


The Relationship Between Perception of HIV Susceptibility and Willingness to Discuss PrEP With a Health Care Provider: A Pilot Study

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Abstract

HIV continues to be a significant public health concern and despite recent reductions in new HIV diagnoses, certain demographics continue to be disproportionately affected. Men who have sex with other men (MSM) account for the largest percentage of new HIV diagnoses; however, 24% of new diagnoses can be attributed to male-to-female sex, highlighting the need to explore the HIV epidemic beyond the narrow scope of MSM. A multivariate linear regression model was used to explore the perception of HIV susceptibility and level of comfort discussing pre-exposure prophylaxis (PrEP) with a health care provider among a sample of men living in the United States ($n = 377$). Men who had an increased perception of HIV susceptibility were significantly more likely to feel comfortable discussing PrEP with a health care provider. Men who distinguish themselves to be at increased risk of acquiring HIV were significantly more likely to report having either insertive or receptive condomless anal intercourse within the previous 3 months, while men who reported condomless vaginal intercourse perceived low HIV susceptibility. Never being screened for HIV was significantly associated with a perception of low HIV susceptibility compared to those men who had been screened in the previous year. Understanding how men perceive HIV susceptibility and engage with HIV prevention may help to improve HIV prevention efforts such as PrEP.

Keywords

HIV risk, PrEP, HIV prevention, health care communication

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Between 2010 and 2017, the number of AIDS-related deaths declined by 34% and the number of new HIV infections declined by 18% (Ghys et al., 2018). This is largely attributed to the effort and resources allocated to combat the global HIV epidemic. Although the decline in HIV-related deaths and infections has been recognized as a major achievement, the success of eradication and prevention efforts has been slower than projected, particularly among those individuals most vulnerable to the virus. Despite recent decreases in new HIV diagnoses, 38,739 Americans became infected with HIV in 2017 alone (Centers for Disease Control and Prevention [CDC], 2018). While men who have sex with other men (MSM) account for the largest percentage of new HIV diagnoses, men and women who identify as heterosexual continue to be at risk. Of the nearly 40,000 new diagnoses in 2018, 69% were attributed to male-to-male

sexual contact, 24% were associated with male-to-female contact, and 7% involved injection drug use (Centers for Disease Control and Prevention, 2020). Of those newly diagnosed, 37% were Black/African American, 27% were White, and 30% identified as Hispanic/Latino. Even as the rate of AIDS-related deaths and new HIV diagnoses declines among certain key populations, the majority of adults in the United States remain unaware of their HIV status (Centers for Disease Control and Prevention, 2019b).

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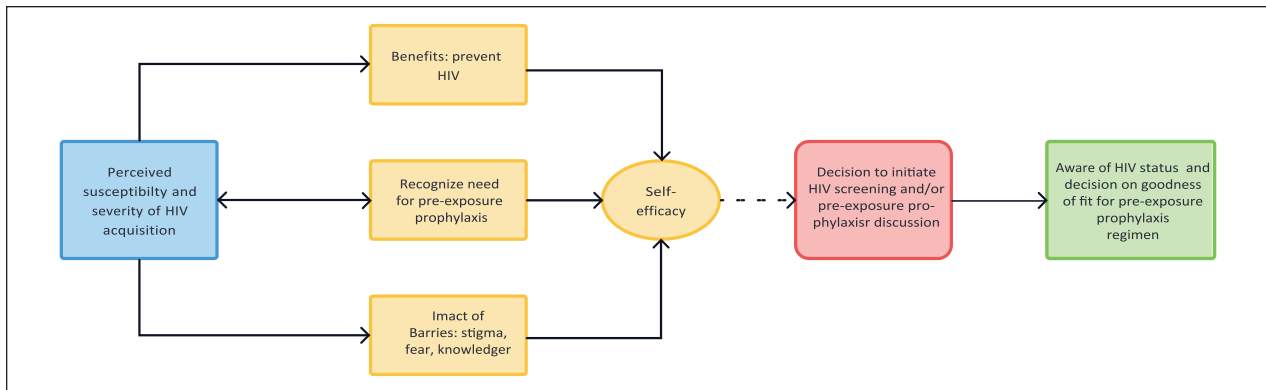


Figure 1. Conceptual model using the Health Belief Model to explore constructs related to HIV susceptibility.

Ample evidence exists to support the view that stigma and the perception that one is at decreased, or no risk, of acquiring HIV are barriers to early screening (Li et al., 2018; Stangl et al., 2013). However, the specific factors influencing an individual's perception of HIV susceptibility and willingness to engage with prevention efforts such as early screening and treatment have yet to be fully understood. Nearly one out of every seven men living with HIV is unaware of his positive serostatus, and only 38.9% of adults living in the United States have ever been tested for HIV, ultimately preventing them from obtaining the treatment or prevention they need to suppress their viral load and prevent transmission of HIV to their sexual partners (Centers for Disease Control and Prevention, 2019a). Being unaware of one's HIV status or avoiding the discussion of sexual health risk factors with a health care provider means individuals who may benefit from HIV prevention methods, such as pre-exposure prophylaxis (PrEP), will remain at an increased risk of acquiring HIV.

PrEP is a recent biomedical intervention that can prevent the acquisition of HIV by greater than 90% (AIDS.gov, 2016). First approved by the Food and Drug Administration in 2012, PrEP has demonstrated great promise in reducing the HIV epidemic; however, uptake among individuals most at risk for HIV continues to be slow (Ojikutu et al., 2018; Zhang et al., 2018). Previous research examining barriers to PrEP uptake has reported that stigma and fear associated with HIV are key factors preventing PrEP acquisition (Calabrese & Underhill, 2015; Vaccher et al., 2018). Another salient issue reported in the previous literature is the inability to accurately identify the level of HIV risk (Sanchez et al., 2019; Zhabokritsky et al., 2019). Understanding the relationship between an individual's perception of HIV risk and the individual's level of comfort discussing PrEP with a health care provider is an important area of research for HIV prevention, as both aspects have illustrated the influence on health-seeking

behaviors, adherence to a medication regimen, and transparent patient and provider interaction (St. Vil et al., 2019; Vaccher et al., 2018).

Comprehensive care that improves the awareness of HIV and encourages open communication between providers and patients could potentiate a global reduction in HIV acquisition. And addressing the perceived stigma and knowledge about HIV and PrEP may allow individuals to speak more openly and seek timely access to preventive health care (United Nations Programme on HIV/AIDS, 2017). To address the gaps in the literature, the current study was developed to better understand how men perceive their susceptibility to HIV in relation to their willingness to discuss PrEP with a health care provider.

Methods

Theoretical Framework

The theoretical framework guiding this study is the health belief model (HBM). The HBM is the basis for the practice of health promotion and suggests that information alone is not enough to motivate a person to act (Glanz et al., 2008). This theory of health promotion consists of several constructs and has been used in recent studies to explore motivations for HIV testing (Lin et al., 2017; Nothling & Kagee, 2013); however, it is the construct of *perceived susceptibility*, or an individual's belief regarding the chance of acquiring a specific condition, that is most meaningful to the present study. Constructs related to risk susceptibility, severity, benefits, and barriers can be viewed in Figure 1.

An exploratory cross-sectional study design measured perception of HIV susceptibility, level of comfort discussing PrEP with a health care provider, history of injection drug use, recent history of condomless anal/vaginal sex, HIV screening history, and previous hepatitis C (HCV)

diagnosis among men in the United States. An online survey was fielded in September 2019 to a sample of men over the age of 18 years living in the United States. Inclusion criteria were as follows: (a) identify as male, (b) be at least 18 years of age, and (c) be a current resident of the United States. Participants were recruited using a digital flyer and study description that was posted on the Mechanical Turk (MTurk) platform. MTurk is a crowdsourcing site developed by Amazon that allows an individual to post a task, or Human Intelligence Task (HITs), for MTurk workers to complete (Walters et al., 2018). The use of a crowdsourcing approach such as MTurk to obtain survey respondents is a growing trend in the social science literature and previous research has demonstrated that the MTurk population is more representative of the general population than other online survey panels are (Behrend et al., 2011) and is more attentive to survey instructions than convenience samples are (Ramsey et al., 2016). The survey was hosted on the Qualtrics platform and took approximately 4 min to complete. Participants were given U.S. \$0.75 incentive for their time.

An instructional manipulation question was integrated into the middle of the survey and instructed the participants to answer the question “Disagree” in order to identify participants with a low attention to instructions and detail (Beymer et al., 2018; Oppenheimer et al., 2009). Before the close of the study, 418 individuals had accessed the survey. Of those who initiated the survey, 15 (4%) did not meet the inclusion criteria. Of those participants who did not meet inclusion criteria, 10 (2%) identified as female and 5 (1%) lived outside the United States. An additional five participants (1%) did not pass the instruction manipulation question and were removed from analysis. Results were then examined for completion and were considered for inclusion in the final analysis if they were at least 80% complete, yielding a final sample size of 377. The Indiana University Institutional Review Board (protocol number 1907112342) approved all study protocols. Each participant was given a digital version of the study information sheet and asked to consent to participate prior to initiating the online survey. Participants were given the option to deny participation and exit the survey prior to initiation.

Measures

The survey collected sociodemographic information including age, ethnicity, sexual orientation, gender, and state of primary residence using questions created for this study. The dependent variable, “Susceptibility of HIV,” was measured using a scale of 0–100 points. Participants were asked to select the point along a sliding scale, from high susceptibility of acquiring HIV (0) to low susceptibility of acquiring HIV (100), that most closely aligns

with how they perceive their susceptibility to HIV. Level of comfort discussing PrEP with a health care provider was measured on a 5-point scale with options ranging from *Does not describe my feelings* to *Mostly describes my feelings*. Previous intravenous drug use was measured by using a dichotomous question (yes/no) developed for this study. Previous HCV diagnosis was measured by using a 3-point question (yes/no/never tested) developed for this survey. History of HIV screening was assessed by using four options: tested in the previous year, tested 1–5 years ago, tested more than 5 years ago, and never tested. Finally, condomless anal and vaginal intercourse was measured by using a question created for this survey that asked participants to identify if they had engaged in condomless insertive anal intercourse, condomless receptive anal intercourse, or condomless vaginal intercourse within the previous 3 months.

Statistical Analysis

First, all data were analyzed descriptively by use of univariate analysis. The independent and covariate variables were dichotomized for inclusion in the final multivariate model. Finally, a multivariate linear regression was used to examine the scores reflecting perception of HIV risk as a function of the predictor variables included in the multivariate model. Statistics Package for the Social Sciences version 26 was used for all analysis. Prior to data analysis, an examination of test assumptions indicated a satisfactory level of normality, linearity, and homoscedasticity. Additionally, the results indicated that the independent variables were not correlated.

Results

Descriptive Analysis

Of the 377 men who participated, 49.3% ($n = 186$) were between the ages of 25 and 34 years, and 27.3% ($n = 103$) were in the age group of 35–44 years. The majority identified as White (66.3%, $n = 250$), followed by 15.1% ($n = 57$) who identified as Asian. Nearly three quarters (73.7%, $n = 278$) stated they were heterosexual, and one quarter (24.9, $n = 94$) identified as MSM. The largest percentage of the participants were from the Southern region of the U.S. ($n = 124$, 32.9%) and 23.1% ($n = 87$) were from the Midwestern region. A majority stated they were at low risk of contracting HIV (46.2%, $n = 174$), and 36.6% ($n = 138$) believed they had no risk of contracting HIV. Concerning HIV screening, 36.3% ($n = 137$) had never received an HIV screening, and among those participants who had previously been screened for HIV, 124 (32.9%) had not been screened for 2 or more years. Participant demographics are presented in Table 1.

Table 1. Participant Demographics, Perception of HIV Susceptibility, and Willingness to Discuss PrEP Study (N =377).

Variable	No.	%
Age		
18–24 years	31	8.2
25–34 years	186	49.3
35–44 years	103	27.3
45–54 years	37	9.8
55–64 years	12	3.2
≥65 years	8	2.1
Race		
White	250	66.3
Black	26	6.9
American Indian	8	2.1
Asian	57	15.1
Native Hawaiian	1	0.3
Multiracial	9	2.4
Hispanic	23	6.1
Sexual orientation		
MSM	94	24.9
Straight	278	73.7
Other	5	1.3
Geographic region		
Northeast	74	19.6
Midwest	87	23.1
South	124	32.9
West	80	21.2
Perceived HIV susceptibility		
High	11	2.9
Medium	54	14.3
Low	174	46.2
Not at risk	138	36.6
History of HIV screening		
Never screened	137	36.3
More than 5 years ago	56	14.9
2 to 5 years ago	68	18
1 to 2 years ago	59	15.6
Previous year	54	14.3

Note. MSM = men who have sex with other men; PrEP = pre-exposure prophylaxis.

Multivariate Analysis

The results of the multivariate model (Table 2) indicated that while controlling for previous HCV diagnosis, history of HIV screening, and comfort level discussing PrEP with a health care provider, perception of HIV risk was related to comfort level discussing PrEP with a health care provider at a statistically significant level with a medium effect size (partial eta squared, 0.09). The model was statistically significant ($p < .001$) and explained 46% ($R = .46$, adjusted $R = .44$) of the variance in the dependent variable of perception of HIV risk.

Concerning the predictor variables, the findings indicated that study participants who felt “mostly” comfortable discussing PrEP with their health care provider ($B = .24$, $SE = .11$, $\beta = -.14$, $p = .034$) had a significantly higher perception of their HIV risk than participants who did not feel comfortable discussing PrEP with their health care provider did. Furthermore, participants who had not engaged in intravenous drug use had a significantly lower perceived HIV risk ($B = .41$, $SE = .01$, $\beta = .20$, $p < .001$) than participants who reported a history of intravenous drug use did.

Having insertive anal sex without a condom in the previous 3 months was significantly associated with reporting a higher risk of contracting HIV ($B = -.21$, $SE = .094$, $\beta = -.13$, $p = .029$) and engaging in receptive anal sex without a condom in the previous 3 months was also significantly associated with reporting a higher perception of HIV risk ($B = -.39$, $SE = .095$, $\beta = -.23$, $p < .001$). Participants who reported having vaginal sex without a condom in the previous 3 months were significantly more likely to report a lower risk of HIV acquisition ($B = .25$, $SE = .07$, $\beta = .15$, $p < .001$).

Regarding HIV screening, never being screened for HIV was significantly associated with a lower perceived risk of acquiring HIV ($B = .24$, $SE = .10$, $\beta = .15$, $p = .021$). Reporting being screened for HIV more than 5 years ago was significantly associated with a lower perceived risk of acquiring HIV ($B = .28$, $SE = .11$, $\beta = .11$, $p = .047$) compared to those men who reported receiving a HIV screening in the previous 3 months. Having received a positive HCV diagnosis ($B = -.60$, $SE = .13$, $\beta = -.22$, $p < .001$) was significantly associated with a higher perception of HIV risk. Finally, never having been tested for HCV infection ($B = .30$, $SE = .09$, $\beta = .14$, $p < .001$) was significantly associated with a lower perceived risk of acquiring HIV compared with those men who had not previously received an HCV diagnosis. Receptive anal sex without a condom in the previous 3 months was the strongest predictor within the regression model ($\beta = -.229$).

Discussion

The study findings revealed that men who felt moderately comfortable discussing PrEP with a health care provider were more likely to perceive their risk of acquiring HIV as higher relative to those men who did not feel comfortable discussing PrEP. There are several reasons for this finding. First, men who felt moderately comfortable discussing PrEP may have a higher degree of sexual health care self-efficacy. These results are meaningful to the study of PrEP in part because of the stigma associated with seeking or receiving HIV services (Dubov et al., 2018; Nanin et al., 2009). This finding is also in

Table 2. Multivariate Linear Regression Analysis Examining Perception of HIV Susceptibility.

Variable	B(SE)	β	95% CI	<i>p</i>
Comfortable discussing PrEP with provider				
Mostly Describes Feelings	-.238(.112)	-.141	[-.458, -.018]	.034*
Moderately Describes My Feelings	-.119(.113)	-.067	[-.342, .103]	.293
Slightly Describes Feelings	-.159(.146)	-.055	[-.447, .128]	.277
Describes My Feelings	-.150(.114)	-.086	[-.374, .075]	.190
Does Not Describe My Feelings	–	–	–	–
Previous intravenous drug use	.384(.100)	.192	[.187, .581]	<.001*
Previous hepatitis C diagnosis				
Yes	-.604(.131)	-.219	[-.862, -.346]	<.001*
Never Tested	.304(.091)	.141	[.126, .483]	<.001*
No	–	–	–	–
History of HIV screening				
Never Tested	.235(.101)	.147	[.036, .435]	.021*
Tested 1 to 5 Years Ago	.079(.097)	.048	[-.111, .269]	.414
Tested More Than 5 Years Ago	.277(.114)	.105	[.003, .451]	.047*
Tested Within Previous Year	–	–	–	–
Condomless sexual encounters reported in the previous 3 months				
Insertive Anal Sex with No Condom	-.205(.094)	-.128	[-.389, -.021]	.029*
Receptive Anal Sex with No Condom	-.389(.095)	-.229	[-.575, -.203]	<.001*
Vaginal Sex with No Condom	.249(.067)	.151	[.116, .381]	<.001*

Note. PrEP = pre-exposure prophylaxis.

**p* < .05.

agreement with previous research by Dou et al. (2019) and Klein (2014), which showed that individuals with a higher degree of HIV prevention-related knowledge, including PrEP and condom use, also demonstrate a higher level of HIV prevention self-efficacy, which may potentially lead to decreased rates of HIV. Another possible explanation for this finding is that men who do not feel comfortable discussing PrEP may also be less likely to acknowledge other components of sexual health and thus may be less likely to be aware of behaviors that place them at risk of acquiring HIV or less likely to discuss sexual risk-taking behaviors in general. In this context, the perception that they possess a decreased risk of acquiring HIV may be a function of both decreased sexual health self-efficacy and decreased HIV knowledge and not necessarily an accurate representation of risk.

One of the most clinically relevant findings is the influence of previous intravenous drug use. Having a history of intravenous drug use was significantly associated with perceiving an increased risk of contracting HIV compared with participants who reported no previous intravenous drug use. A possible explanation for this finding is the prevalent nature of HIV and HCV coinfection among users of intravenous drugs (Lekas et al., 2011). An estimated 33% of people living with HIV also have HCV. Moreover, 50% to 90% of users of intravenous drugs are living with both HIV and HCV (Benson et al., 2005). This finding follows those of other studies

suggesting that users of intravenous drugs are concerned about HIV and HCV infection (De Angelis et al., 2009; Platt et al., 2016); however, uptake of PrEP has remained low in this population (Sherman et al., 2018). While these findings support the idea of increased HIV awareness among users of intravenous drugs, this study was not able to determine what these individuals know about PrEP or whether they feel they are appropriate candidates for the PrEP regimen. Understanding that users of intravenous drugs may already perceive themselves to be at increased risk of acquiring HIV may offer leverage for health care providers to engage in challenging conversations with their patients and offer the opportunity to inform them about the benefits of HIV prevention methodologies, including safe injection practices, addiction treatment programs, and PrEP.

Differences between perception of HIV risk and HCV status may be a bit more nuanced depending on the subject population. The finding that participants with a previous positive HCV diagnosis perceived themselves to be at increased risk of acquiring HIV, whereas those participants who had never been tested for HCV perceived themselves to have a lower risk of acquiring HIV, may speak more to the stigmatizing nature of HCV and HIV than to actual or perceived risk. Butt (2008) stated the nature of HIV and HCV stigma is ultimately shaped by the association with “devalued social groups,” suggesting a cultural script as the factor influencing how those living

with, or at risk for, HIV and HCV infection are viewed by others. Future research is required to understand whether individuals who have a previous diagnosis of HCV infection engage in behaviors that place them at increased risk of acquiring HIV or whether perception of increased risk is due to membership in a stigmatized group. The experience of HIV and HCV stigma is complex and, as a study by Lekas et al. (2011) described, it may be incorrect to assume there is always a compounding effect on an individual's experience of multiple layers of stigma.

Recent history of sexual risk behaviors was significantly associated with perception of HIV risk. On the question of condomless sex, this study identified that participating in insertive anal intercourse without a condom was significantly associated with a perception of increased HIV risk. Similarly, participating in condomless receptive anal intercourse in the previous 3 months was significantly associated with a perception of increased HIV risk. However, participating in condomless vaginal sex in the previous 3 months was significantly associated with a lower perceived risk of acquiring HIV. A possible explanation for these results may be the fact that anal sex is considered the highest risk sexual behavior for HIV transmission (Centers for Disease Control and Prevention, 2019). Yet it is important to note that HIV can be transmitted via vaginal sex and unprotected vaginal intercourse is a high-risk behavior for both partners (Peabody, 2019), and one of the most effective methods to prevent the transmission of HIV is to use condoms. However, condoms are not the only method of prevention. Knowledge of individual and partner HIV status, understanding of fully suppressed viral load if HIV positive, and adherence to PrEP are other effective methods of preventing HIV transmission (Centers for Disease Control and Prevention, 2019a). Yet, despite these effective methods of HIV prevention, the number of new infections has increased among certain key populations (Centers for Disease Control and Prevention, 2020). Viewing anal sex as the highest risk sexual behavior, while correct, may be contributing to a false sense of security for men and women engaging in condomless vaginal sex without paying attention to other factors such as knowledge of their own HIV status and that of their partner.

MSM continue to account for the largest percentage of new HIV diagnosis; however, heterosexual men and women continue to be impacted. Heterosexuals accounted for 24% of the new HIV diagnoses in 2018. And of the 1.1 million people living with HIV in the United States at the end of 2016, an estimated 14% remain unaware of their HIV-positive status (Centers for Disease Control and Prevention, 2019a). These findings further support the idea that universal HIV screening is not just good public health policy but may be an important step toward ending the epidemic. CDC advises that everyone between

the ages of 13 and 64 years be screened for HIV at least once and individuals with specific risk factors be screened at least once a year (Branson et al., 2006). Contrary to CDC HIV prevention guidelines, the majority of the participants in this study reported having never received an HIV test ($n = 137, 36.3\%$), indicating they are unaware of their HIV status. An interesting finding from the present study was that having never received a HIV screening was significantly associated with a decreased risk of acquiring HIV. This finding may be because the participants have an actual low risk of acquiring HIV, but it may also be a result of insufficient or incorrect HIV knowledge. Lacking awareness of HIV status and having a low perception of HIV risk have several implications for clinical practice, the most noteworthy being how HIV screening is integrated into routine care. Current evidence suggests providers are not adhering to the CDC guidelines as HIV screening rates in the United States continue to be suboptimal (Pitasi et al., 2018). Additional research is needed to better understand how health care providers incorporate sexual health screenings in clinical practice settings, if HIV screening is a standard of care, and if patients who meet the guidelines for PrEP are being linked to preventive care services.

Findings from the present study also offer support for further exploration of the optimal environment in which to prescribe PrEP. Recently, California became the first state to allow pharmacists to prescribe PrEP (Levy, 2019), and by removing structural barriers to PrEP prescription, uptake may be increased among individuals who either lack primary care or do not feel comfortable discussing PrEP with their primary care provider. Future studies are required to explore the optimal setting in which to prescribe PrEP. Specifically, further research is needed to determine the impact of embedding HIV prevention services in settings, such as syringe service programs that serve individuals living with, or at increased risk for, HIV.

This study has a few limitations. First, the sample was restricted to men in the United States who are currently affiliated with MTurk. It is possible that the self-reported beliefs and behaviors would differ from those of men who are not recruited using the MTurk platform. Second, the study aimed to explore the perception of HIV risk using a self-report measure. This approach may not include those men who are truly at risk for HIV acquisition. Third, the majority of the sample included primarily heterosexual identified men, potentially exploring men who may be inherently at lower risk of acquiring HIV compared to MSM. However, a deeper understanding and discussion of how we define and screen for HIV risk is needed to reach those men who believe they are not at risk of acquiring HIV simply because they identify as heterosexual. Finally, while the survey asked about previous intravenous drug use, it did not explore the use or misuse

of other drugs. Thus, the results are not able to explore the impact of alcohol and other substances on the perception of HIV risk behaviors.

Conclusion

Results suggest that men's perception of HIV risk is significantly related to their level of comfort with discussing PrEP with a health care provider, history of intravenous drug use, HCV diagnosis, history of HIV screening, and recent history of condomless anal or vaginal sex. Men who perceive themselves to be at increased risk of acquiring HIV are significantly more likely to have recently engaged in condomless anal sex. Because sexual risk behaviors are an important factor in PrEP discussions, gaining a better understanding of what allows men who believe they are at increased or decreased risk for HIV to feel comfortable discussing PrEP with their health care provider is important. Additionally, future studies exploring the intersection of perception of increased HIV risk, HIV screening, and PrEP discussions among providers and patients may improve linking at-risk patients with HIV prevention services.

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