



Factors Associated with PrEP Support and Disclosure Among YMSM and Transgender Individuals Assigned Male at Birth in Chicago

Gregory Phillips II¹ · Anand Raman¹ · Dylan Felt¹ · Ying Han¹ · Brian Mustanski¹

Published online: 21 June 2019

© Springer Science+Business Media, LLC, part of Springer Nature 2019

Abstract

Pre-exposure prophylaxis (PrEP) is one of the best biomedical HIV prevention tools available. However, uptake, particularly in communities of men who have sex with men (MSM) and transgender individuals assigned male at birth (AMAB), remains low. Further, the role of an individual's social support structure on PrEP uptake and adherence remains largely understudied. Understanding MSM and AMAB transgender individuals' perceptions of PrEP use as well as support and patterns of disclosure of (or intent to disclose) their PrEP status may offer key insights into how best to improve uptake in vulnerable communities. Further, the influence of one's social connections on other factors, such as perceptions of and conversations about PrEP deserves attention as well, as these factors may be key to improved knowledge and uptake. Therefore, we assessed perceptions of PrEP use, disclosure of or intent to disclose PrEP status, and social support and associated factors among a cohort of MSM and AMAB transgender individuals in a large Midwestern city. Results demonstrated that, among those not taking PrEP, bisexual participants and those unsure of their sexual identity were less likely to be comfortable with the idea of disclosing PrEP use were they ever to start taking it. Encouragingly however, we found that individuals who reported disclosing their PrEP status had high rates of support among friends and relatives. We also observed that knowing someone else who was on PrEP was associated with increased likelihood of discussing PrEP with one's medical provider, as was increased age. Other findings and implications for research, policy, and practice are discussed within.

Keywords PrEP · Disclosure · Social support · YMSM · Transgender · HIV

Resumen

La profilaxis de preexposición (PrEP) es una de las mejores herramientas biomédicas disponibles para la prevención del VIH. Sin embargo, el uso, particularmente en las comunidades de hombres que tienen sexo con hombres (HSH) y las personas transgéneros asignadas a un hombre al nacer (AHAN), sigue siendo baja. Además, el papel de la estructura de apoyo social de un individuo en el uso y adherencia de PrEP sigue siendo poco estudiado. Comprender las percepciones de HSH y las personas transgéneros AHAN sobre el uso de PrEP, así como el apoyo y los patrones de divulgación (o la intención de revelar) su estado de PrEP puede ofrecer información clave sobre la mejor manera de mejorar el uso en las comunidades vulnerables. Además, la influencia de las conexiones sociales de una persona en otros factores, como las percepciones y conversaciones sobre la PrEP, también merece atención, en que estos factores pueden ser clave para mejorar el conocimiento y el uso. Por lo tanto, evaluamos las percepciones del uso de PrEP, la divulgación o la intención de revelar el estado de PrEP, y el apoyo social y los factores asociados entre una cohorte de HSH y personas transgéneros en una gran ciudad del Medio Oeste. Los resultados demostraron que, entre los que no tomaban PrEP, los participantes bisexuales y los que no estaban seguros de su identidad sexual tenían menos probabilidades de sentirse cómodos con la idea de revelar el uso de PrEP si alguna vez comenzaban a tomarla. Sin embargo, de manera alentadora, encontramos que las personas que informaron haber revelado su estado de PrEP tenían altas tasas de apoyo entre amigos y familiares. También observamos que conocer a otra persona

✉ Gregory Phillips II
glp2@northwestern.edu

¹ Department of Medical Social Sciences, Northwestern University Feinberg School of Medicine, 625 N Michigan Ave 14-043, Chicago, IL 60611, USA

que estaba tomando la PrEP se asoció con una mayor probabilidad de discutir la PrEP con el proveedor médico, al igual que el aumento de la edad. Otros hallazgos e implicaciones para la investigación, la política, y la práctica se discuten dentro.

Introduction

Pre-exposure prophylaxis (PrEP) is one of the most effective biomedical prevention tools for HIV-negative individuals at high risk of infection, particularly transgender individuals assigned male at birth (AMAB) and cisgender men who have sex with men (MSM) [1, 2]. Despite positive results from clinical trials and extensive federal planning to support the implementation of PrEP, studies have shown that high risk populations have low levels of uptake and adherence—most notably young MSM (YMSM) and transgender women [3–7] (PrEP use among non-binary or other-gender identified individuals assigned male at birth has historically not been directly assessed). These demographics have demonstrated elevated HIV risk; adolescents and young adults between the ages of 13 and 24 made up 27% of new diagnoses among all gay and bisexual men in 2015 [8] and transgender women have been consistently shown to bear a disproportionate burden of the HIV epidemic [9], despite frequent and problematic conflation with MSM in HIV surveillance [10, 11].

Extensive campaigns have made progress in increasing PrEP awareness; however, a national study on awareness and use of PrEP among YMSM found that although 67.5% were aware of PrEP, only 8.7% used it [12]. Studies including transgender women have reported similar associations between awareness and use [5]. Factors which have previously been identified to explain this discrepancy include low levels of awareness of the availability and purpose of PrEP and of individual risk of HIV acquisition, [13] as well as concerns about side effects, [14, 15] medical mistrust, [16] disinterest in regimen adherence, [17] structural issues including costs and barriers to access, [17, 18] and insurance concerns encompassing costs and confidentiality when on parental insurance [19]. To expand on this literature, this paper will consider the role of three relatively understudied constructs: PrEP perceptions, PrEP disclosure, and social support, in influencing both uptake and adherence.

Central to any discussion of PrEP perceptions and willingness to disclose is the stigma which surrounds the medication. Despite extensive awareness campaigns, stigma of PrEP use remains ubiquitous, even within healthcare settings. Prior literature has reported that healthcare providers may be reluctant to offer PrEP to at-risk patients due to concerns regarding risk compensation, [20] exposing pervasive preconceptions about certain sex practices and safe sex behaviors, namely condom use, that perpetuate social and internalized stigmas surrounding sex, sexuality, and sexual practice [21]. In other words, rather than receive a prescription for PrEP, individuals may be pressured to ‘correct’ other

behaviors instead, such as improving condom use or exclusively practicing monogamy [22]. Broadly, this pattern is concerning given the importance of the provider’s role in accessing PrEP. For the individual, beyond being a barrier to access, these assumptions and stigmas mean that admitting an interest in PrEP use may be perceived as an admission of “guilt,” or of engaging in “risky” sex practices that may negatively impact health outcomes such as substance use or HIV acquisition, thereby opening oneself to judgement and stress.

Experiences of PrEP stigma are not confined to clinical contexts however, and may in fact be particularly relevant for those who are not out to friends or family regarding their sexual minority identity or behavior [23]. Research regarding barriers to PrEP uptake has identified that participants were discouraged from initiating by the stigma surrounding PrEP use that might result in judgment from family and peers, as well as repercussions within society at large [24]. For example, use of PrEP is often incorrectly seen as an indicator for HIV-positive status, and it is therefore frequently associated with other highly stigmatized behaviors such as sexual promiscuity and sexual minority status [25]. These interlocking factors expose broader social issues, particularly prejudice against sexual minority identities and behaviors, [26] and have important implications for HIV prevention. As these findings make clear, PrEP stigma and misconceptions can interact with individual stressors to create what is effectively a “PrEP closet” for users, thereby discouraging dialogues that are crucial to promote sexual health in populations most impacted by HIV. Unfortunately, there has been relatively little research into the concomitant roles of PrEP perceptions, disclosure, and support among YMSM and transgender individuals assigned male at birth.

Understanding these complex factors which enable PrEP stigma and compel user silence is crucial to addressing low PrEP uptake, as studies have shown that positive social support improves health and treatment adherence in both physical and emotional ways [27]. The kind of social support network an individual has may play an especially critical role in helping combat both internalized and social stigma. There is ample evidence to support this idea, as the structure of individuals’ personal networks has previously been shown to impact PrEP uptake and adherence [28]. Moreover, Baeten et al. suggest that external support structures may be directly associated with high adherence in PrEP trials. Specifically, data gathered within the PARTNERS PrEP Study demonstrated that support from the HIV-positive partner in a serodiscordant couple resulted in better adherence to PrEP on the part of the HIV-negative partner [29–31].

Peer networks have also been studied as a primary way for individuals to learn about PrEP and as a frequent source of advice on safer sex behavior, whilst family and other social institutions have been cited as stress factors [32, 33]. Thus, confiding in more experienced friends can serve as a valuable resource in mutual learning surrounding PrEP navigation and coping with broader sexuality-based stigma, [34] which in turn has the potential to promote sexual health. Crucially, however, achieving this type of social support may not be possible if barriers to disclosure prevent necessary openness and dialogue. Therefore, as partners, peers, family, and other social connections all play a role in influencing how a person learns about, uses, and discloses use of PrEP, identifying relevant support structures is vital to improving PrEP use. Specifically, understanding how disclosure of PrEP use occurs in interpersonal relationships could help to inform interventions to improve self-efficacy and adherence in at-risk populations by promoting social support for PrEP users.

In order to tease apart the influences of these distinct but interrelated social influences, the current study investigated YMSM and AMAB transgender individuals' perceptions of PrEP use and acceptability, the factors associated with PrEP disclosure among those taking PrEP, as well as intended disclosure among those who were HIV-negative and not on PrEP. Further, the ways in which participants' beliefs about PrEP perceptions both nationally and within one's peer group are associated with disclosure were examined. Finally, we explored the correlates of discussing PrEP with one's healthcare provider.

Methods

Data for this study were collected within RADAR, a longitudinal cohort study in Chicago focused on understanding the individual, dyadic, network, social, and biologic factors that are associated with HIV infection among sexual and gender minority youth assigned male at birth. Study participants complete an initial assessment that includes a network survey, an individual-level psychosocial survey, and collection of biological samples for HIV/STI testing. Follow-up visits occur every 6 months for the duration of the study. Data for this manuscript came from study participants who attended a visit between June 6, 2017 and April 27, 2018, were HIV-negative, and were administered the PrEP support and disclosure items, resulting in an analytic sample of 700. For participants who completed the survey at multiple visits, only their first survey was included.

Participants

In order to enroll in the RADAR cohort, participants had to meet the following criteria: between 16 and 29 years of

age, assigned a male sex at birth, English-speaking, and reported a sexual encounter with a man in the previous year or identified as gay or bisexual. Participants were recruited in three ways: (1) involvement in a prior cohort of YMSM and/or sexual and gender minority youth (Project Q2, [35] Crew 450, [36] and a new 2015 cohort) all of which enrolled individuals when they were between 16 and 20 years old; (2) through being a serious partner of an existing RADAR cohort member (i.e., being in a current serious relationship with a RADAR cohort member); or (3) through peer recruitment by an existing RADAR cohort member. Details about the previous cohorts can be found elsewhere, [35, 36] while the new 2015 cohort was recruited using venue-based, peer-referral, and online recruitment methods. Although all serious partners were eligible for a one-time visit, they were required to meet the above criteria for enrollment in the cohort. Similarly, peer recruits needed to meet the same criteria, plus they needed to be between 16 and 29 years of age. Age was restricted for peer recruits to match the recruitment design of the previous cohorts (i.e., Project Q2 and Crew 450), which at the time of the current study also had older participants (i.e., ages 20–29) and because the overall RADAR sample needed to represent a full range of ages to achieve the multiple cohort, accelerated longitudinal design [37].

Measures

Demographics

At baseline, participants were asked to report their racial identity, and whether they identified as Hispanic or Latinx. Following the 2007 United States Department of Education (USED) guidelines for combining ethnicity and race data, anyone who identified as Hispanic/Latinx regardless of race was classified as Hispanic/Latinx [38]. All non-Hispanic/Latinx individuals who identify as a single race were classified as that race; anyone who identified as two or more races were classified as multiracial. For sample size purposes, Asian, American Indian or Alaska Native, Multi-Racial, and Native Hawaiian or Other Pacific Islander individuals were recoded as "Other." Other demographic information collected included age, gender identity, educational attainment, and sexual orientation. Gender identity was assessed at baseline; participants had the option to indicate their gender as male, female, or other. In this paper, we discuss individuals who reported a female or other identity using the term "transgender individuals assigned male at birth," and those who reported a male identity as MSM. The data used in this study was collected as a part of RADAR follow-up visits. Since the RADAR cohort study commenced in 2015 and recruitment into the cohort has been continuous since then, the current range of ages for participants is between

16 and 31. The age variable was recoded based on quartiles: 16–20 years, 21–22 years, 23–24 years, and 25–31 years.

PrEP Disclosure

PrEP disclosure among those who were currently taking PrEP medication was assessed through the question: “Have you told anyone that you use PrEP?” Anyone who said “No” was asked the follow-up question: “Why haven’t you told anyone you are taking PrEP?” Anyone who said “Yes” was asked the follow-up question: “Who have you told that you are taking PrEP?” The question response options were: Friends, Mother, Father, Brother(s), Sister(s), Other Relative(s), Boyfriend/Girlfriend, Sex Partner(s), Someone Else. Those who responded “Someone Else” were then asked to specify who else they told. Participants were able to select more than one response option.

Support was also assessed among the participants who indicated “Yes” through the following question: “In general, how have people reacted when you told them that you use PrEP?” Response options were: most people were supportive, some people were supportive and some people were unsupportive, and most people were unsupportive. Participants were asked to identify degree of support in specific individuals through two questions: “Who was the most supportive person you told about your PrEP usage?” and “Who was the least supportive person you told about your PrEP usage?”. The selection of possible responses for these two questions were identical to the response options regarding who participants told about PrEP use.

Participants who indicated they are not currently taking PrEP, at least in the past 6 months, but have heard of PrEP were asked the question: “Would you feel comfortable telling anyone that you are taking PrEP if you ever began taking it?” Anyone who said “Yes” was asked the follow-up question: “Who would you tell that you were taking PrEP?” The response options were the same as those available to PrEP users who were asked who they told about their PrEP use. Responses to the question about disclosing use if the participant began using PrEP will be referred to as intended PrEP disclosure or intended disclosure.

Regardless of PrEP status, all participants were asked “Do you know anyone on PrEP?” Those who responded “Yes” were asked to specify who they knew who was on PrEP. Response options were friend, relative, boyfriend/girlfriend, sex partner(s), co-worker, and someone else. For this question, participants were able to select multiple response options as well.

PrEP Attitudes and Perceptions of Usage

Perceived PrEP use prevalence was assessed through two questions: “Of all the gay and bisexual men in the United States, how many do you think are on PrEP?” and “Now, thinking about all of your gay and bisexual male friends, how many do you think are on PrEP?” Response options ranged from 1 (Almost None) to 5 (Almost All).

Similarly, attitudes about PrEP use were assessed through a pair of questions: “Thinking about all the gay and bisexual men in the United States, how do you think most feel about PrEP?” and “Now, thinking of your gay and bisexual male friends, how do you think most feel about PrEP?” Response options ranged from 1 (Strongly Disapprove) to 5 (Strongly Approve).

Of note, question language was not changed for transgender participants, therefore both cisgender and transgender participants (the latter of whom likely would not have identified as gay or bisexual males) responded with their perceptions of PrEP use among gay and bisexual male (GBM) friends, and gay and bisexual males nationally. Some participants therefore responded about in-group perceptions, while others responded about perceptions of a separate demographic.

Provider Conversations and Health Care

All participants were asked “Has a medical provider, such as a doctor or nurse, ever talked to you about PrEP?” All participants who answered “Yes” were asked to respond to a series of questions regarding their conversation with a medical provider. Participants were asked “Who initiated this conversation about PrEP?” and were given the options “I did” or “My medical provider did.” Respondents were also asked to specify how their providers responded to their questions about PrEP. Response options included “Recommended I take PrEP,” “Told me I was low risk and did not need PrEP,” “They did not know what PrEP was,” and “Some other response.”

Statistical Analysis

All data cleaning and statistical analysis was performed in R Version 3.5.1. Univariate statistics described the demographics of participants, as well as PrEP disclosure (actual and intended) and awareness.

In order to assess the validity of intended PrEP disclosure, responses among non-PrEP users were compared to actual disclosure among PrEP users; as few people using PrEP had not disclosed, Fisher’s exact confidence intervals were used to determine the significance of the association [39, 40.]. To compare intended disclosure to actual disclosure of PrEP use, the non-overlapping variables of intended

disclosure and actual disclosure were merged into one column of “disclosure” responses. Following this intermediate step, a logistic regression model was constructed with PrEP use and demographic variables as predictors, with the goal of seeing whether disclosure of PrEP status is more common among PrEP users than intended disclosure is among non-PrEP users. Logistic regression models were also used to identify significant associations between demographic variables and intended PrEP disclosure. As virtually all participants who used PrEP had disclosed their use to at least one person, no bivariate analyses were conducted with this outcome. Subsequently, multiple logistic regression models—controlling for demographic characteristics—were fitted to construct adjusted odds ratios for three outcomes: intended disclosure, knowing someone on PrEP, and having a conversation with a health care provider about PrEP. Finally, paired t-tests were calculated for differences between national and friend group perception of the two sets of questions regarding attitudes and usage of PrEP among GBM. Due to the presence of a small sample of transgender participants, sensitivity analyses were conducted for all analyses to ensure findings were robust for MSM.

Results

Sensitivity analyses were conducted on all tests to ensure results were robust for MSM when transgender participants were excluded from analysis. All results were robust to sensitivity analyses.

Demographics

Similar proportions of the 700 individuals in the sample identified as Latino (31.7%) or White (30.3%), while 27.0% reported their race as Black. The majority of participants identified as cisgender male (91.6%) and gay (69.6%). Most were under the age of 23 years (62.1%). A full demographic breakdown is provided in Table 1.

PrEP Disclosure

Approximately one-fifth of participants indicated using PrEP in the prior 6 months (18.9%). Of those, 89 (67.4%) reported that they were currently taking PrEP. Nearly all of these individuals (97.8%) indicated that they disclosed their PrEP usage to at least one person. The most frequently indicated person to whom PrEP use was disclosed was friends (88.5%), followed by sex partner(s) (77.0%), mother (54.0%), and boyfriend/girlfriend (51.7%). Less than half told their father (35.6%), sister(s) (39.1%), brother(s) (20.7%), or another relative (20.7%).

Table 1 Demographics of RADAR participants (N=700)

	N	%
Race/Ethnicity		
White	212	30.3
Black or African American	189	27.0
Hispanic/Latinx	222	31.7
Other	77	11.0
Age, years		
16–20	217	31.0
21–22	218	31.1
23–24	101	14.4
25–31	164	23.4
Sexual identity		
Gay	487	69.6
Bisexual	124	17.7
Queer	49	7.0
Straight/heterosexual	19	2.7
Unsure/questioning	8	1.1
Other	13	1.9
Gender identity		
Cisgender male	641	91.6
Transgender female	30	4.3
Other	29	4.1
Used PrEP, last 6 months		
Yes	132	18.9
No	567	81.1

Participants who were on PrEP were asked how people have reacted when they told them they use PrEP—nearly all respondents indicated that most people were supportive (92.0%). To provide more specificity, participants were asked who was most supportive about their PrEP use: 44.8% indicated their friends (Table 2). Despite the high rates of disclosure to relatives, only 16.1% said their mother was the most supportive, with substantially smaller proportions for other relatives. Finally, 20.7% said their boyfriend/girlfriend was the most supportive. Encouragingly, 70.1% said that no one they told was unsupportive.

Intended PrEP Disclosure

Of note, the odds of actual disclosure were over 5 times greater than the odds of intended disclosure (odds ratio [OR]=5.54; 95% confidence interval [CI] 1.40, 32.36). However, there were no demographic differences between intended and actual disclosure (data not shown).

Of the participants who were not on PrEP, most said they would feel comfortable telling someone they were taking PrEP if they ever started (88.7%). Of the individuals who said they would feel comfortable telling someone if they ever started taking PrEP, the vast majority said they would

Table 2 PrEP disclosure and intended disclosure among RADAR participants (N = 700)

	n	%
Told someone they used PrEP (N = 89)	87	97.8
Friends	77	88.5
Mother	47	54.0
Father	31	35.6
Brother(s)	18	20.7
Sister(s)	34	39.1
Other relative(s)	18	20.7
Boyfriend/girlfriend	45	51.7
Sex partner(s)	67	77.0
Someone else	12	13.8
Most supportive person		
Friends	39	44.8
Mother	14	16.1
Father	4	4.6
Sister(s)	2	2.4
Boyfriend/girlfriend	18	20.7
Sex partner(s)	7	8.0
Brother(s)	1	1.1
Someone else	2	2.3
Least supportive person		
Friends	5	5.7
Mother	7	8.0
Father	4	4.6
Brother(s)	3	3.4
Sister(s)	2	2.3
Boyfriend/girlfriend	3	3.4
Sex partner(s)	2	2.3
Nobody was unsupportive	61	70.1
Would tell someone if on PrEP (N = 655)	502	88.7
Friends	440	87.6
Mother	248	49.4
Father	160	31.8
Brother(s)	163	32.4
Sister(s)	189	37.6
Other relative(s)	141	28.1
Boyfriend/girlfriend	411	81.9
Sex partner(s)	422	84.1
Someone else	20	4.0

tell their friends (87.6%). Many participants also said they would tell their boyfriend/girlfriend and sex partner(s) (81.9% and 84.1%, respectively).

Although no associations between intentions to disclose PrEP use were seen for race/ethnicity, age, or gender identity, they did significantly differ by sexual identity. While the majority of individuals reported that they would tell someone if they were to start taking PrEP, bisexual individuals

were significantly less likely than gay individuals to report that they would feel comfortable telling someone if they began taking PrEP, after controlling for other demographics (adjusted OR [AOR] = 0.47; 95% CI 0.26, 0.88) (Table 3). A similar but stronger association was seen for unsure/questioning individuals (AOR = 0.17; 95% CI 0.04, 0.86). Additionally, if an individual knew someone on PrEP, they were significantly more likely to report feeling comfortable telling someone if they ever began taking PrEP (OR = 1.74, 95% CI 1.03, 2.95).

PrEP Use in the Community

Overall, most participants reported knowing someone on PrEP (n = 441, 63.0%). Of the individuals who reported knowing someone on PrEP, 83.2% reported that they knew a friend on PrEP. The next most commonly named person was a sex partner (31.5%). Comparatively few people reported knowing that a relative, a boyfriend/girlfriend, or a coworker were using PrEP (3.2, 8.2, and 7.9%, respectively).

Knowing someone who used PrEP significantly differed by several key demographic variables. Across racial/ethnic groups, more people reported knowing someone on PrEP than not. However, Hispanic/Latinx individuals were significantly less likely than White individuals to know someone on PrEP, after controlling for age, sexual identity, and gender identity (AOR = 0.59; 95% CI 0.39, 0.88). Furthermore, when asked to specify who they knew on PrEP, Black and Hispanic individuals were significantly less likely than White individuals to report knowing a sex partner on PrEP (AOR = 0.25, 95% CI 0.13, 0.47 and AOR = 0.52, 95% CI 0.31, 0.87, respectively). Age was also significantly related to knowing someone on PrEP; individuals in all older age groups were significantly more likely to know someone on PrEP than those aged 16–20 years (Table 3). Additional associations were seen with sexual orientation. Specifically, both bisexual and unsure/questioning individuals were significantly less likely to know anyone on PrEP compared to gay individuals (AOR = 0.38; 95% CI 0.25, 0.57 and AOR = 0.22; 95% CI 0.04, 0.94, respectively). In addition, individuals who knew someone on PrEP were more likely to have used PrEP in the six months before the interview (AOR = 2.34, 95% CI 1.46, 3.85).

When asked about perceptions of PrEP use, both among gay/bisexual men in general and among their gay/bisexual male friends, noticeable differences were seen between the broad and the more tangible concepts. On a scale from 1 (Almost None) to 5 (Almost All), participants reported a mean of 2.73 (standard deviation [SD] = 0.83) for the proportion of gay/bisexual men in the US they thought were on PrEP, but only a mean of 2.15 (SD = 1.18) for the proportion of their gay/bisexual male friends. The mean of the

Table 3 Demographic associations with intended disclosure, knowing someone on PrEP, and conversations with providers

	Intended disclosure (n = 655)		Know someone on PrEP (n = 700)		Conversation about PrEP (n = 699)	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Race/Ethnicity						
White	1.00	–	1.00	–	1.00	–
Black or African American	0.62	0.30, 1.29	0.77	0.49, 1.20	1.138	0.75, 1.73
Hispanic/Latinx	0.75	0.37, 1.49	0.59	0.39, 0.88	0.96	0.65, 1.41
Other	0.93	0.35, 2.75	1.28	0.71, 2.37	1.05	0.61, 1.82
Age, years						
16–20	1.00	–	1.00	–	1.00	–
21–22	0.92	0.47, 1.80	2.18	1.46, 3.28	1.30	0.89, 1.92
23–24	1.60	0.64, 4.60	3.01	1.79, 5.18	2.03	1.24, 3.35
25–31	0.73	0.36, 1.49	2.36	1.52, 3.70	1.84	1.21, 2.82
Sexual identity						
Gay	1.00	–	1.00	–	1.00	–
Bisexual	0.47	0.26, 0.88	0.38	0.25, 0.57	0.60	0.40, 0.90
Queer	1.04	0.35, 3.98	0.69	0.35, 1.37	1.02	0.53, 1.95
Straight/heterosexual	0.80	0.11, 16.70	1.05	0.35, 3.52	2.17	0.63, 10.05
Unsure/questioning	0.17	0.04, 0.86	0.22	0.04, 0.94	0.11	0.01, 0.66
Other	0.91	0.16, 17.42	0.66	0.20, 2.27	0.57	0.17, 1.83
Gender identity						
Cisgender male	1.00	–	1.00	–	1.00	–
Transgender female	2.08	0.33, 42.27	0.70	0.29, 1.71	2.91	1.12, 8.64
Other	0.69	0.19, 3.33	1.73	0.70, 4.63	1.38	0.60, 3.26

Bold values are used to indicate statistical significance

AOR adjusted odds ratio; association controls for all other variables in the table

differences between these two measures was significantly different from zero ($t = 13.45$, $p < 0.0001$). Further, on a scale from 1 (Strongly Disapprove) to 5 (Strongly Approve), participants ranked PrEP approval among gay/bisexual men in the US at a mean of 3.79 ($SD = 0.93$), and slightly higher at 3.92 ($SD = 1.04$) for their friends. Although the difference was smaller than for the first comparison, it was also significant ($t = -4.04$, $p < 0.0001$).

PrEP Conversations with Healthcare Providers

A substantial number of participants had spoken with a healthcare provider about PrEP ($n = 367$, 52.5%). Most participants indicated that their providers were the ones who initiated the conversation (53.8%). Of those who had a conversation with their providers, most indicated that their provider recommended they take PrEP (72.6%).

Of the individuals who had a conversation with a medical professional about PrEP, approximately one-third reported having taken PrEP in the past 6 months (33.0%). Additionally, discussing PrEP with a healthcare provider was significantly associated with knowing someone on PrEP ($OR = 3.03$; 95% CI 2.20, 4.18).

Age, sexual identity, and gender identity were all significantly associated with having had a PrEP conversation with a provider. After controlling for other demographics, both 23–24 and 25–31 year old participants were significantly more likely to have had a conversation with their provider than 16–20 year old participants (Table 3). Similar to other adjusted comparisons, bisexual and unsure/questioning individuals were significantly less likely to have spoken with their provider about PrEP than their gay peers. Finally, transgender participants were nearly three times as likely to have spoken with their healthcare provider about PrEP as cisgender males ($AOR = 2.91$; 95% CI 1.12, 8.64).

Another variable significantly associated with having a conversation about PrEP with a healthcare provider was being out to your provider as an LGBT person. Individuals who either reported they were fully out or somewhat out to their healthcare provider were significantly more likely to have had a conversation about PrEP than individuals who were not out to their healthcare providers ($AOR = 3.62$, 95% CI 2.21, 6.02 and $AOR = 2.76$, 95% CI 1.18, 6.62, respectively).

Discussion

Consistent with prior reports on rates of PrEP use in the RADAR cohort, [41] approximately one-fifth of participants in the study had used PrEP in the last 6 months, which is somewhat higher than PrEP usage rates found in other studies of similar populations [42–47]. Among those who reported PrEP use, nearly all had disclosed their use to someone. However, disclosure was not universal; more than half of participants on PrEP indicated disclosing to their mother, but far fewer reported disclosure to their father, sister(s), or brother(s). Specifically, there was a stark difference between the percentage of individuals who disclosed PrEP use to their mother and the percentage who disclosed to their father. Future research should more directly assess the motivations behind selective disclosure, as this may indicate a pattern of differential familial support and may have critical implications for social support interventions to improve PrEP uptake and adherence. Regardless, the fact that over 90% of participants reported that most people they told were supportive of their PrEP use was very encouraging in terms of social support for PrEP utilization. Notably, the vast majority of participants who were using PrEP disclosed their use of the drug to someone else, resulting in a small analytic sample of non-disclosing PrEP users. To gain a better understanding of PrEP disclosure and non-disclosure among PrEP users, a larger sample of individuals on PrEP should be taken in the future. This study can serve such future research as a point estimate for calculating the number of observations required to more precisely assess the percentages of PrEP users who have disclosed their use.

We found that individuals who were not using PrEP were much less likely to report an intent to disclose their possible use than actual disclosure reported among PrEP users. Understanding why non-PrEP users are less likely to report being willing to disclose if they began taking PrEP is an important next step in gaining a thorough understanding of barriers to uptake. As there were no clear demographic explanations for these results, reasons not measured within this study may provide the answer to this discrepancy. For instance, we did not explore the reasons why participants were not taking PrEP, which could potentially be a substantial driving factor in their willingness to disclose to others. We also did not test for accurate knowledge of PrEP, so it is possible that participants who indicated they were less likely to disclose may be less informed about PrEP than their counterparts. Use of PrEP may also be viewed as an indicator of sexual activity, and same-sex sexual activity in particular when it comes to MSM—for individuals who may not be out to their family or friends, or whose support network is unaware of their sexual activity, a discussion of PrEP may result in an inadvertent outing. Therefore, it is possible that

an individual's "outness" and experience of stigma impacts their perceived or actual willingness to disclose. Additionally, there remains a degree of stigma surrounding PrEP use itself in this population, [48] and this is likely higher in individuals with less exposure to and understanding of the medication. In fact, previous research indicates that belief in PrEP-related stigma may decrease willingness to use PrEP [49, 50]. Furthermore, those who are not on PrEP might underestimate the support they would need if they began taking it, and thus feel they would not need to disclose their use to those closest to them. Understanding this disclosure differential requires further attention, particularly since perceptions of PrEP among current non-users are likely to significantly influence decisions surrounding PrEP uptake and adherence [17]. Understanding why individuals are hesitant to disclose may provide key insight into developing interventions to increase PrEP uptake, and future research should therefore consider willingness to disclose in tandem with individuals' PrEP readiness, especially considering the far higher rates of disclosure among users than intended disclosure among non-users.

Compared to gay participants, bisexual individuals who were not currently on PrEP were significantly less likely to report willingness to disclose potential future PrEP use. One possible explanation could be that PrEP use is perceived differently within bisexual communities than gay communities. It is also unclear whether PrEP advertising targets bisexual MSM, or whether providers are equally likely to discuss PrEP with bisexual patients. In other words, PrEP may be perceived—by both individuals and their providers—as a drug that is exclusively for men who have sex with men only, or those who only report a gay identity. This may also explain why unsure/questioning individuals are less likely to feel comfortable telling someone if they began using PrEP. Additionally, although transgender participants were not less likely to disclose PrEP use if they were to begin taking it, we also observed that they were far more likely to have discussed PrEP with a provider than cisgender men. This finding was also not explained by our data, and indicates a need for increased study of transgender individuals' clinical and provider experiences. Understanding why transgender individuals are more likely to discuss PrEP with their providers may provide insight into how to increase PrEP conversations among other demographics who experience elevated HIV risk.

Our results also revealed that knowing someone on PrEP was related to an increased likelihood of comfort disclosing PrEP status. While perhaps intuitive, this finding emphasizes the importance of understanding the diffusion of PrEP knowledge within high risk communities. For example, since Hispanic/Latinx participants were less likely to know someone on PrEP than White counterparts, more effective, targeted PrEP messaging may be a tool to combat racial/

ethnic disparities in the uptake of PrEP [51]. Paralleling our previously stated findings, bisexual and unsure/questioning individuals were also less likely to know anyone on PrEP compared to gay individuals. This further supports the idea that PrEP use and knowledge have permeated subsets of MSM differentially. Further research may benefit from an increased focus on uptake of PrEP, and the prevalence of PrEP use among cisgender men who do not primarily identify as gay.

Consistent with previous research on racial/ethnic disparities in PrEP use, [13] Black and Hispanic/Latinx individuals were less likely than White individuals to report that their sex partners were using PrEP. One possible explanation is the combination of racial/ethnic homophily (tendency to have sex with individuals of the same race/ethnicity) and disparate PrEP use in minority communities [13, 52]. This result adds to the growing body of literature which makes clear the need for better uptake of PrEP among groups that are most severely affected by HIV. Similarly, there are indications that PrEP uptake continues to lag among YMSM. Although historically, clinicians have prescribed PrEP off-label to individuals under the age of 18 years, recent changes have expanded the early FDA approval to reach youth under the age of 18. However, this policy change occurred after collection of these data, and thus the impact on 16 and 17 year olds cannot be assessed within this sample. Therefore, factors such as social homophily (only interacting with similarly aged individuals) or having less opportunity to engage in sexual activity than their older peers may explain why the youngest sector of this sample was significantly less likely to know anyone who was using PrEP. Future research should investigate the impact of lowering the age of prescription for PrEP among YMSM, particularly in terms of their awareness and uptake.

Study participants indicated a general belief that PrEP use is more common among GBM in the US than in their GBM friend groups. Conversely, participants believed that PrEP is perceived more positively in their GBM friend group than among other GBM in the US. The differences between the tangible and more abstract GBM populations, as well as differential perceptions about these two metrics, warrants further research. Moreover, future research with transgender populations should assess their perceptions of PrEP use within the transgender community, rather than cisgender sexual minority peers, in order to appropriately study the topic.

Finally, we found that knowing someone on PrEP could influence the likelihood of having a conversation with a provider. This result is intuitive, as knowing someone on PrEP might make an individual feel more comfortable with broaching the subject in a healthcare setting. However, the connection is significant, as conversations with healthcare providers are a key step in the path towards PrEP initiation.

This result, in combination with our observation that willingness to disclose was also associated with knowing someone on PrEP, may indicate that comfort with being out of the “PrEP closet” is crucial to supporting broader uptake. Further clarifying this, other research has indicated that PrEP uptake is related to knowing someone on PrEP [53]. To that effect, the significant demographic differences in likelihood of having a conversation with a healthcare provider about PrEP are worthy of further investigation, particularly with regard to bisexual and unsure/questioning individuals, as providers should be encouraged to engage these populations in discussion about PrEP. Additionally, providers should begin having honest conversations about sexual health early, given the approval of PrEP for individuals under the age of 18 years. Since most of the individuals who had a conversation about PrEP were recommended by their provider to begin taking PrEP, it is imperative that the number of these conversations increase. This result provides the clearest guidance for a potential path forward to supporting PrEP uptake via social network interventions, and should be given more explicit and in-depth attention in the future.

There are limitations to our study that must be acknowledged. While we utilized a large sample, it was drawn exclusively from Chicago and was composed of a relatively young cohort of MSM and transgender individuals assigned male at birth, so generalizability of our results may be limited. Furthermore, we had relatively few transgender participants, and though we have included them here due to the critical need for more research with this population, it is important and necessary for research to move beyond categorizing MSM and transgender individuals assigned male at birth as one and the same, as these groups are not interchangeable and experience unique risk and protective factors [10]. Moreover, this created a further limitation where our transgender participants were asked to report their perceptions of PrEP use among a group they did not belong to (gay and bisexual men), resulting in a limited ability to compare their perceptions to those of the MSM in our sample. Although data from transgender participants have been kept in this analytic sample, and findings for MSM are robust to sensitivity analyses, there is a pressing need for increased and culturally competent research with this population. Additionally, since this analysis used data from a single time point, we were unable to detect the temporality of events studied. For instance, we cannot determine whether discussing PrEP usage with a healthcare provider occurred after becoming aware of a friend’s PrEP use.

Conclusions

Our results support the well-established need for increased uptake of PrEP in vulnerable communities, but also provide a potential path forward to encouraging awareness, uptake, and adherence. Providers should initiate conversations about PrEP early, and with any individual who may be at risk. Providers should especially consider initiating the discussion about PrEP with bisexual and unsure/questioning MSM, with Black and Latinx MSM, and with MSM under 18 years of age. Targeted PrEP advertising may also be a useful tool to dispel PrEP myths and improve uptake in underrepresented demographics. Further, community-based interventions to support and encourage open discussion of PrEP among peers may be an effective means of increasing uptake of, and knowledge about, PrEP. Additional research is needed on how MSM's perceptions of PrEP use both among their friends and nationwide influence their desire to initiate PrEP, and how their intentions to disclose prior to initiation may change or remain stable following PrEP uptake. Improving PrEP use remains a critical goal in reducing the burden of HIV and ensuring the health of vulnerable and high-need communities.

Acknowledgements The authors wish to acknowledge and thank Antonia Clifford, Dan Ryan, and the participants of the RADAR study. Additionally, the authors wish to acknowledge the following source of funding: U01DA036939, PI: Mustanski.

Funding This study was funded by a grant from the National Institute on Drug Abuse (NIDA): U01DA036939, PI: Mustanski.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

- Molina J-M, Capitant C, Spire B, Pialoux G, Cotte L, Charreau I, et al. On-demand preexposure prophylaxis in men at high risk for HIV-1 infection. *N Engl J Med*. 2015;373(23):2237–46.
- Deutsch MB, Glidden DV, Sevelius J, Keatley J, McMahan V, Guanira J, et al. HIV pre-exposure prophylaxis in transgender women: a subgroup analysis of the iPrEx trial. *Lancet HIV*. 2015;2(12):e512–9.
- National HIV/AIDS Strategy for the United States. Updated to 2020. Washington, DC: U.S Department of Health and Human Services; 2015.
- Chan PA, Mena L, Patel R, Oldenburg CE, Beauchamps L, Perez-Brumer AG, et al. Retention in care outcomes for HIV pre-exposure prophylaxis implementation programmes among men who have sex with men in three US cities. *J Int AIDS Soc*. 2016;19(1):20903.
- Eaton LA, Matthews DD, Driffin DD, Bukowski L, Wilson PA, Stall RD, et al. A multi-US city assessment of awareness and uptake of pre-exposure prophylaxis (PrEP) for HIV prevention among black men and transgender women who have sex with men. *Prev Sci*. 2017;18(5):505–16.
- Grant RM, Anderson PL, McMahan V, Liu A, Amico KR, Mehrotra M, et al. Uptake of pre-exposure prophylaxis, sexual practices, and HIV incidence in men and transgender women who have sex with men: a cohort study. *Lancet Infect Dis*. 2014;14(9):820–9.
- Marshall BD, Mimiaga MJ. Uptake and effectiveness of PrEP for transgender women. *Lancet HIV*. 2015;2(12):e502–3.
- HIV Among Gay and Bisexual Men, Centers for Disease Control and Prevention: U.S. Department of Health and Human Services; 2018.
- Centers for Disease Control and Prevention. HIV Among Transgender People. In: Services DoHaH, editor. Atlanta: Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services; 2018.
- Baral SD, Poteat T, Stromdahl S, Wirtz AL, Guadamuz TE, Beyrer C. Worldwide burden of HIV in transgender women: a systematic review and meta-analysis. *Lancet Infect Dis*. 2013;13(3):214–22.
- Clark H, Babu AS, Wiewel EW, Opoku J, Crepaz N. Diagnosed HIV infection in transgender adults and adolescents: results from the National HIV Surveillance System, 2009–2014. *AIDS Behav*. 2017;21(9):2774–83.
- Strauss BB, Greene GJ, Bhatia R, Madkins K, Parsons JT, et al. Exploring patterns of awareness and use of HIV pre-exposure prophylaxis among young men who have sex with men. *AIDS Behav*. 2016;21:1288–9.
- Eaton LA, Driffin DD, Bauermeister J, Smith H, Conway-Washington C. Minimal awareness and stalled uptake of pre-exposure prophylaxis (PrEP) among at risk, HIV-negative, black men who have sex with men. *AIDS Patient Care STDs*. 2015;29(8):423–30.
- Holloway IW, Tan D, Gildner JL, Beougher SC, Pulsipher C, Montoya JA, et al. Facilitators and barriers to pre-exposure prophylaxis willingness among young men who have sex with men who use geosocial networking applications in California. *AIDS Patient Care STDs*. 2017;31(12):517–27.
- Bauermeister JA, Meanley S, Pingel E, Soler JH, Harper GW. PrEP awareness and perceived barriers among single young men who have sex with men. *Curr HIV Res*. 2013;11(7):520–7.
- Brooks RA, Allen VC Jr, Regan R, Mutchler MG, Cervantes-Tadeo R, Lee SJ. HIV/AIDS conspiracy beliefs and intention to adopt preexposure prophylaxis among black men who have sex with men in Los Angeles. *Int J STD AIDS*. 2018;29(4):375–81.
- Perez-Figueroa RE, Kapadia F, Barton SC, Eddy JA, Halkitis PN. Acceptability of PrEP uptake among racially/ethnically diverse young men who have sex with men: the P18 study. *AIDS Educ Prev*. 2015;27(2):112–25.
- Wood SM, Lee S, Barg FK, Castillo M, Dowshen N. Young transgender women's attitudes toward HIV pre-exposure prophylaxis. *J Adolesc Health*. 2017;60(5):549–55.
- Moore K, Dell S, Oliva M, Morgan A, Rothman R, Hsieh YH, et al. Does parental insurance impact willingness to take

- Prep in adolescents & young adults? *J Adolescent Health*. 2018;62(2):S23–4.
20. Calabrese SK, Magnus M, Mayer KH, Krakower DS, Eldahan AI, Hawkins LAG, et al. Support your client at the space that they're in": HIV pre-exposure prophylaxis (PrEP) prescribers' perspectives on PrEP-related risk compensation. *AIDS Patient Care STDs*. 2017;31(4):196–204.
 21. Dean T. Mediated intimacies: raw sex, Truvada, and the biopolitics of chemoprophylaxis. *Sexualities*. 2015;18(1):224–46.
 22. Knight R, Small W, Carson A, Shoveller J. Complex and conflicting social norms: implications for implementation of future HIV pre-exposure prophylaxis (PrEP) interventions in Vancouver, Canada. *Public Library Sci*. 2016;11(1):0146513.
 23. Kalichman SC, DiMarco M, Austin J, Luke W, DiFonzo K. Stress, social support, and HIV-status disclosure to family and friends among HIV-positive men and women. *J Behav Med*. 2003;26(4):315–32.
 24. Smith DK, Toledo L, Smith DJ, Adams MA, Rothenberg R. Attitudes and program preferences of African-American urban young adults about pre-exposure prophylaxis (PrEP). *AIDS Educ Prev*. 2012;24(5):408–12.
 25. Mutchler MG, McDavitt B, Ghani MA, Nogg K, Winder TJA, Soto JK. Getting PrEPared for HIV prevention navigation: young black gay men talk about HIV prevention in the biomedical era. *AIDS Patient Care STDs*. 2015;29(9):490–502.
 26. Grace D, Jollimore J, MacPherson P, Strang MJP, Tan DHS. The pre-exposure prophylaxis-stigma paradox: learning from Canada's first wave of PrEP users. *AIDS Patient Care STDs*. 2018;32(1):24–30.
 27. DiMatteo MR. Social support and patient adherence to medical treatment: a meta-analysis. *Health Psychol*. 2004;23(2):207–18.
 28. Phillips G, Neray B, Birkett M, Felt D, Janulis P, Mustanski B. Role of social and sexual network factors in PrEP utilization among YMSM and transgender women in Chicago. *Prev Sci*. 2019. <https://doi.org/10.1007/s11121-019-00995-6>.
 29. Baeten JM, Haberer JE, Liu AY, Sista N. Pre-exposure prophylaxis for HIV prevention: where have we been and where are we going? *J Acquir Immune Defic Syndr*. 2013;63(02):S122–S9.
 30. Ware NC, Wyatt MA, Haberer JE, Baeten JM, Kintu A, Psaros C, et al. What's love got to do with it? Explaining adherence to oral antiretroviral pre-exposure prophylaxis (PrEP) for HIV serodiscordant couples. *J Acquir Immune Defic Syndr*. 2012. <https://doi.org/10.1097/QAI.0b013e31824a060b>.
 31. Tangmunkongvorakul A, Chariyalertsaka S, Amico KR, Saokhieoa P, Wannalaka V, Sangangamsakuna T, et al. Facilitators and barriers to medication adherence in an HIV prevention study among men who have sex with men in the iPrEx study in Chiang Mai, Thailand. *AIDS Care*. 2013;25(8):961–7.
 32. Kelly JA, Lawrence JSS, Diaz YE, Stevenson LY, Auth AC, Brasfield TL, et al. HIV risk behavior reduction following intervention with key opinion leaders of population: an experimental analysis. *Am J Public Health*. 1991;81(2):961–7.
 33. Garcia J, Parker C, Parker RG, Wilson PA, Philbin M, Hirsch JS. Psychosocial implications of homophobia and HIV stigma in social support networks: insights for high-impact HIV prevention among black men who have sex with men. *Health Educ Behav*. 2016;43(2):217–25.
 34. Garcia J, Colson PW, Parker C, Hirsch JS. Passing the baton: community-based ethnography to design a randomized clinical trial on the effectiveness of oral pre-exposure prophylaxis for HIV prevention among Black men who have sex with men. *Contemp Clin Trials*. 2015;45(Part B):244–51.
 35. Mustanski B, Garofalo R, Emerson EM. Mental health disorders, psychological distress, and suicidality in a diverse sample of lesbian, gay, bisexual, and transgender youths. *Am J Public Health*. 2010;100(12):2426–32.
 36. Mustanski B, Johnson AK, Garofalo R, Ryan D, Birkett M. Perceived likelihood of using HIV pre-exposure prophylaxis medications among young men who have sex with men. *AIDS Behav*. 2013;17(6):2173–9.
 37. Miyazaki Y, Raudenbush SW. Tests for linkage of multiple cohorts in an accelerated longitudinal design. *Psychol Methods*. 2000;5(1):44–63.
 38. Final Guidance on Maintaining, Collecting, and Reporting Racial and Ethnic Data to the U.S. Department of Education, 72 FR 59266 (2007).
 39. Fay MP. Confidence intervals that match Fisher's exact or Blaker's exact tests. *Biostatistics*. 2010;11(2):373–4.
 40. Mustanski BS, Dupree MG, Nievergelt CM, Bocklandt S, Schork NJ, Hamer DH. A genomewide scan of male sexual orientation. *Hum Genet*. 2005;116(4):272–8.
 41. Morgan E, Moran K, Ryan DT, Mustanski B, Newcomb ME. Threefold increase in PrEP uptake over time with high adherence among young men who have sex with men in Chicago. *AIDS Behav*. 2018;22(11):3637–44.
 42. Barash EA, Golden M. Awareness and use of HIV pre-exposure prophylaxis among attendees of a Seattle gay pride event and sexually transmitted disease clinic. *AIDS Patient Care STDs*. 2010;24(11):689–91.
 43. Newcomb ME, Mongrella MC, Weis B, McMillen SJ, Mustanski B. Partner disclosure of PrEP use and undetectable viral load on geosocial networking apps: frequency of disclosure and decisions about condomless sex. *J Acquir Immune Defic Syndr*. 2016;71(2):200–6.
 44. Oldenburg CE, Perez-Brumer AG, Hatzenbuehler ML, Krakower D, Novak DS, Mimiaga MJ, et al. State-level structural sexual stigma and HIV prevention in a national online sample of HIV-uninfected MSM in the United States. *AIDS*. 2015;29(7):837–45.
 45. Goedel WC, Halkitis PN, Duncan DT. Behavior- and partner-based HIV risk perception and sexual risk behaviors in men who have sex with men (MSM) who use geosocial-networking smartphone applications in New York City. *J Urban Health*. 2016;93(2):400–6.
 46. Holloway IW, Dougherty R, Gildner J, Beougher SC, Pulshofer C, Montoya JA, et al. Brief report: PrEP uptake, adherence, and discontinuation among California YMSM using geosocial networking applications. *J Acquir Immune Defic Syndr*. 2017;74(1):15–20.
 47. Kuhns LM, Hotton AL, Schneider J, Garofalo R, Fujimoto K. Use of pre-exposure prophylaxis (PrEP) in young men who have sex with men is associated with race, sexual risk behavior and peer network size. *AIDS Behav*. 2017;21(5):1376–82.
 48. Mustanski B, Ryan DT, Hayford C, Phillips G 2nd, Newcomb ME, Smith JD. Geographic and individual associations with PrEP stigma: results from the RADAR cohort of diverse young men who have sex with men and transgender women. *AIDS Behav*. 2018;22(9):3044–56.
 49. Eaton LA, Kalichman SC, Price D, Finneran S, Allen A, Maksut J. Stigma and conspiracy beliefs related to pre-exposure prophylaxis (PrEP) and interest in using PrEP among black and white men and transgender women who have sex with men. *AIDS Behav*. 2017;21(5):1236–46.
 50. Cahill S, Taylor SW, Elsesser SA, Mena L, Hickson D, Mayer KH. Stigma, medical mistrust, and perceived racism may affect PrEP awareness and uptake in black compared to white gay and bisexual men in Jackson, Mississippi and Boston, Massachusetts. *AIDS Care*. 2017;29(11):1351–8.
 51. Snowden JM, Chen YH, McFarland W, Raymond HF. Prevalence and characteristics of users of pre-exposure prophylaxis (PrEP) among men who have sex with men, San Francisco, 2014 in a cross-sectional survey: implications for disparities. *Sex Transm Infect*. 2017;93(1):52–5.

52. Janulis P, Phillips G 2nd, Birkett M, Mustanski B. Sexual networks of racially diverse young MSM differ in racial homophily but not concurrency. *J Acquir Immune Defic Syndr*. 2017;77(5):459–66.
53. Goedel WC, Halkitis PN, Greene RE, Hickson DA, Duncan DT. HIV risk behaviors, perceptions, and testing and preexposure prophylaxis (PrEP) awareness/use in Grindr-using men who have sex with men in Atlanta, Georgia. *J Assoc Nurses AIDS Care*. 2016;27(2):133–42.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.