

# HIV Preexposure Prophylaxis Initiation at a Large Community Clinic: Differences Between Eligibility, Awareness, and Uptake

Chelsea L. Shover, PhD, Marjan Javanbakht, PhD, MPH, Steven Shoptaw, PhD, Robert K. Bolan, MD, Sung-Jae Lee, PhD, Jeffrey T. Parsons, PhD, Jonathon Rendina, PhD, MPH, and Pamina M. Gorbach, MHS, DrPH

**Objectives.** To characterize uptake of HIV preexposure prophylaxis (PrEP) in a community setting and to identify disparities in PrEP use by demographic and behavioral factors associated with increased HIV risk.

**Methods.** We conducted a cross-sectional study of 19 587 men who have sex with men and transgender people visiting a Los Angeles, California, clinic specializing in lesbian, gay, bisexual, and transgender care between August 2015 and February 2018 by using clinical care data.

**Results.** Seventy percent of patients met PrEP eligibility criteria, while 10% reported PrEP use. Using sex drugs, reporting both condomless anal intercourse and recent sexually transmitted infection, older age, and higher education level were associated with higher odds of PrEP use given eligibility. Latino or Asian race/ethnicity and bisexual orientation were associated with lower odds of PrEP use given eligibility. Higher odds of perceived need were associated with demographic risk factors but PrEP use was not similarly elevated.

**Conclusions.** Discrepancies between PrEP eligibility, perceived need, and use reveal opportunities to improve PrEP delivery in community settings.

**Public Health Implications.** Efforts are needed to facilitate PrEP uptake in populations with highest HIV incidence. (*Am J Public Health*. Published online ahead of print August 23, 2018; e1–e10. doi:10.2105/AJPH.2018.304623)

Taking HIV antiretroviral medication as preexposure prophylaxis (PrEP) is efficacious in preventing HIV infection.<sup>1</sup> Approved by the Food and Drug Administration (FDA) in 2012, oral daily tenofovir/emtricitabine PrEP has been shown to reduce the risk of HIV acquisition by more than 90% when taken at least 4 times per week.<sup>2,3</sup> Despite PrEP's efficacy, population studies suggest PrEP use in community settings is low, even among those at highest risk of HIV acquisition.<sup>4–6</sup>

In the United States, HIV disproportionately affects gay, bisexual, and other men who have sex with men (MSM) and transgender people—that is, individuals whose gender identity differs from the sex they were assigned at birth.<sup>7,8</sup> Two thirds of the approximately 40 000 new HIV infections annually occur among MSM, with highest

incidence among young Black and Latino MSM.<sup>7,9,10</sup> HIV prevalence among transgender women (TW) is estimated to be 22%.<sup>11</sup> Limited data on transgender MSM (TMSM) suggests that, although HIV prevalence is currently low compared with cisgender (nontransgender) MSM, TMSM

engaging in HIV risk behaviors are an understudied but sizeable portion of transgender men.<sup>12,13</sup> Data on HIV risk among genderqueer people—those whose gender identity differs from assigned sex at birth but is not strictly male or female—is even more limited.

The Centers for Disease Control and Prevention (CDC) estimates that approximately 25% of MSM in the United States may be appropriate candidates for PrEP, but studies estimate real-world uptake to be less than 5%.<sup>4–6</sup> Among TW, the gap between eligibility and uptake appears to be even larger.<sup>11</sup> This analysis aimed to characterize eligibility for PrEP, perceived need for PrEP, and PrEP initiation at a community clinic serving a large, diverse population of MSM and transgender people.

The CDC recommends PrEP for people with HIV-positive sexual partners; MSM with a 6-month history of sexually transmitted infection (STI) or condomless anal intercourse (CAI); people with a 6-month history of injecting drugs who report sharing injection or preparation equipment; and heterosexually active men and women at elevated risk of sexual acquisition (defined by recent STI, inconsistent condom use with partners of unknown HIV serostatus, or

## ABOUT THE AUTHORS

Chelsea L. Shover is with the Department of Epidemiology, Fielding School of Public Health, University of California Los Angeles; and the Department of Health and Mental Health Services, Los Angeles LGBT Center, Los Angeles, CA. Marjan Javanbakht is with the Department of Epidemiology, Fielding School of Public Health. Steven Shoptaw is with the Departments of Family Medicine and Psychiatry and Bio-behavioral Sciences, David Geffen School of Medicine, University of California Los Angeles. Robert K. Bolan is with the Department of Health and Mental Health Services, Los Angeles LGBT Center. Sung-Jae Lee is with the Department of Epidemiology, Fielding School of Public Health; and the Department of Psychiatry and Biobehavioral Sciences, David Geffen School of Medicine. Jeffrey T. Parsons and Jonathon Rendina are with the Department of Psychology, Hunter College of the City University of New York, New York, NY. Pamina M. Gorbach is with the Department of Epidemiology, Fielding School of Public Health; and Division of Infectious Diseases, David Geffen School of Medicine.

Correspondence should be sent to Chelsea L. Shover, PhD, Stanford Systems Neuroscience and Pain Lab, 1070 Arastradero Rd #200, Palo Alto, CA 94304 (e-mail: shover@post.harvard.edu). Reprints can be ordered at <http://www.ajph.org> by clicking the "Reprints" link.

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partners who inject drugs or are MSM).<sup>3,14</sup> On the basis of evidence that the CDC's PrEP indications for MSM may be too restrictive to identify new HIV infections and a lack of guidelines specific to transgender and genderqueer people, we applied a broader criteria of sexual risk to determine PrEP eligibility on the basis of STI in the past year and CAI in the past 90 days.<sup>14–16</sup>

As PrEP becomes available outside of research settings, evaluation of its uptake and effectiveness have documented differences in awareness of PrEP, eligibility for PrEP, willingness to use PrEP, and PrEP initiation related to social determinants of health, including age, race/ethnicity, and substance use.<sup>4,17–21</sup> Among those who are aware of PrEP, a commonly cited barrier to initiation is self-perception as low risk for HIV infection despite having a history of STI or CAI with a partner of unknown HIV status.<sup>17,19,20</sup>

Noninjection substance use—including sex drugs (e.g., stimulants, nitrites [poppers], erectile dysfunction drugs [without prescription], and  $\gamma$ -hydroxybutyric acid) as well as heavy alcohol use—is associated with both increased risk of HIV acquisition and decreased adherence to HIV treatment regimens.<sup>22–27</sup> Use of sex drugs can impair decision-making and increase vulnerability to HIV infection by facilitating longer or more frequent sexual encounters.<sup>23,25</sup> Unlike condom use, effective use of PrEP relies on planning but not necessarily in-the-moment actions, and may thus be a good option for individuals who use sex drugs. Evidence from some small studies suggest that stimulant use and alcohol use may affect PrEP initiation differently.<sup>18,21</sup>

Given the recent introduction of PrEP in the United States, information about context of initiation and use are scanty. To contribute to the implementation science on PrEP, the objectives of this analysis were threefold: (1) identify correlates of reporting perceived need for PrEP among MSM and transgender people meeting the CDC's PrEP guidelines, (2) identify correlates of PrEP initiation among individuals who report perceived need for PrEP, and (3) determine relationship(s) between noninjection substance use and PrEP initiation. We hypothesized that significantly more individuals would be eligible than report perceived need, and significantly fewer individuals would initiate PrEP

compared with those who report perceived need. We further hypothesized that among those who are eligible for PrEP, demographic markers of increased HIV risk—younger age, Black or Latino race/ethnicity—would be associated with lower odds of PrEP initiation, whereas behavioral indicators of increased HIV risk—sex drug use, history of both CAI and STI—would be associated with greater odds of PrEP initiation.

## METHODS

The data for this study came from The Los Angeles LGBT Center, a federally qualified health center that provides free and low-cost HIV and STI testing through its Sexual Health Education Program at 2 clinics in West Hollywood and Los Angeles, California. When a patient undergoes HIV or STI testing, they first meet with a counselor who administers a 40-question risk-assessment interview. Questions related to PrEP were added to the risk assessment in August 2015. The analysis included the data collected in the medical record at the first visit of each unique client who visited the clinics between August 2015 and April 2017. Versions of a PrEP cascade, analogous to the HIV-care cascade, have been proposed to identify gaps in HIV prevention.<sup>17,28,29</sup> A conceptual model based on the initial steps in these cascades informs this analysis (Figure 1). This model expands on the PrEP cascade by incorporating demographic and behavioral factors that may influence not only HIV risk but also perceived risk and PrEP use.

## Inclusion and Exclusion Criteria

We included records from patients who met the following criteria:

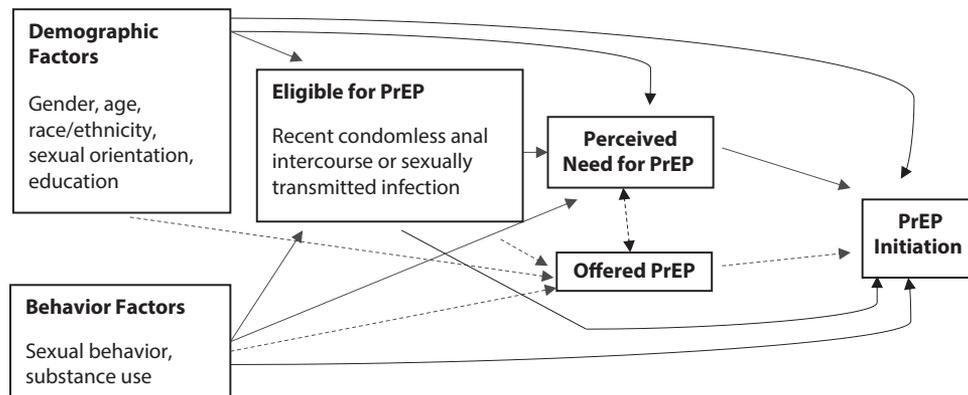
1. gender identity of cisgender man, transgender man, transgender woman, or genderqueer person;
2. gay or bisexual sexual orientation, or another sexual orientation and most recent partner was male, transgender, or genderqueer;
3. a least 18 years of age;
4. presumed HIV-negative before testing; and
5. visited the center during the study period.

We included individuals who tested HIV-positive for the first time at their first visit during the study period because they answered PrEP questions before receiving HIV test results. We excluded individuals who reported an established HIV infection or a history of testing HIV-positive.

Patients reported age, birth sex, gender identity, sexual orientation, race/ethnicity (American Indian or Alaska Native, Asian/Pacific Islander, Black, Latino/Hispanic, White, and other race including multiracial), and highest education level attained during the clinic's registration process. Other patient-level variables were collected via the counselor-administered risk assessment. Whether clients were eligible for PrEP on the basis of sexual risk was determined on the basis of history of STI (self-report or laboratory testing) in the past year and CAI in the past 90 days. Patients had a PrEP indication if they reported a history of STI (gonorrhea, chlamydia, syphilis, human papillomavirus, hepatitis B, or hepatitis C) in the past year; had a positive test result for gonorrhea, chlamydia, or syphilis in the past 365 days (human papillomavirus, hepatitis B, and hepatitis C testing was not routinely performed in the sexual health clinic throughout the study period); or reported CAI (insertive or receptive) in the past 90 days. We coded PrEP indication as CAI only, STI only, or both CAI and STI. We assessed substance use in the past 12 months by self-report in the risk assessment.

We measured perceived need for PrEP and PrEP use with a scale used in previous research.<sup>30</sup> We collapsed Likert scale responses to the question “Do you believe that you are currently an appropriate candidate for PrEP?” to create binary perceived need categories of “yes” and “no/unsure.” We collapsed responses to the question “Have you ever taken PrEP?” to create categories of “current use” and “former/never use.”

We categorized past-year reports of sex-drug use as follows: stimulants (including methamphetamine and MDMA or ecstasy), nitrites,  $\gamma$ -hydroxybutyric acid, and erectile dysfunction drugs (without prescription), combinations of any 2, and 3 or more. We defined heavy alcohol use as 5 or more alcoholic beverages on at least 5 occasions in the past 30 days.



*Note.* Demographic and behavioral factors associated with HIV acquisition may influence whether someone starts PrEP. We examined how these factors influence PrEP eligibility (defined on the basis of recent sexual history), perceived need for PrEP, and PrEP use. We expected that many people become aware of PrEP, then perceive a need, and then seek it out. But because some people may start using PrEP not because they sought it out but because PrEP was offered to them (e.g., in the context of another health care visit), we included a bidirectional pathway between being offered PrEP and perceiving a need. Solid lines denote relationships directly tested in this analysis, while dotted lines indicate relationships we were not able to assess.

**FIGURE 1—Factors Affecting Preexposure Prophylaxis (PrEP) Initiation in Community Settings**

## Statistical Methods

We used the  $\chi^2$  test to assess independence of categorical variables. We created bivariate logistic regression and multiple logistic regression models to assess relationships between independent variables and the 3 outcomes related to PrEP initiation.

Independent variables examined included gender, sexual orientation, race/ethnicity, age group, education level, sex-drug use, and PrEP indication. We imputed missing demographic variables from an individual's chart where available. We used complete case analysis. We investigated covariate-dependent missingness and included significant predictors in the multivariable models. We included year of visit in all models, and we included PrEP use in the perceived need model. We performed all analyses with SAS version 9.4 (SAS Institute, Cary, NC).

## RESULTS

In total, 19 587 individuals met the inclusion criteria (Table 1). The majority ( $n = 18\,954$ ; 97%) were cisgender MSM, 389 (2%) were TW, and less than 1% were TMSM or genderqueer people. More than half of the study population was older than 30 years. The study population was ethnically diverse: 42% White, 32% Latino/Hispanic, 9% Asian/Pacific Islander, and 7% Black. Approximately half of participants had a college

degree or higher. Twenty-five percent of all participants ( $n = 4918$ ) reported using any sex drug in the past year.

## Preexposure Prophylaxis Eligibility

Seventy percent ( $n = 13\,676$ ) of all participants met at least 1 of the sexual-risk criteria for PrEP eligibility (Table 1). In the bivariate and multivariable models, cisgender MSM had higher odds of PrEP eligibility than did TMSM or genderqueer people (categorized together as “other” because of small sample sizes). The proportion of TW eligible for PrEP did not significantly differ from that of cisgender men (Table 2). Individuals older than 40 years had lower odds of eligibility compared with those younger than 24 years. Asians had lower odds of PrEP eligibility compared with Whites, but eligibility did not otherwise differ significantly by race/ethnicity. Gay-identified individuals had highest odds of eligibility compared with bisexual-identified individuals or those with other sexual orientations. When we controlled for demographic variables, heavy alcohol use and sex-drug use were associated with significantly higher odds of eligibility for PrEP compared with those who reported nonheavy alcohol use or no sex-drug use, respectively.

## Perceived Need

Perceived need was reported by 37% of all participants and 47% of those who met

eligibility criteria. Among those who were eligible, perceived need for PrEP was significantly associated with age group, race/ethnicity, sexual orientation, education level, indication, sex-drug use, and current PrEP use, but not gender or heavy alcohol use (Table 2). In the multivariable model, age group, sexual orientation, race/ethnicity, indication, and sex-drug use were significantly associated with perceived need for PrEP. Individuals aged 40 years or older had lower odds of perceived need compared with younger individuals. Black (adjusted odds ratio [AOR] = 1.3; 95% confidence interval [CI] = 1.1, 1.5) and Latino (AOR = 1.1; 95% CI = 1.0, 1.2) individuals had significantly higher odds of perceived need than did White individuals. Bisexual individuals and those with another sexual orientation had significantly lower odds of reporting perceived need compared with gay individuals. More individuals with a history of both STI and CAI reported perceived need for PrEP, compared with individuals who had STI only (AOR = 0.5; 95% CI = 0.4, 0.6) or CAI only (AOR = 0.8; 95% CI = 0.7, 0.9). Eighty-two percent of those who reported perceived need also met eligibility criteria.

## Preexposure Prophylaxis Use

Ten percent ( $n = 1906$ ) of individuals reported current PrEP use. Use was reported by 13% of individuals who met PrEP eligibility

TABLE 1—Baseline Characteristics of Study Population: Los Angeles, CA, August 2015–February 2018

Characteristic	Eligible for PrEP, No. (%) <sup>a</sup>	Perceived Need, No. (%) <sup>a</sup>	Currently Taking PrEP, No. (%) <sup>a</sup>	Perceived Need (Among Eligible), No. (%) <sup>b</sup>	Currently Taking PrEP (Among Eligible), No. (%) <sup>b</sup>	Total, No. (%) <sup>c</sup>
<b>Gender</b>						
Cis men (who have sex with men)	13 321 (70)	7 054 (37)	1 868 (10)	5 723 (43)	1 670 (13)	18 954 (97)
Trans women	252 (65)	124 (32)	20 (5)	95 (38)	16 (6)	389 (2)
Trans men (who have sex with men)	23 (34)	21 (31)	6 (9)	13 (57)	4 (17)	68 (0.3)
Genderqueer people	80 (45)	43 (24)	12 (7)	28 (35)	10 (13)	176 (0.9)
<b>Sexual orientation</b>						
Gay	11 182 (72)	6 117 (39)	1 732 (11)	4 998 (45)	1 554 (14)	15 564 (79)
Bisexual	1 665 (63)	775 (29)	112 (4)	596 (36)	96 (6)	2 654 (14)
Heterosexual	253 (55)	103 (23)	11 (2)	80 (32)	8 (3)	456 (2)
Other	179 (64)	79 (28)	15 (5)	62 (35)	13 (7)	278 (1)
Unknown	397 (63)	168 (26)	36 (6)	123 (31)	29 (7)	635 (3)
<b>Age group, y</b>						
18–24	2 928 (70)	1 533 (37)	189 (5)	1 193 (41)	160 (5)	4 182 (21)
25–29	3 986 (73)	2 110 (39)	440 (8)	1 730 (43)	397 (10)	5 435 (28)
30–39	4 235 (71)	2 354 (39)	761 (13)	1 917 (45)	681 (16)	5 980 (31)
40–49	1 576 (67)	817 (35)	336 (14)	681 (43)	307 (19)	2 364 (12)
≥ 50	951 (58)	428 (26)	180 (11)	338 (36)	155 (16)	1 626 (8)
<b>Race/ethnicity</b>						
American Indian or Alaska Native	48 (76)	27 (43)	10 (16)	23 (48)	9 (19)	63 (0.3)
Asian/Pacific Islander	1 143 (65)	581 (33)	120 (7)	457 (40)	110 (10)	1 752 (9)
Black or African American	987 (72)	571 (42)	119 (9)	458 (46)	106 (11)	1 375 (7)
Hispanic/Latino	4 560 (72)	2 371 (37)	410 (6)	1 892 (41)	360 (8)	6 365 (32)
Other	846 (70)	413 (34)	118 (10)	335 (40)	102 (12)	1 209 (6)
White	5 717 (69)	3 098 (38)	1 082 (13)	2 551 (45)	976 (17)	8 245 (42)
Unknown	375 (65)	181 (31)	47 (8)	143 (38)	37 (10)	578 (3)
<b>Education level</b>						
Less than college degree	5 324 (72)	2 679 (36)	493 (7)	2 195 (41)	445 (8)	7 370 (38)
College degree or more	6 985 (69)	3 830 (38)	1 282 (13)	3 088 (44)	1 154 (17)	10 179 (52)
Unknown	1 367 (67)	733 (36)	131 (6)	576 (42)	101 (7)	2 038 (10)
<b>Noninjection substance use in the past 12 mo</b>						
Methamphetamine	754 (84)	450 (50)	117 (13)	406 (54)	111 (15)	900 (5)
Nitrites	2 376 (82)	1 488 (52)	495 (17)	1 300 (55)	461 (19)	2 884 (15)
GHB	622 (87)	393 (55)	167 (23)	365 (59)	160 (26)	718 (4)
Ecstasy/MDMA	1 690 (82)	978 (47)	335 (16)	849 (50)	312 (18)	2 063 (11)
ED drugs without prescription	529 (86)	332 (54)	157 (26)	315 (60)	152 (29)	612 (3)
Other prescription drug use without prescription	244 (78)	164 (52)	36 (12)	142 (58)	32 (13)	313 (2)
Alcohol	10 354 (71)	5 271 (36)	1 452 (10)	4 330 (42)	1 309 (13)	14 498 (74)
Heavy alcohol use (5 drinks or more, 5 times in the last month)	1 473 (77)	795 (41)	195 (10)	676 (46)	174 (12)	1 918 (10)
Injection drug use ever	252 (76)	166 (50)	32 (10)	136 (54)	28 (11)	330 (2)
CAI, past 90 d	11 820 (100)	5 273 (45)	1 557 (13)	5 273 (45)	1 557 (13)	11 820 (60)
STI, past year	5 846 (100)	2 626 (45)	889 (15)	2 626 (45)	889 (15)	5 846 (30)

*Continued*

TABLE 1—Continued

Characteristic	Eligible for PrEP, No. (%) <sup>a</sup>	Perceived Need, No. (%) <sup>a</sup>	Currently Taking PrEP, No. (%) <sup>a</sup>	Perceived Need (Among Eligible), No. (%) <sup>b</sup>	Currently Taking PrEP (Among Eligible), No. (%) <sup>b</sup>	Total, No. (%) <sup>c</sup>
<b>Reports perceived need for PrEP</b>						
Yes	5 859 (81)	7 242 (100)	1 705 (24)	5 859 (100)	1 540 (26%)	7 242 (37)
Unsure	3 218 (68)	NA	32 (1)	NA	26 (1)	4 723 (24)
No	3 449 (59)	NA	41 (1)	NA	25 (1)	5 862 (30)
Unknown/unreported	1 150 (65)	NA	128 (7)	NA	109 (9)	1 760 (9)
<b>PrEP use</b>						
Current	1 700 (89)	1 705 (89)	1 906 (100)	1 540 (91)	1 700 (100)	1 906 (10)
Former	569 (80)	413 (58)	NA	354 (62)	NA	707 (4)
Never	11 244 (67)	5 105 (31)	NA	3 948 (35)	NA	16 689 (85)
Unknown/unreported	163 (57)	19 (7)	NA	17 (10)	NA	285 (1)
Tested HIV-positive at baseline visit	201 (82)	98 (40)	1 (0.4)	84 (42)	1 (0.5)	246 (1)
<b>Total</b>	<b>13 676 (70)</b>	<b>7 242 (37)</b>	<b>1 906 (10)</b>	<b>5 859 (43)</b>	<b>1 700 (100)</b>	<b>19 587 (100)</b>

Note. CAI = condomless anal intercourse; ED = erectile dysfunction; GHB =  $\gamma$ -hydroxybutyric acid; MDMA = 3,4-methylenedioxy-methamphetamine; NA = not applicable; PrEP = preexposure prophylaxis; STI = sexually transmitted infection. The sample size was  $n = 19\,587$ .

<sup>a</sup>Row percentages (denominator is total).

<sup>b</sup>Row percentages (denominator is total eligible).

<sup>c</sup>Column percentages.

criteria and 24% of those who reported perceived need. Of those who were eligible and reported perceived need ( $n = 5859$ ), 26% reported current PrEP use. Ninety-one percent of those who reported current PrEP use met PrEP eligibility criteria. Of PrEP users who answered the question on perceived need, 96% reported perceived need while 2% reported they were unsure if they needed PrEP and 2% reported they were not a good candidate for PrEP. Among those who were eligible, PrEP use was associated with gender, age group, race/ethnicity, sexual orientation, education level, indication, and sex-drug use but not heavy alcohol use.

In the multivariable model, PrEP use was associated with gender, age group, race/ethnicity, sexual orientation, education level, indication, sex-drug use, and heavy alcohol use (Table 2). Older individuals had higher odds of PrEP use compared with those younger than 24 years. Asian (AOR = 0.6; 95% CI = 0.5, 0.7) or Latino (AOR = 0.6; 95% CI = 0.5, 0.7) race/ethnicity was associated with lower odds of PrEP use compared with White race/ethnicity. Bisexual individuals and those with another sexual orientation had significantly lower odds of PrEP use compared with gay individuals. Individuals with a college degree or higher had 1.6 times the odds of PrEP use (95% CI = 1.4, 1.8) compared with those with less than

a college degree. Most patterns of sex-drug use, except for stimulants only, were associated with higher odds of PrEP use in the adjusted model. Heavy alcohol use was associated with significantly lower odds of PrEP use (AOR = 0.7; 95% CI = 0.6, 0.9).

Among those eligible but not using PrEP, race/ethnicity was a significant predictor of perceived need. Of the 11 813 individuals who met the criteria but were not currently taking PrEP, 39% reported perceived need. Both Black and Latino race/ethnicity were associated with higher odds of perceived need in bivariate associations compared with White race/ethnicity. In the multivariable model, Black individuals not on PrEP had significantly higher odds of reporting perceived need compared with White individuals not on PrEP (AOR = 1.3; 95% CI = 1.1, 1.6; Table 3). Significantly lower odds of perceived need were associated with being aged 40 years and older, bisexual or other sexual orientation, and single PrEP indication.

## DISCUSSION

Seventy percent of individuals were eligible for PrEP on the basis of recent STI or CAI, 37% reported perceived need for PrEP, and 10% reported that they were currently using PrEP. The gaps between eligibility,

need, and use reveal priorities for PrEP scale-up in community settings. By identifying how key factors—namely, age, race/ethnicity, and noninjection substance use—contribute to these gaps, we can target interventions to specific drop-offs in the PrEP cascade and ultimately ensure that those who need PrEP are able to access it.

We found that PrEP use among individuals at elevated HIV risk was more common in this community-based clinic population than was previously reported in population-based surveys.<sup>4,5</sup> This may reflect the population that seeks care and services at this Los Angeles clinic; it is not a generalizable sample of MSM or TW but reflects those who choose to seek care in a gay-identified setting that offers low-cost and free care. Nevertheless, 10% is still low compared with the proportion who could benefit from PrEP. Though PrEP use was higher among those who met the sexual eligibility criteria and reported perceived need, there is an opportunity for improvement, as three quarters of this group were not using PrEP. In general, reporting more behavioral HIV risk factors was associated with greater perceived need for PrEP and greater PrEP use. Those with a recent history of both CAI and STI were more likely to report perceived need and PrEP use compared with those who reported only 1 indication. This is encouraging for

**TABLE 2—Odds Ratios for Correlates of Preexposure Prophylaxis (PrEP) Eligibility, Perceived Need, and Use, Among Those Eligible for PrEP: Los Angeles, CA, August 2015–February 2018**

	No.	Eligibility <sup>a</sup>			Perceived Need <sup>b</sup>				PrEP Use <sup>c</sup>				
		Crude OR (95% CI)	P	Adjusted OR (95% CI)	P	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P
<b>Gender</b>			<.001		<.001		.3		.9		.02		.05
Cis male	18 954	1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)	
Transgender female	389	0.8 (0.6, 1.0)		1.0 (0.8, 1.4)		0.8 (0.6, 1.1)		1.1 (0.7, 1.6)		0.5 (0.3, 0.8)		1.4 (0.7, 2.8)	
Other	244	0.3 (0.2, 0.4)		0.3 (0.2, 0.5)		0.8 (0.6, 1.3)		1.0 (0.6, 1.7)		1.1 (0.6, 1.9)		2.2 (1.1, 4.3)	
<b>Age, y</b>			<.001		<.001		<.001		<.001		<.001		<.001
18–24	2 928	1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)	
25–29	3 986	1.1 (1.0, 1.3)		1.1 (1.0, 1.2)		1.1 (1.0, 1.3)		1.0 (0.9, 1.1)		1.9 (1.6, 2.3)		1.6 (1.3, 1.9)	
30–39	4 235	1.0 (0.9, 1.1)		1.0 (0.9, 1.1)		1.2 (1.1, 1.4)		0.9 (0.8, 1.0)		3.3 (2.8, 4.0)		2.6 (2.2, 3.2)	
40–49	1 576	0.8 (0.7, 0.9)		0.8 (0.7, 0.9)		1.1 (1.0, 1.3)		0.8 (0.7, 0.9)		4.2 (3.4, 5.2)		3.3 (2.7, 4.2)	
≥ 50	951	0.6 (0.5, 0.6)		0.6 (0.7, 0.9)		0.8 (0.7, 1.0)		0.6 (0.5, 0.7)		3.4 (2.7, 4.3)		2.5 (1.9, 3.3)	
<b>Race/ethnicity</b>			<.001		<.001		.002		.006		<.001		<.001
White	8 245	1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)	
Asian/Pacific Islander	1 752	0.8 (0.7, 0.9)		0.8 (0.7, 0.9)		0.8 (0.7, 1.0)		1.0 (0.9, 1.2)		0.5 (0.4, 0.6)		0.6 (0.5, 0.7)	
Black	1 375	1.1 (1.0, 1.3)		1.2 (1.0, 1.4)		1.1 (0.9, 1.2)		1.3 (1.1, 1.5)		0.6 (0.5, 0.7)		0.8 (0.6, 1.0)	
Hispanic	6 365	1.1 (1.0, 1.2)		1.1 (1.0, 1.2)		0.9 (0.8, 1.0)		1.1 (1.0, 1.2)		0.4 (0.4, 0.5)		0.6 (0.5, 0.7)	
Other	1 272	1.0 (0.9, 1.2)		1.0 (0.9, 1.2)		0.8 (0.7, 1.0)		0.9 (0.8, 1.1)		0.7 (0.6, 0.9)		0.8 (0.7, 1.1)	
<b>Sexual orientation</b>			<.001		<.001		<.001		.002		<.001		<.001
Gay	15 564	1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)	
Bisexual	2 654	0.4 (0.3, 0.4)		0.7 (0.6, 0.8)		0.7 (0.6, 0.8)		0.8 (0.7, 1.0)		0.4 (0.3, 0.5)		0.4 (0.3, 0.5)	
Other	734	0.3 (0.2, 0.4)		0.6 (0.5, 0.7)		0.6 (0.5, 0.8)		0.7 (0.5, 0.9)		0.3 (0.2, 0.5)		0.3 (0.2, 0.6)	
<b>Education level</b>			<.001		<.001		.005		.2		<.001		<.001
< college degree	7 370	1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)	
≥ college degree	10 179	0.8 (0.8, 0.9)		0.8 (0.8, 0.9)		1.1 (1.0, 1.2)		0.9 (0.9, 1.0)		2.2 (1.9, 2.4)		1.6 (1.4, 1.8)	
<b>PrEP indication (among eligible)</b>							<.001		<.001		<.001		<.001
STI and CAI	3 990	NA		NA		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)	
STI only	1 856	NA		NA		0.4 (0.4, 0.5)		0.5 (0.4, 0.6)		0.4 (0.3, 0.4)		0.4 (0.3, 0.5)	
CAI only	7 830	NA		NA		0.7 (0.6, 0.7)		0.8 (0.7, 0.9)		0.5 (0.5, 0.6)		0.5 (0.5, 0.6)	
<b>Sex drug use</b>			<.001		<.001		<.001		<.001		<.001		<.001
None	14 699	1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)	
Stimulants only	1 335	1.7 (1.5, 2.0)		1.7 (1.5, 2.0)		1.2 (1.0, 1.4)		1.2 (1.0, 1.4)		1.2 (1.0, 1.4)		1.2 (0.9, 1.5)	
Nitrites only	1 628	1.9 (1.7, 2.2)		1.8 (1.5, 2.0)		1.6 (1.4, 1.8)		1.4 (1.2, 1.6)		1.8 (1.5, 2.1)		1.7 (1.4, 2.0)	
ED drugs only	203	1.8 (1.3, 2.5)		2.2 (1.5, 3.2)		1.5 (1.1, 2.0)		1.0 (0.7, 1.6)		3.2 (2.3, 4.7)		2.3 (1.6, 3.4)	
GHB only	80	1.9 (1.1, 3.3)		2.2 (1.2, 4.2)		2.0 (1.1, 3.4)		1.7 (0.9, 3.3)		3.0 (1.7, 5.4)		2.8 (1.5, 5.2)	
Stimulants and nitrite	650	2.9 (2.3, 3.7)		2.9 (2.2, 3.7)		1.8 (1.5, 2.2)		1.6 (1.3, 2.0)		2.0 (1.6, 2.5)		1.9 (1.4, 2.4)	
Stimulants and ED drugs	59	3.4 (1.5, 7.5)		3.1 (1.4, 6.9)		2.2 (1.2, 3.9)		1.5 (0.8, 3.0)		3.2 (1.7, 6.0)		2.5 (1.3, 4.9)	
Stimulants and GHB	170	2.4 (1.6, 3.7)		2.2 (1.4, 3.4)		1.3 (0.9, 1.8)		1.0 (0.7, 1.5)		2.2 (1.4, 3.3)		2.0 (1.3, 3.2)	
2 drugs, nonstimulant	165	2.5 (1.6, 3.8)		2.6 (1.6, 4.0)		2.6 (1.8, 3.8)		1.7 (1.1, 2.7)		4.2 (2.9, 6.0)		3.1 (2.1, 4.6)	
Poly (≥ 3)	482	5.8 (4.1, 8.1)		5.3 (3.6, 7.7)		2.7 (2.2, 3.3)		1.9 (1.5, 2.4)		3.2 (2.6, 4.0)		2.8 (2.2, 3.7)	
<b>Heavy alcohol use: ≥ 5 drinks, 5 times in the last 30 d</b>	1 918	1.6 (1.4, 1.8)	<.001	1.3 (1.1, 1.5)	<.001	1.1 (1.0, 1.2)		1.0 (0.8, 1.1)	.5	1.0 (0.8, 1.1)	.5	0.7 (0.6, 0.9)	.002

Continued

TABLE 2—Continued

	No.	Eligibility <sup>a</sup>		Perceived Need <sup>b</sup>				PrEP Use <sup>c</sup>				
		Crude OR (95% CI)	Adjusted OR (95% CI)	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P	
Year of visit												
2015	5 652	1 (Ref)	1 (Ref)	1 (Ref)		1 (Ref)		1 (Ref)		1 (Ref)		
2016	7 822	0.9 (0.8, 1.0)	0.9 (0.8, 1.0)	0.8 (0.8, 0.9)		0.8 (0.7, 0.9)		1.0 (0.9, 1.1)		1.0 (0.9, 1.2)		
2017	5 921	0.9 (0.9, 1.0)	0.9 (0.8, 1.0)	0.8 (0.8, 0.9)		0.8 (0.7, 0.9)		1.4 (1.3, 1.6)		1.5 (1.3, 1.8)		
2018	822	1.0 (0.9, 1.2)	1.1 (0.9, 1.3)	0.7 (0.6, 0.8)		0.6 (0.5, 0.8)		1.2 (1.0, 1.6)		1.4 (1.0, 1.8)		
PrEP use: current	1 906	NA	NA	46.3 (35.0, 61.4)	<.001	49.2 (36.2, 66.7)	<.001	NA		NA		

Note. CAI = condomless anal intercourse; CI = confidence interval; ED = erectile dysfunction; GHB =  $\gamma$ -hydroxybutyric acid; NA = not applicable; OR = odds ratio; PrEP = preexposure prophylaxis; STI = sexually transmitted infection. The sample size was  $n = 19\,587$ ; those eligible for PrEP:  $n = 13\,676$ .

<sup>a</sup>Eligibility was defined as STI in the past year or CAI in the past 90 d. Model also included year of visit. We omitted 3265 observations because of missing values (effective sample size = 16 322).

<sup>b</sup>We omitted 2862 observations because of missing values (effective sample size = 10 814).

<sup>c</sup>We omitted 1978 observations because of missing values (effective sample size = 11 698).

maximizing HIV prevention resources allocated in Los Angeles County.

The relationship between PrEP initiation and substance use differed between sex drugs and heavy alcohol use. The finding that use of sex drugs was associated with higher odds of eligibility, perceived need, and PrEP use suggests that people who use sex drugs are aware of their increased HIV risk and willing to use PrEP. Still, the substantial gap between those who report perceived need and those who use PrEP may point to opportunities to increase PrEP services. Early longitudinal data suggest that stimulant users who do start PrEP may have decreased adherence compared with nonusers.<sup>31</sup> Although concerns about nonadherence should not discourage providing PrEP to individuals who use sex drugs, this suggests that additional adherence support will be important to PrEP's success for people who use stimulants. Conversely, heavy alcohol use was associated with lower odds of PrEP use after we controlled for demographics and sex-drug use. These results may suggest a need for PrEP programs to adopt various strategies to engage people who use noninjection substances and recognize that alcohol is a substance associated with HIV risk.

Demographic correlates of perceived need versus PrEP use among eligible individuals highlighted disparities that could affect PrEP's effectiveness at a community-wide level. Although Latino individuals had significantly higher odds of reporting perceived need compared with Whites, PrEP use was

significantly lower. Blacks had significantly higher odds of reporting perceived need but similar odds of PrEP use compared with Whites. These are especially important findings because of the higher HIV incidence rates in Black and Latino communities.<sup>32</sup> Asians and Pacific Islanders had similar odds of perceived need compared with Whites but significantly lower odds of PrEP use. Though Asians account for a low percentage of HIV diagnoses in the United States, HIV incidence in Asians has been increasing.<sup>32</sup> Finally, Blacks and Latinos who met PrEP eligibility criteria but were not taking PrEP were more likely to report perceived need compared with Whites. The substantial gap between MSM and transgender people of color who view themselves as PrEP candidates and those who initiate PrEP suggests that PrEP is an acceptable intervention, but specific efforts to increase uptake of PrEP services are key to reducing HIV incidence.

Younger age was associated with increased odds of perceived need and decreased odds of PrEP use. Like racial/ethnic disparities, this age disparity highlights an opportunity to improve access to PrEP for people who may, because of overlapping social determinants of health, face additional barriers to PrEP initiation, such as lack of insurance or inconsistent access to a primary health care provider.

Compared with gay-identified individuals, PrEP-eligible bisexual individuals and those with another sexual orientation had lower odds of perceived need and PrEP use.

Future studies evaluating PrEP initiation should collect more detailed information on how partnerships and exposures may differ by sexual orientation. Without this additional context, it is difficult to determine whether lower PrEP need and use among non-gay-identified individuals represents a need for broader intervention.

## Strengths

The study had several key strengths, including a large, ethnically diverse sample from a community clinic, and does not represent a research study population that were incentivized to either adopt PrEP or participate in the study. To our knowledge, this is among the first PrEP analyses to include TMSM and genderqueer individuals. Though the analysis was underpowered to investigate demographic and behavioral correlates of PrEP initiation in transgender and genderqueer people, the differences in proportions of PrEP use in these groups compared with cisgender men point to the need for PrEP guidelines and programs for transgender and genderqueer people. Another strength was the ability to investigate substance use and PrEP initiation in a large sample and confirm findings from smaller studies that found associations between stimulant use and PrEP use.

## Limitations

This analysis had several limitations. Because the sample was a convenience

**TABLE 3—Odds Ratios for Correlates of Reporting Perceived Need Among Men Who Have Sex With Men and Transgender People Eligible for Preexposure Prophylaxis (PrEP) but Not Taking PrEP: Los Angeles, CA, August 2015–February 2018**

	No. (%) <sup>a</sup>	Perceived Need <sup>a</sup>			
		Crude OR (95% CI)	<i>P</i>	Adjusted OR <sup>a</sup> (95% CI)	<i>P</i>
<b>Gender</b>			.7		.9
Cis male	11 492 (86)	1 (Ref)		1 (Ref)	
Transgender female	232 (92)	1.0 (0.8, 1.3)		1.1 (0.7, 1.6)	
Other	89 (86)	0.8 (0.5, 1.3)		1.0 (0.6, 1.7)	
<b>Age, y</b>			<.001		<.001
18–24	2 735 (93)	1 (Ref)		1 (Ref)	
25–29	3 542 (89)	1.0 (0.9, 1.1)		1.0 (0.9, 1.1)	
30–39	3 508 (83)	0.9 (0.8, 1.0)		0.9 (0.8, 1.0)	
40–49	1 243 (79)	0.8 (0.6, 0.9)		0.7 (0.6, 0.9)	
≥ 50	785 (83)	0.6 (0.5, 0.7)		0.6 (0.5, 0.7)	
<b>Race/ethnicity</b>			<.001		.003
White	4 668 (82)	1 (Ref)		1 (Ref)	
Asian/Pacific Islander	1 020 (89)	1.0 (0.9, 1.2)		1.0 (0.8, 1.2)	
Black	868 (88)	1.3 (1.2, 1.6)		1.3 (1.1, 1.6)	
Hispanic	4 154 (91)	1.2 (1.1, 1.3)		1.1 (1.0, 1.2)	
Other	771 (86)	0.9 (0.8, 1.1)		0.9 (0.8, 1.1)	
<b>Sexual orientation</b>			<.001		.004
Gay	9 496 (85)	1 (Ref)		1 (Ref)	
Bisexual	1 552 (93)	0.8 (0.7, 0.9)		0.8 (0.7, 1.0)	
Other	408 (94)	0.8 (0.6, 0.9)		0.7 (0.5, 1.0)	
<b>Education level</b>			.006		.2
< college degree	4 808 (90)	1 (Ref)		1 (Ref)	
≥ college degree	5 756 (82)	0.90 (0.8, 1.0)		0.9 (0.9, 1.0)	
<b>PrEP indication</b>			<.001		<.001
STI and CAI	3 198 (80)	1 (Ref)		1 (Ref)	
STI only	1 686 (91)	0.50 (0.4, 0.6)		0.5 (0.4, 0.6)	
CAI only	6 929 (88)	0.80 (0.7, 0.8)		0.8 (0.7, 0.9)	
<b>Sex drug use</b>			<.001		<.001
None	8 668 (89)	1 (Ref)		1 (Ref)	
Stimulants only	906 (87)	1.2 (1.0, 1.4)		1.2 (1.0, 1.4)	
Nitrites only	1 056 (82)	1.5 (1.3, 1.7)		1.4 (1.2, 1.6)	
ED drugs only	115 (72)	1.0 (0.6, 1.4)		1.1 (0.7, 1.7)	
GHB only	44 (73)	1.6 (0.9, 3.0)		1.9 (1.0, 3.6)	
Stimulants and nitrite	440 (81)	1.6 (1.4, 2.0)		1.6 (1.3, 2.0)	
Stimulants and ED drugs	36 (71)	1.7 (0.9, 3.3)		1.5 (0.7, 3.0)	
Stimulants and GHB	113 (80)	1.0 (0.7, 1.6)		1.0 (0.6, 1.5)	
2 drugs, nonstimulant	93 (67)	1.8 (1.2, 2.7)		1.7 (1.1, 2.8)	
Poly (≥3)	320 (72)	2.2 (1.7, 2.7)		1.9 (1.5, 2.5)	
<b>Heavy alcohol use: ≥5 drinks, 5 times in the last 30 d</b>	1 263 (86)	1.10 (1.0, 1.3)		1.0 (0.8, 1.1)	.5
<b>Year of visit</b>			<.001		<.001
2015	3 613 (88)	1 (Ref)		1 (Ref)	
2016	4 801 (87)	0.8 (0.7, 0.9)		0.8 (0.7, 0.9)	
2017	2 880 (83)	0.7 (0.6, 0.8)		0.7 (0.7, 0.8)	
2018	519 (86)	0.6 (0.4, 0.7)		0.6 (0.5, 0.7)	

Note. CAI = condomless anal intercourse; CI = confidence interval; ED = erectile dysfunction; GHB =  $\gamma$ -hydroxybutyric acid; OR = odds ratio; PrEP = preexposure prophylaxis; STI = sexually transmitted infection. The sample size was  $n = 11\,813$ . Eligibility for PrEP was defined as STI in the past year or CAI in the past 90 d.

<sup>a</sup>We excluded 2447 observations because of missing values.

sample based on clinic attendance, findings may not be generalizable to individuals who do not access sexual health care or would not attend a clinic focused on individuals who are lesbian, gay, bisexual, or transgender. Differences in the time periods between the proxies and CDC criteria likely classified some individuals' PrEP eligibility differently than a strict application of the guidelines would, as the window we used was 90 days for CAI and 365 for STIs. In addition, answers to the CAI and STI questions may be subject to underreporting, and STI test results were available only for participants who tested at the center in the year before their study period visit. Finally, clinical nuance is lost in relying on the quantitative questions to assess PrEP eligibility.

On the basis of these factors together, it is unclear whether the proxy would over-identify or underidentify individuals eligible for PrEP. We assessed PrEP use via self-report collected via a face-to-face interview, which may be subject to overreporting attributable to social desirability bias. Some patients may have underreported PrEP use because of stigma, but we expect this to be minimal in a clinic focused on individuals who are lesbian, gay, bisexual, or transgender and that provides PrEP services. Some relevant substance use data were not available—including frequency of use, measures of dependence, and use of substances not included in the risk assessment (notably, cocaine). Furthermore, the 12-month timeframe for substance use report may misclassify those who used in the past year but not recently (e.g., 10 months ago vs past month). Ever use and recent use may influence PrEP initiation differently in ways the design could not measure.

Finally, because the study was cross-sectional, temporality of substance use and PrEP use could not be established. By including only an individual's first visit, we could not distinguish between individuals who initiated PrEP by a later visit and those who never initiated PrEP during the study period.

## Public Health Implications

By examining PrEP initiation in a community setting, we identified opportunities

to improve PrEP delivery in nonresearch settings. Disparities in PrEP use among young MSM and transgender people of color suggest that, although PrEP uptake is increasing generally, the same may not yet be true for populations with highest HIV incidence. Because PrEP is acceptable to those who use sex drugs, interventions providing PrEP services including retention and adherence support targeting these individuals have the potential to reduce HIV transmission. **AJPH**

## CONTRIBUTORS

C. L. Shover originated the research questions, conducted the analysis, and led the writing. M. Javanbakht contributed to study design, assisted with analyses, and critically revised the article. S. Shoptaw contributed to study design, conceptualized key measures and methods related to substance use, and critically revised the article. R. K. Bolan refined the research question and critically revised the article. S.-J. Lee contributed to study design, and critically revised the article. J. T. Parsons and J. Rendina developed data collection instruments for preexposure prophylaxis initiation and critically revised the article. P. M. Gorbach originated and supervised the study, contributed to study design, and critically revised the article.

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## HUMAN PARTICIPANT PROTECTION

The study received approval from the institutional review board at the University of California, Los Angeles (IRB#17-000717).

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