED for STI concerns at the time of their diagnosis.

Implementing routine syphilis testing in the ED has the potential to identify a substantial cohort of people who largely did not realize they were at risk for syphilis or HIV, or who may have had some HIV prevention awareness but have been pre-contemplative about HIV PrEP. This approach differs from traditional models of HIV prevention that engage patients who have already identified themselves as candidates for HIV PrEP by virtue of seeking out STI testing or reporting behaviors that led their physician or healthcare provider to test them for STIs. When patients screened in the ED come back for syphilis treatment, it presents an opportunity for HIV prevention education and PrEP initiation. However, given that these patients may not have identified themselves as vulnerable to HIV, it is unknown if a syphilis diagnosis obtained through routine screening in the ED will increase a patient's likelihood of PrEP initiation. One earlier study found no change in HIV risk perception after a diagnosis of rectal gonorrhea or chlamydia,[8] but this was a symptomatic population visiting a STI clinic, which may already have had elevated awareness of risk. The present study examines patients who were not primarily seeking STI care, hypothesizing that a diagnosis of syphilis will increase the proportion of PrEP uptake compared to individuals who did not receive a syphilis diagnosis, even for patients with no previous awareness of HIV risk. This pilot study could represent an important new means of identifying PrEP candidates and

increasing uptake of HIV prevention strategies, particularly among populations with limited care engagement.

Materials and Methods

Study Design

This is a prospective cohort study that took place in a large, urban, adult ED in Chicago with a routine, opt-out universal syphilis testing program. The screening program, which has been described previously,[6] is built on an electronic medical record (EMR) based platform, with annual HIV and syphilis testing for adult patients who are under age 65 and not identified as living with HIV in the EMR. Patients are determined to have syphilis through a previously described algorithm, taking into account both serology and clinical history.[6] All patients with positive syphilis results are contacted by staff from Infectious Diseases and, if the patient wishes, treatment is arranged in an affiliated STI clinic.

Eligibility Criteria

All patients participating in routine ED syphilis screening were eligible for participation in this pilot study. The study aimed to enroll approximately equal numbers of participants with and without a diagnosis of syphilis. Enrollment took place between July 2019 and July 2021. The enrollment period was prolonged due to research restrictions during the first year of the COVID-19 pandemic. Because results of syphilis testing are generally not available until after patients are discharged from the ED, patients testing positive for syphilis were approached to participate at their initial follow-up visit for treatment. The best opportunity to enroll patients testing negative, however, was during their ED visit, as patients are often difficult to reach after discharge. A convenience sample of ED patients participating in syphilis screening was approached by a research assistant for participation during their ED visit. Data from these patients was included if syphilis testing later returned negative. Patients living with HIV were excluded from the study, as they would not be eligible for PrEP.

Enrollment and study procedures

All participants completed a confidential survey about their STI history, sexual behaviors, drug use, knowledge of HIV and PrEP, perception of their own HIV risk, and opinions about PrEP. Participants who tested positive for syphilis were notified of their results by phone. They were then enrolled in the study and completed a written consent at their follow up visit for syphilis treatment, after which they were administered the survey on an iPad and then offered PrEP during the clinical visit immediately afterward. Participants negative for syphilis were consented to participate in the study during their ED visit and then completed the survey on an iPad during their ED visit or by phone afterwards. This group was offered PrEP by follow up phone call from a health educator if their survey answers indicated they had elevated HIV risk and therefore met current CDC criteria for recommending PrEP.[5] Since the conclusion of the study, PrEP guidelines have been updated to be more inclusive of all people vulnerable to HIV.[9]

Measures

Demographic characteristics including age, race, ethnicity, gender identity, and sexual orientation were collected from patient surveys. Patient surveys also included questions about healthcare utilization, prior history of STIs, sexual behaviors (eg. condom use, anonymous sex), perception of HIV risk (assessed through the following questions: “I think my chances of getting infected with HIV are,” followed by a scale from zero to “very large,” and “I worry about getting infected with HIV,” followed by a scale of “none of the time” to “all of the time”), and PrEP awareness (eg. whether the patient is aware of PrEP, has ever been recommended PrEP, has ever taken PrEP, or knows anyone who uses PrEP). Syphilis status, HIV status, and PrEP prescriptions were collected from the EMR and/or patient interviews.

The primary outcome for this analysis was PrEP initiation. The EMR was reviewed to ascertain if any participants were prescribed PrEP at the time of the initial survey (during their initial visit for syphilis treatment or, for those testing negative, at any follow up visit arranged through the study). Follow-up contact attempts and chart reviews were conducted at six months after the initial survey to ascertain if participants were interested in starting PrEP, had initiated PrEP, continued PrEP, or had been diagnosed with HIV. Outreach efforts at follow up included: up to three phone calls/voice mails, one text message, and one email, before determining that a participant was unreachable. If there were no notes in the EMR documenting PrEP initiation and the participant was unable to be reached, PrEP status and interest were considered unknown.

Statistical Analysis

Study participants were divided into three groups: syphilis positive, syphilis negative with reported PrEP indications, and syphilis negative without PrEP indications, based on their survey answers. Bivariate analysis comparing these three groups was performed using a chi-square test, or Fisher’s Exact Test was used when the number of observations was less than ten. The relationship between demographics, HIV risk perception, and PrEP awareness was examined using logistic regression for two sets of participants: (1) those who started PrEP compared to the PrEP-eligible subset of those who did not, and (2) those with syphilis compared to those who tested negative. P-values of 0.05 or less were considered statistically significant. A demographic comparison was conducted to examine differences between those participants with PrEP outcome data and those without (Supplementary Table 1). All analysis was performed in SAS version 9.4 (SAS Institute, Cary, NC) and STATA (Version 17).

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Results

Sample Characteristics

A total of 97 patients who participated in routine syphilis screening in the ED were enrolled in this study, including 49 who tested positive for syphilis and 48 who tested negative. Of those testing negative, 28 (58.3%) were eligible for PrEP by CDC guidelines, based on their survey answers. The distribution of patient demographics and behavioral risks were similar between all three groups (Table 1). The majority of patients identified as female (61.9%), non-Hispanic Black (86.6%), and heterosexual (78.4%). Most (74.2%) had a primary care doctor, less than half had a previous STI (45.4%), and 14% had a previous syphilis diagnosis.

Data on PrEP initiation was available through chart review for all patients in the syphilis positive group (n=49), as PrEP prescriptions or declinations were documented in the visit note that immediately followed study enrollment. For patients in the syphilis negative group, 19 of 28 (67.9%) PrEP eligible patients were reachable to confirm any PrEP initiation. The others were unable to be reached by phone, text or email and did not follow up within the hospital system. At the six month follow up, 30 (61.2%) patients in the syphilis positive group were successfully reached or had visits documented in the EMR (17 by chart review, 13 by phone), compared to 19 (67.9%) of the patients in the syphilis negative, PrEP eligible, group (2 by chart review, 17 by phone).

Participants with available data were compared to those without follow up data (Supplementary Table 1). There were no significant differences in demographics, although those with follow up data more frequently reported having had a primary care physician at the time of the initial survey (80.3% with follow-up information vs. 57.7% in the no follow-up information available group, p=0.02).

PrEP Outcomes

Out of the entire cohort, 11 (n=11/97, 11.3%) participants started PrEP (Table 2), four of whom (36.4%) were cis-gender women, six (54.5%) were cis-gender men who have sex with men (MSM), and 1 was a cis-gender male who had sex with women only. All 11 participants who started PrEP were in the syphilis group (n=11/49, 22.4%), despite 28 (n= 28/48, 58.3% of the syphilis negative group reporting behaviors or history that would be indications for PrEP initiation. At six month follow up, three (n=3/11, 27.3%) participants were confirmed still on PrEP. No patients reached for follow up were interested in starting PrEP, and none reported or were found in the EMR to have a diagnosis of HIV during the study period.

Odds ratios could not be calculated to compare likelihood of PrEP uptake between the syphilis positive and negative groups because no participants in the negative syphilis group started PrEP. Examining the entire cohort of PrEP eligible participants regardless of syphilis status, demographic factors associated with higher likelihood of PrEP uptake included younger age, with the highest likelihood in ages 18–24 (OR 7.50; 95%CI, 0.69–81.24, p=0.09), male gender (OR 4.67; 95%CI, 0.80–12.50, p=0.09), and not identifying as heterosexual (OR 21.0; 95%CI, 3.74–117.8, p<0.01). Prior history of STI was associated

with an increase in PrEP uptake (OR 12.0; 95%CI, 0.51–7.80, p=0.32), although this association was not statistically significant.

HIV Risk Perception

Of 28 syphilis negative patients who met CDC criteria for PrEP, 26 (92.9%) reported their perceived HIV risk to be zero to small, whereas by comparison 41 (83.7%) participants with syphilis perceived their chances for HIV infection were zero to small, an almost 10% difference (Table 2). Syphilis diagnosis was associated with a higher likelihood of worrying about HIV infection (OR 4.12; 95%CI, 1.12–15.3, p=0.03) and higher odds of perceiving moderate to large HIV risk (OR 4.00; 95%CI, 0.95–16.9, p=0.06), an association that approached statistical significance (Table 3). Participants who perceived their risk of HIV to be moderate to large had a significantly increased likelihood of starting PrEP (OR 10.5; 95%CI, 1.41–78.1, p=0.02). Those who reported worrying about getting infected with HIV sometimes or all the time (49.0% of syphilis positive, 28.5% syphilis negative, PrEP eligible) had increased odds of starting PrEP (OR 3.19; 95%CI, 0.44–23.01, p=0.25), though this association was not significant. The majority of both syphilis positive and syphilis negative groups reported previous HIV testing (87.7% of syphilis positive, 93.6% syphilis negative).

PrEP Awareness

Approximately a third (36.5%) of participants reported ever having heard about PrEP; 56.3% in the syphilis positive group compared to 10.7% in the syphilis negative, PrEP eligible group. Those who had heard of PrEP were significantly more likely to start PrEP (OR 15.0; 95%CI, 1.76–127.5, p=0.01). Knowing someone who uses PrEP also increased the likelihood of PrEP uptake (OR 26.4; 95%CI, 4.16–167.6, p=0.001). While no one in the syphilis negative group started PrEP, only seven (14.9%) reported they might, probably or definitely would start PrEP in the next 6 months, in contrast to 24 (49.0%) in the syphilis group. While most (57.7%) participants did note a preference to receive PrEP information from their regular primary care doctor, 42.3% of participants indicated that the emergency department was a preferred location for PrEP information.

Discussion

Increasing the uptake of PrEP for HIV prevention is a key component of the Ending the HIV Epidemic (EHE) Initiative, a program designed to reduce HIV incidence by 90% by 2030.[10] One of the major goals of EHE is for PrEP to be prescribed to at least half of individuals with an indication for PrEP by 2025.[11] However, as of 2020, only 25% of around 1.2 million people with an indication for PrEP received a prescription for PrEP.[1] Furthermore, there are major racial and ethnic disparities affecting PrEP use, with Black and Hispanic individuals less likely to use PrEP for several reasons,[12] despite higher prevalence of HIV in these communities.[13] Disparities in PrEP use also affect women, who use PrEP at much lower rates than men. These gender disparities are magnified in Black women, who also have a much higher incidence of HIV than White women.[12,13]

Areas of high economic hardship often are highly affected by high STI and HIV rates.[7] Residents in these areas face many barriers to accessing primary care and may disproportionately visit the ED for health care.[14] Within this context, ED screening programs have proven to be a successful means of reaching these communities.[15] HIV screening in the ED, for example, ensures testing is not limited to patients with the means to access ambulatory services and increases early diagnosis and linkage to care. The use of an ED screening program to promote HIV prevention strategies is more novel, however.

This study found that almost a quarter of the patients diagnosed with syphilis through routine ED screening started PrEP, while none of those without syphilis did, despite more than half of this latter group's survey answers indicating they should be recommended PrEP.[5] Previous studies have suggested that low perceived risk is a major barrier to PrEP uptake, even in individuals reporting behaviors that increase HIV risk.[2–4] While it is difficult to know if the participants in the present study already perceived their HIV risk to be high before their syphilis diagnosis, at the time of participation in the study, a much higher proportion of patients with syphilis perceived their HIV risk to be moderate to large compared to syphilis negative patients with PrEP indications (16.2% vs 7.1%). Furthermore, participants with syphilis were more than three times as likely to state that they might, probably or definitely would start PrEP in the next 6 months (49.0% vs 14.9%). Overall very few participants, regardless of syphilis status or reported risk factors, perceived their risk of HIV to be high, which suggests that there is a great need for improved public health messaging around HIV risk and the association between syphilis and HIV. However, the fact that participants with syphilis more frequently perceived themselves as at risk for HIV, were more likely to express intention to start PrEP, and started PrEP in higher numbers during this study, suggests that a diagnosis of syphilis may have affected participants' personal risk calculus, increasing their likelihood of starting PrEP through an increased awareness of HIV vulnerability.

One limitation of this study is that patients testing negative for syphilis but indicating HIV risk factors were offered PrEP by a health educator over the phone, which differed from the setting in which syphilis-positive participants were offered PrEP, which was during a clinic visit with a physician or nurse practitioner, and this may have affected their likelihood of accepting PrEP. A syphilis diagnosis does present an opportunity to speak with a clinician about HIV prevention, and even if this was the reason for increased PrEP uptake, it still demonstrates the value of syphilis screening in increasing PrEP uptake.

Notably, all of the patients who started PrEP in this study were Black or Hispanic, and more than a third of those starting PrEP were Black women, a priority population in the EHE strategy and a group that has traditionally been difficult to engage in PrEP.[11] Women diagnosed with syphilis have been shown to have an elevated risk of HIV acquisition within a few years of their diagnosis.[16] Previous data from this same community showed that rates of syphilis among women are higher than expected when a universal rather than targeting screening strategy is employed,[6] suggesting perhaps that women at risk for syphilis may not be sufficiently screened utilizing traditional strategies. The benefit of universal screening leading to higher syphilis diagnosis rates in women may translate to improved linkage to HIV PrEP as well, as these women come for follow up care, where they can receive

education and counseling about HIV prevention. Awareness of PrEP, knowing someone who uses PrEP, or having been recommended PrEP by a doctor or non-physician provider all increased the likelihood of PrEP initiation in this study. At the same time, only about a third of participants had ever heard of PrEP before. While the PrEP initiation rate was relatively low overall, both groups participating in this study were educated about PrEP and those with PrEP indications were recommended to start PrEP and provided counseling. Even if the rate of initiation during the study was low, this opportunity to provide HIV prevention education may raise the likelihood of PrEP initiation later.

Unfortunately, PrEP retention rates at six months were relatively low, though PrEP retention has been a widely reported challenge.[17] Self-referred individuals may be more likely to continue PrEP in the long term,[18] and by definition, patients starting PrEP after referral from an ED screening program are not self-referred. The drivers of PrEP discontinuation are multifactorial, and may include stigma, difficulty adhering to a daily pill, or lack of adherence self-efficacy.[19] It is possible that the initial increase in risk perception waned over time after the ED visit. Means of increasing PrEP retention, which may include ongoing motivational interventions and proactive patient education, will be a rich area for future study.

While the confidence intervals in the results of this study are wide, this reflects a relatively small sample size that was unavoidable due to the small overall numbers of patients diagnosed with syphilis, following up at the affiliated clinic and agreeing to participate in the study. Because of the small sample size, certain associations that may yet be true did not reach statistical significance, and it was not feasible to adjust for potential confounders. As routine, opt-out ED syphilis testing expands to more sites, these preliminary findings can be examined with a much larger sample size. Additionally, it is unknown if those patients unable to be reached after their ED visit would have started PrEP if successfully contacted. This suggests a need for mechanisms to start PrEP directly from the ED in appropriate patients, a strategy that is currently being studied.

In order to make progress on the goals of the EHE initiative, novel strategies are needed to reach vulnerable populations such as racial and ethnic minorities, women, and underserved communities with limited access to routine healthcare. Universal ED syphilis screening has shown great promise as a public health intervention to increase syphilis diagnosis and treatment in exactly these populations. The findings from this study suggest a significant added benefit for HIV prevention efforts through increased uptake of PrEP in patients found to have syphilis through routine ED screening. This may be in part due to changes in risk perception at the time of syphilis diagnosis, or simply from the opportunity afforded to improve PrEP awareness and provide education at the time of the follow up visit. Both screening and PrEP education in the ED are highly acceptable to patients. Robust ED screening programs with partnered STI clinics for follow up care may represent an important tool in the effort to increase PrEP uptake and improve HIV prevention, especially among traditionally underserved populations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Participant characteristics by syphilis diagnosis and self-reported PrEP indications

	All Participants (n=97)	Syphilis Positive (n=49)	Syphilis Negative, PrEP Eligible (n=28)	Syphilis Negative, No PrEP Indications (n=20)
Demographics and STI History				
Age Category				
18–24	21 (21.7%)	8 (16.3%)	8 (28.6%)	5 (25.0%)
25–34	34 (35.1%)	14 (28.6%)	14 (50.0%)	6 (30.0%)
35–49	26 (26.8%)	15 (30.6%)	5 (17.9%)	6 (30.0%)
50+	16 (16.5%)	12 (24.5%)	1 (3.6%)	3 (15.0%)
Gender				14 (70.0%)
Female	60 (61.9%)	28 (57.1%)	18 (64.3%)	5 (25.0%)
Male	35 (36.1%)	20 (40.8%)	10 (35.7%)	1 (5.0%)
Transgender Male	2 (2.1%)	1 (2.0%)	0 (0.0%)	
Race/Ethnicity				
NH Black	84 (86.6%)	46 (93.9%)	22 (78.6%)	16 (80.0%)
NH Other	5 (5.2%)	0 (0%)	3 (10.7%)	2 (10.0%)
Hispanic	8 (8.3%)	3 (6.1%)	3 (10.7%)	2 (10.0%)
Sexual orientation				
Heterosexual	76 (78.4%)	38 (77.6%)	23 (82.1%)	15 (83.3%)
Not Heterosexual	17 (17.5%)	9 (18.4%)	5 (17.9%)	3 (16.7%)
Has a primary care doctor	72 (74.2%)	37 (75.5%)	18 (64.3%)	17 (85.0%)
Previous STI diagnosis	44 (45.4%)	24 (49.0%)	10 (37.0%)	10 (50.0%)
Recent Behavioral Risks (Past 6 Months)				
Anal sex with a man or transwoman	15 (22.4%)	11 (35.5%)	3 (11.1%)	1 (11.1%)
No condom use	39 (84.8%)	20 (83.3%)	19 (90.5%)	0 (0.0%)
Exchanged sex for money/goods	4 (5.9%)	3 (9.7%)	1 (3.6%)	0 (0.0%)
Sex with anonymous partner *	18 (26.5%)	12 (38.7%)	4 (14.3%)	2 (22.2%)
Unstable housing	8 (8.4%)	3 (6.3%)	2 (7.4%)	3 (15.0%)

*Anonymous or found on the internet

Table 2.

PrEP outcomes, HIV risk perception, and PrEP awareness of all participants by syphilis diagnosis and self-reported PrEP indications

	All Participants (n=97)	Syphilis Positive (n=49)	Syphilis Negative, PrEP Eligible (n=28)	Syphilis Negative, No PrEP Indications (n=20)
PrEP Outcomes				
Started PrEP at time of enrollment	11 (11.4%)	11 (22.5%)	0 (0%)	0 (0.0%)
On PrEP at 6 months	3 (3.1%)	3 (6.1%)	0 (0%)	0 (0.0%)
Interested in PrEP at 6 months*	0 (0.0%)	0 (0%)	0 (0%)	N/A
HIV Risk Perception				
Perceived risk of acquiring HIV				
Zero	50 (51.6%)	20 (40.8%)	14 (50.0%)	16 (80.0%)
Near Zero	14 (14.4%)	8 (16.3%)	5 (17.9%)	1 (5.0%)
Small	22 (22.7%)	13 (26.5%)	7 (25.0%)	2 (10.0%)
Moderate-Large	11 (11.3%)	8 (16.2%)	2 (7.1%)	1 (5.0%)
Worry about getting HIV				
None of the time	40 (41.2%)	16 (32.6%)	12 (42.9%)	12 (60.0%)
Rarely	19 (19.6%)	9 (18.4%)	8 (28.6%)	2 (10.0%)
Some of the time	23 (23.7%)	13 (26.5%)	6 (21.4%)	4 (20.0%)
Moderate-All of the time	15 (15.5%)	11 (22.5%)	2 (7.1%)	2 (10.0%)
PrEP Awareness				
Has heard of PrEP before	35 (36.5%)	27 (56.3%)	3 (10.7%)	5 (25.0%)
Knows someone who takes PrEP	9 (9.4%)	6 (12.5%)	3 (10.7%)	0 (0.0%)
Has been recommended to take PrEP by a medical provider	26 (27.1%)	20 (41.7%)	2 (7.1%)	4 (20.0%)
Has ever taken PrEP	4 (4.2%)	3 (6.3%)	0 (0.0%)	1 (5.0%)

*Of those not on PrEP

Table 3.

Demographics, HIV risk perception, and PrEP awareness associated with syphilis diagnosis and PrEP uptake among participants eligible for PrEP

	Syphilis Positive vs Syphilis Negative[1]		PrEP Users vs PrEP Eligible Users Not on PrEP[2]	
	Odds Ratio [95% CI]	**p-value**	**Odds Ratio [95% CI]**	**p-value**
Demographics and STI History				
Age Category				
18–24	0.21 [0.05, 0.86]	0.03*	7.50 [0.69, 81.24]	0.09
25–34	0.23 [0.06, 0.87]	0.03*	2.40 [0.23, 24.96]	0.46
35–49	0.45 [0.12, 1.79]	0.26	0.56 [0.03, 10.12]	0.69
50+	*Ref*		*Ref*	
Gender				
Female	*Ref*		*Ref*	
Male	1.52 [0.66, 3.53]	0.33	3.17 [0.80, 12.50]	0.09
Transgender Male	1.14 [0.07, 19.13]	0.93	N/A	
Race/Ethnicity				
NH Black	*Ref*		*Ref*	
Hispanic	0.50 [0.11, 2.21]	0.36	4.67 [0.58, 37.6]	0.15
NH Other	N/A		N/A	
Sexual orientation				
Heterosexual	*Ref*		*Ref*	
Not Heterosexual	1.13 [0.39, 3.23]	0.83	21.0 [3.74, 117.8]	0.001*
Previous STI	1.30 [0.58, 2.90]	0.53	2.00 [0.51, 7.80]	0.32
HIV Risk Perception				
Perceived risk of acquiring HIV				
Zero	*Ref*		*Ref*	
Almost zero	2.0 [0.60, 6.64]	0.26	1.05 [0.08, 13.0]	0.97
Small	2.17 [0.78, 6.01]	0.14	3.82 [0.60, 24.2]	0.16
Moderate - Large	4.00 [0.95, 16.9]	0.06	10.5 [1.41, 78.1]	0.02*
Worry about getting HIV				
None of the time	*Ref*		*Ref*	
Rarely	1.35 [0.45, 4.06]	0.59	0.77 [0.06, 9.58]	0.84
Some of the time	1.95 [0.69, 5.51]	0.21	4.25 [0.69, 26.13]	0.12
Moderate – All	4.12 [1.12, 15.3]	0.03*	3.19 [0.44, 23.01]	0.25
PrEP Awareness				
Has heard of PrEP before	6.43 [2.49, 16.6]	<0.001*	15.0 [1.76, 127.5]	0.01*

	Syphilis Positive vs Syphilis Negative[1]		PrEP Users vs PrEP Eligible Users Not on PrEP[2]	
	Odds Ratio [95% CI]	**p-value**	**Odds Ratio [95% CI]**	**p-value**
Knows someone who takes PrEP	2.14 [0.50, 9.12]	0.30	26.4 [4.16, 167.6]	0.001 *
Has been recommended to take PrEP by doctor or provider	5.0 [1.78, 14.0]	0.002 *	N/A **	

*Indicates $p < 0.05$.

**Model was not able to calculate odds ratio given 0 responses in one group.

[1]Odds ratio comparing participants positive for syphilis (n=49) vs. those negative for syphilis (n=48).

[2]Odds ratio comparing participants who started PrEP to those who did not, of all PrEP-eligible participants (syphilis positive (n=49) and syphilis negative reporting PrEP indicators (n=28))