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## Talking to My Partners About PrEP: Factors Associated with PrEP-Related Communication in a Longitudinal U.S. Study of Sexual Minority Men Living with HIV

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### Abstract

Treatment as prevention and pre-exposure prophylaxis (PrEP) have reduced HIV transmission among sexual minority men (SMM). However, little is known about PrEP-related communication in serodiscordant partnerships. In 2015–2016, 965 U.S. SMM living with HIV ( $M_{age} = 39$ ; 63% White, 19% Black, 18% Latinx) enrolled in a year-long longitudinal study with surveys every 3 months (2,850 surveys). Multilevel models explored factors associated with PrEP-related communication with HIV-negative partners. Most participants (77%) reported PrEP-related communication. Participants were more likely to discuss PrEP during periods with more sexual partners,  $AOR = 2.89$ ,  $p < .001$ , and group sex,  $AOR = 1.99$ ,  $p = .001$ . Those with more partners on average,  $\beta = 0.48$ ,  $p < .001$ , and those engaging in other drug use more frequently,  $\beta = 0.11$ ,  $p = .002$ , were more likely to discuss PrEP. PrEP-related communication was more common for men who disclosed their HIV status,  $\beta = 0.22$ ,  $p < .001$ , and who had undetectable viral loads,  $\beta = 0.25$ ,  $p = .007$ . Communication was also more common for those with higher incomes,  $\beta = 0.12$ ,  $p = .02$ , and from larger cities,  $\beta = 0.07$ ,  $p = .048$ , and less common for Black participants,  $\beta = -0.29$ ,  $p = .003$ , and older participants,  $\beta = -0.18$ ,  $p < .001$ . PrEP-related communication increased over the course of the study,  $AOR = 1.16$ ,  $p = .02$ . PrEP can confer additional HIV prevention benefits within serodiscordant partnerships, and future research should continue to explore the role PrEP plays in these partnerships.

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## Keywords

pre-exposure prophylaxis; sexual minority men; people living with HIV; safer sex communication; serodiscordant partnerships; multilevel modeling

HIV disproportionately affects gay, bisexual, and other men who have sex with men in the U.S., with sexual minority men (SMM) accounting for 69% of HIV incidence in 2019 (CDC, 2021a). The federal government announced the Ending the HIV Epidemic initiative to combat the persistent HIV epidemic (Fauci et al., 2019), which prioritizes implementing models of HIV testing, treatment, and biomedical prevention. Specifically, HIV treatment as prevention (i.e., “TasP”), a term coined in 2011, is a highly effective method of HIV prevention, wherein individuals living with HIV who are adherent to antiretroviral treatment (ART) can reduce their HIV viral load to levels undetectable by current laboratory-based testing and eliminate sexual HIV transmission risk to partners (Cohen et al., 2011). This has led to major public health campaigns promoting the message, “undetectable equals untransmittable,” or “U=U,” to help reduce HIV stigma and promote HIV testing and treatment (Campaign, 2021). Nonetheless, fewer than half of SMM living with HIV are engaged in treatment, and the U.S. continues to experience greater than 35,000 HIV infections yearly (CDC, 2020), requiring combined biomedical and behavioral HIV prevention approaches inclusive of HIV-negative individuals.

HIV pre-exposure prophylaxis (PrEP) is highly effective at preventing HIV-seroconversion among SMM with adequate adherence (Spinner et al., 2016). Although PrEP is not required for HIV-negative individuals engaged in condomless sex with a partner living with HIV who has an undetectable viral load, CDC guidelines still recommended PrEP for HIV-negative partners in the first two iterations of PrEP guidelines (CDC, 2014, 2018), and more nuanced language was added in 2021 recommending PrEP for HIV-negative partners who have virally unsuppressed partners or who are seeking additional reassurance (CDC, 2021b). In addition to the added HIV prevention that PrEP affords individuals who have a partner living with HIV, PrEP offers several other benefits to the wellbeing of SMM, including enhanced sexual self-esteem, increased sexual agency, reduced HIV-related anxiety, and improved sexual and relationship satisfaction (Groves et al., 2021). Research also suggests that the combination of PrEP use for HIV-negative partners and undetectable viral loads for partners living with HIV increases the confidence of SMM in serodiscordant sexual partnerships, indicating benefits of PrEP for these relationships even in the context of U=U (Quinn, Christenson, et al., 2020). SMM living with HIV have cited several potential benefits of PrEP use by their HIV-negative partners, including increased confidence, decreased fear, and reduced stigma (Jaspal & Daramilas, 2016; Skinta et al., 2021). However, most research on PrEP and interpersonal dynamics is from the perspective of HIV-negative persons considering PrEP for themselves or their partner (John et al., 2019; John et al., 2018; Quinn, Zarwell, et al., 2020) or heterosexual couples in the context of reducing HIV transmission during conception (Bazzi et al., 2017; McMahon et al., 2014). More research is needed to understand the role PrEP plays in serodiscordant SMM partnerships.

Although PrEP use confers additional protection within serodiscordant partnerships, little is known about PrEP-related communication in these partnerships. With a growing understanding and acceptance of U=U, discussions of HIV status and related sexual behaviors based on status concordance or discordance (e.g., serosorting, condom use, and sexual activity type, such as oral or anal sex) may be less likely to occur (Goodreau et al., 2021; Rendina et al., 2020). However, research has suggested some discussion and disclosure of PrEP use between serodiscordant partners. For example, one study found that nearly two-thirds of men living with HIV reported having a partner disclose PrEP use to them on a mobile app (Newcomb et al., 2016). Yet, research has also suggested that some SMM may avoid discussing PrEP with their sexual partners due to PrEP-related stigma (Brooks et al., 2020). Notably, qualitative studies have suggested that some PrEP users may perceive less need to discuss HIV status when protected by PrEP, and that some people living with HIV (PLH) may be less likely to discuss HIV status when they know a partner is using PrEP (Jaspal & Daramilas, 2016; Pantalone et al., 2020). Additional research can contribute to an understanding of when, and between whom, conversations about PrEP occur in the context of serodiscordant sexual relationships.

The purpose of this paper was to determine factors associated with PrEP-related communication with serodiscordant male sexual partners among SMM living with HIV. We applied the information-motivation-behavioral skills (IMB) model to understand PrEP-related communication, since IMB constructs have predicted many HIV-related health behaviors, including condom use (Fisher & Fisher, 2002; Fisher et al., 2003; Walsh et al., 2011) and PrEP use (Dubov et al., 2018; Walsh, 2019). Therefore, we anticipated that IMB constructs might also be associated with eliciting discussions about PrEP use.

The current study leveraged longitudinal data from an online cohort of SMM living with HIV, allowing us to understand both time-varying and person-level factors associated with PrEP-related communication. Predictors included demographic characteristics (person-level), sexual behavior (time-varying and person-level), substance use (time-varying and person-level), and IMB constructs (time-varying and person-level). In line with the IMB model, we hypothesized that increased knowledge related to HIV transmission (information) would be associated with increased odds of discussing PrEP with male HIV-negative sex partners. Greater perceived responsibility for HIV prevention, HIV stigma, having an undetectable viral load, and adherence to HIV treatment were viewed as motivational factors that may influence PrEP-related communication. Specifically, we hypothesized that those with greater perceived responsibility would have increased odds of discussing PrEP with partners, while those with higher levels of HIV stigma would have decreased odds of discussing PrEP (Smith et al., 2008; Wolitski et al., 2009; Yigit et al., 2021). We predicted that men self-reporting an undetectable viral load and those who were adherent to HIV treatment would have lower odds of discussing PrEP compared to men with a detectable or unknown viral load and those not adherent to treatment, given the protection of treatment as prevention. In terms of behavioral skills, we hypothesized that men with higher levels of HIV disclosure self-efficacy and those who had disclosed their HIV status to all recent sexual partners would have higher odds of discussing PrEP with partners. Covariates and exploratory variables in analyses included age, race/ethnicity, education, employment status,

income, city of residence, years living with HIV, heavy alcohol use, stimulant use before or during sex, and other drug use before or during sex.

## Methods

### Procedures

Between 2015 and 2016, 1,204 SMM living with HIV in the U.S. and U.S. territories enrolled into an eHealth intervention. Data from this study were collected as part of a one-year, video-based online randomized controlled trial, Sex Positive!<sup>[+]</sup> (Hirshfield et al., 2019). This study aimed to reduce serodiscordant condomless anal sex among Black, White, and Latinx SMM living with HIV who reported sub-optimal adherence to antiretroviral therapy (ART) and/or a detectable viral load. Details on the study design are described elsewhere (Hirshfield et al., 2019).

Participants were recruited from social and sexual networking websites and smartphone applications. Additional recruitment processes were utilized to specifically target SMM of color and younger men in order to enroll a more representative sample of the HIV epidemic in the United States (CDC, 2021a). We conducted targeted recruitment on websites like BGCLive and by using recruitment language specifying young men and/or Black men. For GPS-based smartphone apps such as Grindr or Scruff, we targeted recruitment by city, race and ethnicity, and age. Based on previous research that sought to understand and mitigate lower click-through rates among SMM of color (Sullivan et al., 2011), our targeted recruitment strategy included banner advertisements featuring male models that resembled the racial and ethnic composition of each subgroup. Finally, POZ Personals, the online dating site for POZ Magazine, emailed a defined national subset of male-identified POZ Personals members (i.e., identified as HIV-positive, age 18 or older, and gay or bisexual).

Potential participants clicking on recruitment ads could complete an online screener. In addition to HIV-positive status, eligibility criteria for enrollment included the following: (1) having been assigned male sex at birth and currently identifying as a man or genderqueer, (2) being 18 years or older, (3) primary racial or ethnic identity as White, Latinx, or Black, (4) ability to read and answer survey questions in English, (5) current resident of the United States or a U.S. territory, (6) self-reporting suboptimal adherence to combination antiretroviral therapy (cART) in the month prior to study recruitment (Wilson et al., 2016) or being virologically non-suppressed (detectable viral load  $\geq$  200 copies/ml) in the past year, (7) having condomless anal sex with a serodiscordant or unknown HIV-status male partner in the past six months, (8) willingness to participate in the study for one year, and (9) access to a working email address and phone number for follow-up activities.

Potential participants who screened eligible viewed an online study consent form and could agree to participate. After participants consented and registered online, by providing their name, phone number, and mailing address, they were invited to complete the baseline survey via a hyperlink on the Sex Positive!<sup>[+]</sup> study dashboard. Procedures included an identity verification process to ensure individuals did not register multiple times and were located within the United States or a U.S. territory. Participants received email or text notifications

to complete the 3-, 6-, 9-, and 12-month follow-up surveys. Intervention content and procedures are discussed elsewhere (Hirshfield et al., 2019).

### Ethical Considerations

The Institutional Review Board at Public Health Solutions approved all study procedures. A Data and Safety Monitoring Board (DSMB), comprised of experts in trial designs, Internet research, web design, and HIV-positive populations met regularly during active study recruitment to discuss issues related to participant safety, study validity, and data integrity. A Certificate of Confidentiality was also obtained from the National Institute of Mental Health (NIMH) to provide additional privacy protections for participants enrolled in this study. Participants could receive up to a total of US \$115 in [Amazon.com](https://www.amazon.com) gift cards (distributed electronically and via postal mail) depending on the completion of study activities.

### Measures

**PrEP-related communication.**—The primary outcome was whether participants had asked any of their HIV-negative male sexual partners in the past 3 months if they were using PrEP (“In the last 3 months, did you ask a sex partner if they were taking PrEP?”; 0 = no, 1 = yes). Participants reported this outcome in the 3-, 6-, 9-, and 12-month follow-up surveys.

**Demographics.**—Demographic characteristics, including age, race/ethnicity, education, employment, annual income, city size, and years living with HIV, were self-reported at the baseline assessment. Education was on a scale from high school or less (0) to college or graduate degree (3). Participants reported whether they were working full-time (0 = no, 1 = yes). Annual income was measured on a scale from less than \$10,000 (1) to \$150,000 or more (8). City size was on a scale from rural area (1) to big city (6).

**Substance use before or during sex.**—At each follow-up survey, participants reported on their frequency of consuming 6 or more drinks before or during sex in the past 3 months (from 0 = never to 6 = more than 5 times). They also reported whether they had used each of 17 different drugs within 2 hours before or during sex in the past 3 months (0 = no, 1 = yes). Composite variables were created to indicate whether participants reported any use of stimulants (cocaine, crack, crystal meth, ecstasy, or uppers) and other drugs (downers, erection medication, GHB, hallucinogens, heroin, ketamine, marijuana, methadone, painkillers, poppers, synthetic drugs, or other drugs) before or during sex.

**Sexual behavior.**—In order to participate in the study, participants had to have reported condomless anal sex with a serodiscordant or unknown HIV-status male partner in the past six months. At each follow-up survey, participants reported the total number of male partners they had engaged in anal sex with during the past 3 months. Given that biomedical HIV prevention advancements were reported during the study period, we focused on the total number of anal sex partners rather than only condomless anal sex partners. Outliers more than  $3 \times$  the interquartile range (IQR) from the 75th percentile were trimmed to  $3 \times$  IQR from the 75th percentile, and the count was natural log-transformed. Participants also reported whether they had engaged in group sex in the past 3 months (“In the last 3 months,

have you had anal or vaginal sex with more than one person in the same encounter?"; 0 = no, 1 = yes). Participants who had male sexual partners reported the HIV status of each of their 3 most recent anal sex partners, and also reported the number of additional HIV-negative or status-unknown anal sex partners they had within the last 3 months. We included observations from time periods where men reported HIV-negative, presumed HIV-negative, or status-unknown anal sex partners.

**Information-motivation-behavioral skills related predictors.**—To assess information, participants completed 7 items adapted items from the KABP WHO Questionnaire (Division of Youth Affairs, 2001) at baseline. These items assessed knowledge of how HIV is transmitted. Responses were scored as correct or incorrect, with “not sure” responses considered incorrect. Total scores indicated the proportion of items answered correctly (from 0 to 1).

Several constructs were selected to capture motivation to ask partners about PrEP. First, at each follow-up, participants responded to 6 items assessing beliefs about personal responsibility for protecting sexual partners from HIV (Wolitski et al., 2007). Participants responded to items (e.g., “I feel responsible for protecting my partners from HIV”) using a 1 = strongly disagree to 5 = strongly agree scale. Items were averaged ( $\alpha$ s = .84–.87 across waves), with higher scores indicating greater perceptions of personal responsibility. Second, at each follow-up, participants reported whether they were currently taking antiretroviral medications to treat HIV and, if so, how many pills of their medications they had missed in the past 2 days (Buehler et al., 1996). Participants who were on ART and had no missed doses were coded as adherent (0 = not on medication or not fully adherent, 1 = adherent). Third, at baseline, participants reported whether their viral load was undetectable (0 = no, 1 = yes). Finally, at the 3-month assessment, participants completed the HIV Stigma Scale (Berger et al., 2001). The scale contained 6 items (e.g., “I worry that people who know I have HIV will tell others”) that participants responded to on a 1 = strongly disagree to 4 = strongly agree scale. Items were averaged ( $\alpha$  = .78), with higher scores indicating more HIV-related stigma.

Two measures related to HIV status disclosure were selected to capture behavioral skills. First, to capture actual disclosure behavior, participants reported whether they had disclosed their HIV status to their 3 most recent male anal sex partners within the past 3 months; a composite variable was created indicating whether they had disclosed to all of their most recent partners (0 = no, 1 = yes). Second, participants completed 5 items assessing disclosure self-efficacy that were created for this study. Items evaluated participants’ confidence about telling potential sex partners their HIV status in different ways (e.g., in an online or app dating profile, in a text message, in person); participants responded using a 1 = not at all confident to 5 = extremely confident scale. Items were averaged ( $\alpha$ s = .90–.92 across waves), with higher scores indicating greater disclosure self-efficacy.

## Data Analysis

The current manuscript focuses on 965 participants who completed at least one follow-up survey where they reported one or more HIV-negative male anal sex partners. Participants

completed a total of 2,580 longitudinal surveys where they reported HIV-negative male anal sex partners ( $M = 2.67$  observations per person).

**Missing data.**—Reasons for missing observations included attrition from the study; failure to correctly answer a trap question embedded in each survey (Liu & Wronski, 2018); and not reporting male, HIV-negative anal sex partners. Participants completed an average of 3.52 out of 4 possible follow-up surveys ( $SD = 0.86$ , range = 1–4), an average of 2.67 of which were included in analysis ( $SD = 1.12$ , range = 1–4). More follow-up surveys were completed by those who were older,  $r = .12$ ,  $p < .001$ , had higher income,  $r = .14$ ,  $p < .001$ , and had been living with HIV for more years,  $r = .12$ ,  $p < .001$ . Additionally, White participants completed more follow-up surveys than Black participants,  $t(260.84) = -2.17$ ,  $p = .03$ , and employed participants completed more surveys than unemployed participants,  $t(901.66) = -3.05$ ,  $p = .002$ . For surveys that were included, missing data was very rare. However, most questions included a “prefer not to answer” option, and some also included “not sure” or “I don’t know” options. These types of responses were treated as missing data. Less than 1% of data was missing at the between level, and 1% was missing at the within level. To address missing data, we used multiple imputation, a method for dealing with missing data which allowed us to maintain the maximum sample size and avoid biases associated with complete case analysis or single imputations (Schafer, 1999). All study variables were included when imputing 100 datasets in Mplus 8 (Muthén & Muthén, 1998–2015). Mplus allows for multiple imputation with multilevel data. Analyses were conducted with all datasets, and parameter estimates were pooled using the imputation algorithms in Mplus 8.

**Analytic approach.**—To examine predictors of PrEP-related communication, we used multilevel modeling. Three-month periods ( $N = 2,580$ ) were nested within people ( $N = 965$ ). We explored associations between person-level (between-level) predictors (e.g., age, race, HIV stigma) and time-varying (within-level) predictors (e.g., number of sexual partners in the past 3 months, recent ART adherence) and the time-varying outcome of having asked at least one sexual partner about their PrEP use. We fit multilevel regression models using a full information maximum likelihood (FIML) estimator robust to non-normality (the MLR estimator). We report odds ratios (ORs) at the within level and standardized coefficients ( $\beta$ s) at the between level. For binary predictors,  $\beta$ s are STDY estimates from Mplus, which can be interpreted as the change in the outcome variable in standard deviation units when the categorical covariate changes from zero to one (Muthén & Muthén, 1998–2015).

**Intervention condition.**—Although data used in this analysis came from a randomized controlled trial, very little of the intervention content related specifically to PrEP, and we did not anticipate that intervention condition would be associated with PrEP-related communication. In line with this expectation, preliminary analyses showed no impact of intervention arm on asking partners about PrEP,  $\beta = 0.04$  (0.09),  $p = .66$ , and no interaction between intervention arm and time,  $B = 0.12$  (0.13),  $p = .34$ . Therefore, we include all participants (intervention and control arm) in the current analysis. Intervention outcomes are discussed elsewhere (Hirshfield et al., 2019).

## Results

### Descriptive Information

Participants ranged in age from 19 to 71 ( $M = 38.99$ ,  $SD = 10.85$ ). The majority of participants (63%) were White; 19% were Black/African American and 18% were Latinx. Most participants resided in big cities (52%) or suburbs of big cities (21%). Participants had been living with HIV an average of 9 years ( $SD = 8.00$ , range 0–32). Further demographic characteristics of the participants are included in Table 1.

Over three-quarters (77%) of men asked at least one partner about PrEP during the study period. Men asked at least one partner if they were using PrEP during 62% of all 3-month periods where they reported HIV-negative male partners. Descriptive statistics related to substance use, sexual behavior, IMB constructs, and PrEP-related communication are summarized in Table 1.

Intraclass correlation coefficient (ICCs) for the time-varying variables in the current study were moderate to high, indicating relatively strong correlations between the responses individual participants gave over time (e.g., participants who asked partners about PrEP use during one 3-month period were also likely to ask partners about PrEP during other 3-month periods). ICCs are summarized in Table 1.

### Predictors of PrEP-Related Communication

A multilevel model (Table 2) indicated that both person-level and time-varying factors were associated with PrEP-related communication. At the within level (time-varying factors), participants were more likely to ask partners about PrEP during time periods where they reported more male sexual partners,  $AOR = 2.89$  (0.68),  $p < .001$ , and engagement in group or party sex,  $AOR = 1.99$  (0.43),  $p = .001$ . Accounting for other predictors, the likelihood of asking a partner about PrEP increased over the course of the study,  $AOR = 1.16$  (0.08),  $p = .02$ . No IMB factors were associated with asking partners about PrEP at the within level.

At the between level (person-level factors), accounting for other predictors, older participants were less likely to ask partners about PrEP,  $\beta = -0.18$  (0.05),  $p < .001$ . Black participants were less likely than White participants to ask partners about PrEP,  $\beta = -0.29$  (0.10),  $p = .003$ . Participants with higher incomes were more likely to ask partners about PrEP,  $\beta = 0.12$  (0.05),  $p = .02$ , as were those living in larger cities,  $\beta = 0.07$  (0.04),  $p = .048$ . Participants who more often reported other drug use before or during sex were more likely to ask partners about PrEP,  $\beta = 0.11$  (0.04),  $p = .002$ . Participants who reported more sexual partners on average were also more likely to ask partners about PrEP,  $\beta = 0.48$  (0.05),  $p < .001$ .

Considering IMB factors, contrary to expectations, participants with undetectable viral loads at baseline, whom we thought would have less motivation to disclose, were more likely to ask partners about PrEP,  $\beta = 0.25$  (0.09),  $p = .007$ . In line with predictions, participants who more often disclosed to all recent sexual partners, which we considered an indicator of greater behavioral skills, were more likely to ask partners about PrEP,  $\beta = 0.22$  (0.04),  $p < .001$ . HIV knowledge (used as an indicator of information) was not associated with asking



partners about PrEP in adjusted models, nor were other motivational or behavioral skills factors.

## Discussion

This study explored person-level and time-varying factors associated with PrEP-related communication with HIV-negative sexual partners in a large, national sample of SMM living with HIV. We identified several factors associated with PrEP-related communication, including increased sexual behavior; engagement in drug use prior to sex; demographic characteristics including race, income, and urbanicity/rurality; having an undetectable viral load; and disclosure of HIV status to sexual partners. Understanding factors associated with PrEP-related communication in serodiscordant partnerships can aid in developing prevention campaigns and interventions.

We found that SMM living with HIV commonly asked their HIV-negative sexual partners about PrEP use, with 77% asking a partner about PrEP use sometime during the year-long study period. Studies have indicated that disclosure of PrEP use to SMM living with HIV is relatively common (Newcomb et al., 2016). Our research adds to this literature by establishing that SMM living with HIV also actively and regularly seek out information about HIV-negative partners' PrEP use, often multiple times per year. Research has suggested some stigma around disclosure of PrEP use to sexual partners (Brooks et al., 2020); in the context of this stigma, PLH may need to directly ask their partners to gain information about their PrEP use. Our model also showed that after accounting for changes in sexual behavior over the study period, the likelihood of PrEP-related communication increased over time. This increase aligns with increases in PrEP uptake during the study period (Finlayson et al., 2019).

Multivariable models indicated that individuals who were more sexually active were more likely to ask partners about PrEP. This was true both between- and within-persons, meaning that SMM with more partners on average were more likely to ask about PrEP and that SMM were more likely to ask about PrEP during periods of time where they had more partners than usual or engaged in group sex. This finding makes sense, given that individuals with more sexual partners have more opportunities to discuss PrEP. It may also be that individuals develop skills at discussing safer sex topics such as PrEP with experience, since these discussions can sometimes be uncomfortable (Bosco et al., 2021). A third potential explanation is that men may perceive PrEP-related discussions to be more important during time frames when they have more partners if they become more focused on risk reduction for partners during times with higher perceived risk. Future research should explore potential mechanisms for these associations.

We explored a number of potential predictors in line with the IMB model. However, few of these variables were significantly associated with PrEP-related communication. In terms of motivation, we predicted that those with detectable viral loads would be more likely to ask partners about PrEP given the need in that scenario for the additional protection conferred by PrEP. However, results showed that those with *undetectable* viral loads were more likely to ask partners about PrEP. This finding aligns with past research that has found evidence

of biomed matching, wherein those using PrEP and those with undetectable viral loads seek one another out as sexual partners (GroV et al., 2018). In terms of behavioral skills, we predicted that those who had disclosed their HIV status to all recent sexual partners would be more likely to ask about PrEP, given that HIV disclosure and discussions of safer sex require similar skill sets. Multivariable models did show that individuals who disclosed their status more were more likely to ask about PrEP, although this result held only at the person-level, meaning that men who disclosed their status more overall were more likely to ask about PrEP, but that men were not more likely to ask about PrEP during time frames when they disclosed to all partners versus those when they did not. Conscientiousness may explain this person-level association; research has found that conscientiousness improves other HIV-related outcomes such as medication adherence (O’Cleirigh et al., 2007).

Finally, our analyses identified disparities in line with other research related to PrEP. Black participants were less likely to ask partners about PrEP than white participants. Research has shown that pervasive racism and medical distrust create structural barriers to access and information sharing (Quinn, Bowleg, et al., 2019; Quinn, Dickson-Gomez, et al., 2019). Additionally, PrEP use remains less common among Black SMM as compared to white SMM despite large disparities in HIV (Jeness et al., 2018; Siegler et al., 2018), and some research has suggested higher levels of PrEP stigma exist among Black and Latinx SMM versus white SMM (Mustanski et al., 2018). Participants from more rural areas and those with lower incomes were also less likely to ask about PrEP. PrEP use is less common outside of urban areas and thus may not be commonly discussed between sexual partners in smaller towns and rural areas. Increased HIV and PrEP stigma in rural areas may also contribute to the avoidance of these discussions (Hubach et al., 2017; Walters et al., 2021). There are also disparities in PrEP use based on income (Okafor et al., 2017; Rathakrishnan et al., 2021). Finally, after accounting for other demographic factors and sexual behavior, younger participants were more likely to ask partners about PrEP than older participants. PrEP uptake is highest among those ages 24–35 (Siegler et al., 2018), so discussions of PrEP may be more common for individuals in this age group compared to those who are older. Younger individuals may also be more likely to have discussions about HIV status and PrEP online before meeting.

## Limitations

The findings of this research should be considered in the context of several limitations. First, participants were recruited online, and results may not generalize to men who do not use social networking sites or smartphone apps. However, online recruitment did allow us to reach a sample that was both geographically and racially diverse, and protections were employed to avoid duplicate and inattentive responses. Second, questions about PrEP-related communication focused on all recent HIV-negative partners collectively rather than specific recent partners, preventing us from examining partner-specific predictors of discussions. Further research should consider dyadic relationship factors impacting PrEP-related communication. Third, although the IMB model provided a framework for some predictors considered in this research, some measures that would better capture IMB constructs were not available. For example, future tests of the IMB model in this arena should consider measures capturing PrEP-specific knowledge, motivation to discuss PrEP

or sexual health with partners, PrEP attitudes, and skills specifically related to safer sex conversations with sexual partners. Finally, although the longitudinal study design is a strength of our investigation, we considered predictors and outcomes assessed within the same time frames (every 3 months), and the current research cannot determine cause and effect.

### Conclusions and Future Directions

In conclusion, we found that SMM living with HIV commonly asked their HIV-negative sexual partners about PrEP use. Factors associated with PrEP-related communication included sexual behavior, drug use, viral load, HIV disclosure, and demographic characteristics including race, income, and city size. Even with an understanding that U=U, PrEP can confer additional HIV prevention benefits within serodiscordant sexual partnerships, and future research should continue to explore the role PrEP plays in these partnerships. Specifically, dyadic investigations focused on partner-specific factors impacting PrEP-related communication or decisions to use PrEP within serodiscordant partnerships are called for. Additionally, both qualitative and quantitative research could investigate the content and tone of conversations about PrEP in both serodiscordant and seroconcordant partnerships. Results of our research indicate that further efforts are needed to increase HIV and PrEP discussions among Black, older, and rural SMM living with HIV.

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**Table 1**

Descriptive Characteristics of a Sample of Men Living with HIV Reporting HIV-Negative Male Sexual Partners ( $N = 965$ )

Between Persons/Person-Level	<i>M (SD)</i>	%	
Age [range: 19–71]	38.99 (10.85)	--	
Race/ethnicity			
White	--	63%	
Black	--	19%	
Latinx	--	18%	
Education			
High school or less	--	11%	
Some college	--	31%	
Associate's/technical degree or some college	--	11%	
College or graduate degree	--	48%	
Employed full-time	--	53%	
Income [range: 1–8]	3.33 (1.80)	--	
City size [range: 1–6]	4.94 (1.46)	--	
Years living with HIV [range: 0–32]	8.62 (8.00)	--	
HIV knowledge [range: 0–1]	0.91 (0.14)	--	
Undetectable viral load	--	81%	
HIV stigma (3 months) [range: 1–4]	2.62 (0.69)	--	
Within Persons/Time-Varying	<i>M (SD)</i>	%	ICC
Asked a partner about PrEP (outcome) <sup>a</sup>	--	62%	.64
Frequency of heavy alcohol use before/during sex <sup>a</sup> [range: 0–6]	0.61 (1.37)	--	.53
Stimulant use before/during sex <sup>a</sup>	--	33%	.84
Other drug use before/during sex <sup>a</sup>	--	65%	.76
Number of male sexual partners <sup>a</sup> [range: 1–29]	6.29 (6.36)	--	.68
Engagement in group sex <sup>a</sup>	--	37%	.66
Personal responsibility [range: 1–5]	3.56 (0.93)	--	.72
Antiretroviral therapy (ART) adherence	--	78%	.63
Disclosure to all recent partners <sup>a</sup>	--	54%	.67
Disclosure self-efficacy [range: 0–4]	2.60 (1.13)	--	.77

Notes. Between-persons factors were assessed at baseline unless otherwise indicated.

<sup>a</sup>During the past 3 months.

**Table 2**

Predictors of Asking Partners About PrEP Use Among 965 Men Living with HIV Reporting HIV-Negative Male Sexual Partners Across 2,580 Total 3 Month Periods

<b>Within Persons/Time-Varying</b>	<b>OR (SE)</b>	<b><i>p</i></b>	<b>AOR (SE)</b>	<b><i>p</i></b>
Time	1.06 (0.06)	.35	<b>1.16 (0.08)</b>	<b>.02</b>
Heavy alcohol use before/during sex	1.10 (0.08)	.19	1.03 (0.08)	.74
Stimulant use before/during sex	<b>2.26 (0.66)</b>	<b>.005</b>	1.42 (0.40)	.22
Other drug use before/during sex	<b>1.80 (0.42)</b>	<b>.012</b>	1.53 (0.37)	.08
Number of male sexual partners (ln)	<b>3.06 (0.64)</b>	<b>&lt;.001</b>	<b>2.89 (0.68)</b>	<b>&lt;.001</b>
Engagement in group sex	<b>2.86 (0.57)</b>	<b>&lt;.001</b>	<b>1.99 (0.43)</b>	<b>.001</b>
Personal responsibility	1.00 (0.15)	.98	1.09 (0.17)	.58
Antiretroviral therapy (ART) adherence	0.74 (0.15)	.14	0.73 (0.16)	.14
Disclosure to all recent partners	1.01 (0.21)	.99	1.29 (0.29)	.25
Disclosure self-efficacy	1.11 (0.14)	.40	1.04 (0.13)	.73
<b><i>R</i><sup>2</sup>within</b>			<b>0.07 (0.02)</b>	<b>&lt;.001</b>
<b>Between Persons/Person-Level</b>	<b><math>\beta</math> (SE)</b>	<b><i>p</i></b>	<b><math>\beta</math> (SE)</b>	<b><i>p</i></b>
Age	-0.01 (0.04)	.90	<b>-0.18 (0.05)</b>	<b>&lt;.001</b>
Race/ethnicity (ref: White)				
Black	<b>-0.76 (0.10)</b>	<b>&lt;.001</b>	<b>-0.29 (0.10)</b>	<b>.003</b>
Latinx	<b>-0.23 (0.11)</b>	<b>.03</b>	-0.03 (0.10)	.76
Education (BL)	<b>0.20 (0.04)</b>	<b>&lt;.001</b>	0.08 (0.04)	.051
Employed full-time (BL)	-0.001 (0.09)	.99	-0.12 (0.09)	.18
Income (BL)	<b>0.18 (0.04)</b>	<b>&lt;.001</b>	<b>0.12 (0.05)</b>	<b>.02</b>
City size (BL)	<b>0.22 (0.04)</b>	<b>&lt;.001</b>	<b>0.07 (0.04)</b>	<b>.048</b>
Years living with HIV	-0.01 (0.04)	.83	0.04 (0.05)	.45
Heavy alcohol use before/during sex (average)	0.03 (0.04)	.54	0.02 (0.04)	.59
Stimulant use before/during sex (average)	<b>0.22 (0.04)</b>	<b>&lt;.001</b>	-0.01 (0.04)	.77
Other drug use before/during sex (average)	<b>0.31 (0.04)</b>	<b>&lt;.001</b>	<b>0.11 (0.04)</b>	<b>.002</b>
Number of male sexual partners (ln average)	<b>0.61 (0.03)</b>	<b>&lt;.001</b>	<b>0.48 (0.05)</b>	<b>&lt;.001</b>
Engagement in group sex (average)	<b>0.49 (0.04)</b>	<b>&lt;.001</b>	0.07 (0.05)	.12
HIV knowledge (BL)	<b>0.13 (0.04)</b>	<b>.004</b>	0.04 (0.03)	.26
Personal responsibility (average)	<b>-0.26 (0.04)</b>	<b>&lt;.001</b>	-0.04 (0.04)	.30
Antiretroviral therapy (ART) adherence (average)	0.06 (0.04)	.14	0.01 (0.04)	.71
Undetectable viral load (BL)	<b>0.38 (0.11)</b>	<b>&lt;.001</b>	<b>0.25 (0.09)</b>	<b>.007</b>
HIV stigma (3mo)	0.02 (0.04)	.74	0.07 (0.04)	.051
Disclosure to all recent partners (average)	<b>0.17 (0.04)</b>	<b>&lt;.001</b>	<b>0.22 (0.04)</b>	<b>&lt;.001</b>
Disclosure self-efficacy (average)	<b>0.25 (0.04)</b>	<b>&lt;.001</b>	0.06 (0.04)	.17
<b><i>R</i><sup>2</sup>between</b>			<b>0.53 (0.04)</b>	<b>&lt;.001</b>

*Notes.* Within predictors are group-mean centered; between predictors are grand-mean centered. Odds ratios (ORs, within level) or standardized regression coefficients ( $\beta$ s, between level) are reported. For binary predictors on the between level, we report STDY estimates from Mplus, which can be interpreted as the change in the outcome variable in standard deviation units when the categorical covariate changes from zero to one (Muthén & Muthén, 1998–2015).