Published in final edited form as:

Soc Sci Med. 2017 January ; 172: 115–123. doi:10.1016/j.socscimed.2016.10.030.

Distinguishing hypothetical willingness from behavioral intentions to initiate HIV pre-exposure prophylaxis (PrEP): Findings from a large cohort of gay and bisexual men in the U.S.

H. Jonathon Rendina, PhD, MPH^{1,2,3}, Thomas H. F. Whitfield, BA^{2,3}, Christian Grov, PhD, MPH^{2,4}, Tyrel J. Starks, PhD^{1,2,3}, and Jeffrey T. Parsons, PhD^{1,2,3}

¹Department of Psychology, Hunter College of the City University of New York (CUNY), New York, NY

²Center for HIV/AIDS Educational Studies & Training, Hunter College of the City University of New York (CUNY), New York, NY

³Health Psychology and Clinical Sciences Doctoral Program, The Graduate Center of the City University of New York (CUNY), New York, NY

⁴CUNY Graduate School of Public Health and Health Policy, New York, NY

Abstract

Rationale—Much of the data on the acceptability of HIV Pre-Exposure Prophylaxis (PrEP) is based on willingness to take PrEP (i.e., hypothetical receptivity) rather than actual intentions (i.e., planned behavioral action) to do so.

Objective—We sought to examine differences between hypothetical willingness and behavioral intentions to begin PrEP in a national sample of gay and bisexual men (GBM) across the U.S.

Methods—We utilized data collected in 2015 to examine differences between those *Unwilling* (42.6% $n=375$), *Willing* but not intending (41.4%, $n=365$), and willing and *Intending* to take PrEP (15.9%, $n=140$) in a multivariable, multinomial logistic regression.

Results—Men with less education had higher odds of *Intending* to take PrEP. Compared to men unsure about PrEP's efficacy, those who believed PrEP was at least 90% efficacious had higher odds of *Intending* to take PrEP. Those who saw themselves as appropriate candidates for PrEP had higher odds of *Intending* to take PrEP while those who saw themselves as inappropriate candidates for PrEP had lower odds of *Intending* to take PrEP in comparison to men unsure if they were appropriate candidates. Increased motivation for condom non-use because of perceived sexual pressure by partners was associated with higher odds of *Intending* to take PrEP. The groups did not differ by risk behavior nor recent STI diagnosis.

Corresponding Author Correspondence concerning this article should be addressed to Jeffrey T. Parsons, Department of Psychology, Hunter College of the City University of New York, 695 Park Ave., New York, NY 10065. Phone: 212-772-5533. Fax: 212-206-7994. Jeffrey.Parsons@hunter.cuny.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Conclusions—Overall, the distinction between *willingness* and *intentions* to take PrEP was meaningful and may help explain disparities between PrEP acceptability and uptake. While much of the literature has focused on hypothetical willingness to take PrEP, these results highlight the importance of simultaneously assessing willingness and intentions when examining correspondence with uptake and developing interventions to increase PrEP uptake.

Keywords

Pre-exposure prophylaxis; PrEP; gay and bisexual men; HIV prevention; behavioral intentions; uptake

Introduction

Gay, bisexual, and other men who have sex with men (GBMSM) make up an estimated 4-15% of the U.S. population (Herbenick et al., 2010; Purcell et al., 2012) and yet they account for 84% of all new HIV infections among males in the United States (CDC, 2015). The infection rate continues to increase in this population and is up 12% since 2008 (CDC, 2012). HIV Pre-exposure prophylaxis (PrEP) in the form of a once-daily pill (emtricitabine and tenofovir disoproxil fumarate) was approved by the U.S. Food and Drug Administration (FDA) in 2012 to combat the growing spread of HIV (USFDA, 2012) and represents the most promising biomedical prevention strategy to date. Before approval by the FDA, clinical trials reported efficacy as high as 99% when optimal adherence to once-daily dosing regimens was met (Anderson et al., 2012; Grant et al., 2010). Since the FDA approval, one demonstration project reported that none of their 657 participants (99% GBMSM) seroconverted over their course of participation in the study (which averaged 7.2 months) (Volk et al., 2015). A second study following 557 GBMSM and transgender women for 48 weeks found only two seroconversions over 48 weeks of enrollment, both among participants with low plasma levels of PrEP consistent with poor adherence (Liu et al., 2015). Despite being shown to be highly effective in the prevention of HIV transmission, PrEP uptake has been relatively slow. Based on data from 2015, it was estimated that approximately 30,000 individuals were prescribed Truvada for use as PrEP (Grant, 2015), with more recent numbers suggesting an increase to nearly 80,000 (Mera et al., 2016). Despite the increase, these numbers remain far below the estimated number of individuals in the U.S. that would be candidates for PrEP (Mermin, 2014). For GBMSM alone, it was recently estimated that 24.7% have indications for PrEP, which equates to approximately 492,000 individuals (Smith et al., 2015).

Several potential reasons exist for low rates of uptake. The acceptability of taking PrEP has been explored among a variety of samples including heterosexuals (Calderon et al., 2012; Khawcharoenporn et al., 2012), GBMSM (Al-Tayyib et al., 2014; Ayala et al., 2013; Galea et al., 2011; Golub et al., 2013; Grov et al., 2015; Holt et al., 2012; Mimiaga et al., 2009; Mustanski et al., 2013; Saberi et al., 2012) and transgender populations (Galea et al., 2011; Galindo et al., 2012; Golub et al., 2013; Kuhns et al., 2015). Among the studies of GBMSM, the acceptability rate has ranged considerably from 25-83% between populations and over time, though all of these figures remain far greater than those for PrEP uptake. The discrepancy between PrEP acceptability and PrEP uptake may be partially due to the way

participants are asked about PrEP acceptability. Specifically, participants are often asked a hypothetical question about willingness to take PrEP based on situations characterized by varying dosing schedules (Aghaizu et al., 2013; Al-Tayyib et al., 2014; Galindo et al., 2012; Holt et al., 2012; Mimiaga et al., 2009; Mustanski et al., 2013), levels of effectiveness (Al-Tayyib et al., 2014; Barash & Golden, 2010; Golub et al., 2013; Holt et al., 2012; Mustanski et al., 2013) and costs (Golub et al., 2013; Golub et al., 2010; Grov et al., 2015; Holt et al., 2012; Mimiaga et al., 2009). However, these hypothetical situations often do not reflect the realities of initiating a PrEP regimen. Although people may be willing to start a PrEP regimen if it is conveniently offered to them for free and is perfectly effective, they may be unlikely to make the effort to request PrEP from a provider, particularly if they are unaware that it may be obtained at little or no cost to them and that it has been shown to be highly efficacious.

Two prominent theories of health behavior suggest important distinctions between the hypothetical acceptability of PrEP and behavioral intentions to seek out and initiate PrEP. The Theory of Planned Behavior (Ajzen, 1991; Ajzen & Fishbein, 1980) has been widely used within the HIV literature (Albarracín et al., 2001; Sheeran & Orbell, 1998; Sheeran & Taylor, 1999) and focuses specifically on behavioral intentions as a mediator in the influence of attitudes, norms, and self-efficacy on behavior. The ways in which hypothetical acceptability data are collected might be best thought of as tapping into the attitudinal component of the model, which is only one of several components that subsequently influence the development of intentions and, ultimately, behavior. The literature on the association between behavioral intentions and subsequent behavior has had mixed findings, though meta-analyses show the average association to be moderate, with intentions being one of the strongest predictors of future behavior (Albarracín et al., 2001; Webb & Sheeran, 2006). Similarly, the Transtheoretical Model (Prochaska & Velicer, 1997) focuses on individuals' stages of change for engaging in a health behavior, ranging from precontemplation (i.e., low awareness of the need to change, no intentions to change) and contemplation (i.e., awareness and intentions are increasing) to action (i.e., one has engaged in the behavior) and maintenance (i.e., one continues to engage in the behavior). Applied to PrEP, individuals in any of the stages prior to action could report high acceptability of PrEP, though only those further along in contemplation and preparation have recognized the need to begin PrEP and are making plans to do so. As such, while documenting high acceptability of PrEP was critical to determining it was a worthwhile public health pursuit, it may provide substantially less information about actual uptake, which requires behavioral intentions and subsequent action.

Many of the studies conducted on PrEP acceptability among GBMSM in the U.S. have examined a variety of factors including structural (e.g., access, insurance), demographic (e.g., race/ethnicity, age), behavioral (e.g., risk for HIV infection, substance use), and psychological (e.g., perceived barriers, perceived risk). Multiple studies have reported that PrEP acceptability is higher among several demographic groups, including men under 40 years of age (Aghaizu et al., 2013; Barash & Golden, 2010; Grov et al., 2015; Holt et al., 2012), men of color (Aghaizu et al., 2013; Golub et al., 2010), and those with a college degree (Grov et al., 2015; Mustanski et al., 2013). PrEP acceptability has also been found to be higher among men with a greater number of condomless anal sex (CAS) acts (Aghaizu et

al., 2013; Barash & Golden, 2010; Golub et al., 2010; Holt et al., 2012; Mustanski et al., 2013), sexual partners (Barash & Golden, 2010; Mustanski et al., 2013), and sex acts while under the influence of substances (Golub et al., 2010; Mimiaga et al., 2009). Some research has been focused on the psychological facilitators and barriers associated with willingness to take PrEP, with one study of a large sample of GBMSM and transgender women in New York City showing that the highest rated barriers included long-term effects on health, side effects, and incomplete protection against HIV (Golub et al., 2013). As might be expected, greater concerns about these barriers were significantly associated with decreased willingness to take PrEP. These findings are consistent with other commonly reported barriers, including costs around PrEP (i.e. prescription, tri-monthly check ups, STI testing), side effects, stigma, and perceived appropriateness of oneself as a candidate for PrEP (Ayala et al., 2013; Galea et al., 2011; Gallagher et al., 2014; Golub et al., 2013; Grov et al., 2015; Holt et al., 2012; King et al., 2014; Mimiaga et al., 2009; Smith et al., 2012). Finally, one study has suggested that differing motivations behind condom use and non-use—including those related to intimacy and partner pressure—were associated with PrEP acceptability (Gamarel & Golub, 2014). Taken together, these results regarding PrEP acceptability among GBMSM highlight the importance of considering these multiple domains of influence as they may also apply to PrEP intentions.

Although there have been some clear consistencies across the research on PrEP acceptability among GBMSM, many of the reports to date have included samples that are regionally restricted, often primarily living in large urban centers (Aghaizu et al., 2013; Al-Tayyib et al., 2014; Barash & Golden, 2010; Brooks et al., 2012; Galea et al., 2011; Galindo et al., 2012; Golub et al., 2013; Golub et al., 2010; Grant, 2015; Grov et al., 2015; Holt et al., 2012; King et al., 2014; Mimiaga et al., 2009; Mustanski et al., 2013; Saberi et al., 2012). In order to better understand PrEP uptake across the U.S., it is critical to understand how PrEP is viewed among GBMSM living both inside and outside of urban centers. To the best of our knowledge, there have been no studies on factors associated with PrEP acceptability or uptake using a national sample of GBMSM across the U.S.

Aims

To date, there has been a clear discrepancy between hypothetical acceptability of PrEP and actual uptake of PrEP among GBMSM in the U.S. This discrepancy may be at least partially attributable to the distinction between acceptability and behavioral intentions, the former of which we expect would be substantially higher than the latter. As a result, we sought to examine structural, demographic, behavioral, and psychological factors that differentiate PrEP willingness from intentions using a large sample of HIV-negative, gay- and bisexually-identified males (GBM; i.e., none were non-identified men who have sex with men) across the U.S. in order to inform the development of intervention targets aimed at increasing uptake of PrEP.

Method

Participants and Procedures

One Thousand Strong is a longitudinal study prospectively following a national cohort of GBM across the U.S. for a period of 3 years, with many of the details described elsewhere (Groß et al., 2016a; Groß et al., 2016b). Participants were identified through a Community Marketing and Insights, Inc. (<http://communitymarketinginc.com/>) panel of over 22,000 GBM throughout the United States. Our goal was to recruit a sample that approximately represented the population GBM in the U.S. by using data from the U.S. Census with regard to same-sex households. Primary eligibility criteria included residing in the U.S., being at least 18 years of age, being biologically and self-identified as male, identifying as gay or bisexual, reporting sex with a man in the past year, being willing to complete testing for HIV and sexually transmitted infections (STIs), and receiving an HIV-negative test result at baseline. Procedures were reviewed and approved by the Institutional Review Board of the City University of New York.

Approximately 6 months after their baseline assessment, from January to March of 2015, participants were emailed link to verify their contact information and were invited to complete a brief survey about PrEP. Details on the recruitment and enrollment procedures and a figure describing the flow from screening through enrollment and retention at the 6-month survey are included within the online supplementary materials. The survey was optional to participants and they were entered into a raffle for one of 50 Amazon gift cards worth \$20 if they completed the brief 10-15 minute survey.

Measures

A majority of the data on demographic and other background characteristics originate from the surveys during the baseline assessment, while those focused more specifically on PrEP were assessed during the 6-month follow-up survey.

Demographic and structural characteristics—During the baseline survey, participants indicated their age, sexual orientation, and relationship status, as well as their zip code, which we recoded into their geographic region of residence. Participants also indicated their race and educational attainment, income, whether they had health insurance, if they had a primary care provider (PCP), and, if so, whether or not their PCP knew they had sex with other men.

Behavioral characteristics.

Sexual HIV transmission risk: During the baseline survey, participants were asked the number of times they had engaged in various sexual behaviors with different partner types, from which we created an indicator of whether the participant had engaged in any CAS with an HIV-positive or unknown main partner or any casual partner in the previous three months.

STI diagnosis: Based on the baseline gonorrhea and chlamydia testing, we created an indicator of whether or not the participant received any positive result.

Club drug use: During the baseline survey, participants were also asked whether or not they had used each of the following drugs in the prior three months: cocaine, crack, crystal meth, ecstasy, GHB, heroin/opiates, or ketamine. Their responses were recoded into a single variable indicating any “club drug” use.

Psychological factors

Condom motivations: In the 6-month survey, we used a 21-item scale to assess four different motivations participants might have for and against condom use. One subscale—risk reduction (5 items, $\alpha = .80$)—measured motivations for condom use and three subscales—pleasure interference (4 items, $\alpha = .82$), sexual pressure (4 items, $\alpha = .76$), and intimacy interference (7 items, $\alpha = .85$)—measured motivations for condom non-use (Gamarel & Golub, 2014; Golub et al., 2012; Starks et al., 2014). Participants responded from 1 (*Never feel*) to 5 (*Always feel*) and responses were averaged to form subscale scores.

Anticipated HIV stigma: In the 6-month survey, we adapted the 13 items from the internalized negative self-esteem subscale of the Berger HIV stigma scale (Berger et al., 2001; Starks et al., 2013) to measure the extent to which participants expected they would feel internalized HIV-related stigma were they to seroconvert. Participants responded on a Likert-type scale from 1 (*Strongly disagree*) to 4 (*Strongly agree*) and responses were averaged to form an overall score ($\alpha = .92$).

Barriers to PrEP uptake: Participants were next asked about how concerned they were about a series of potential barriers to taking PrEP using a modified version of a scale used in prior research (Golub et al., 2013). Participants rated their concern about taking PrEP as a result of three factors—its potential health consequences (4 items, $\alpha = .82$), provider concerns (2 items, $\alpha = .91$), and social stigma (6 items, $\alpha = .90$)—from 1 (*Not at all concerned*) to 4 (*Very concerned*) and subscale scores were computed by taking the average of its items.

PrEP-specific characteristics—During the 6-month survey, participants were presented with the following description of PrEP:

PrEP (pre-exposure prophylaxis) is a new biochemical strategy to prevent HIV infection. PrEP involves HIV-negative guys taking anti-HIV medications (for example, Truvada) once a day, every day to reduce the likelihood of HIV infection if they were exposed to the virus. Clinical trials of PrEP indicated that it reduced the likelihood of HIV infection when used in combination with other preventive methods, such as condoms. Please note that PrEP is not the same as taking HIV medications for a brief period of time (i.e., 28 days) after a high risk exposure to HIV through encounters such as being stuck by a contaminated needle or having unprotected intercourse. PrEP is intended for regular, long-term use.

No additional information on PrEP candidacy, efficacy, side effects, or cost was provided. Then, they responded to a series of PrEP questions.

Perceived efficacy of PrEP: Participants were first asked how effective they have heard PrEP is in preventing HIV, with responses recoded into a trichotomous variable with categories corresponding to greater than 90% effective, less than 90% effective, and unsure.

Appropriate candidate for PrEP: To assess perceived appropriateness of PrEP for themselves, participants were asked, “Do you believe that you are currently an appropriate candidate for PrEP?” with responses recoded into a trichotomous variable with categories corresponding yes, no, and unsure.

Potential PrEP provider: Participants were asked whether they had a provider who they would be comfortable asking for a PrEP prescription and who they thought would be willing to provide it to them.

Primary Outcomes

Willingness to take PrEP: To assess hypothetical willingness to take oral PrEP in a way consistent with several previous studies (Al-Tayyib et al., 2014; Golub et al., 2013; Grov et al., 2015; Holt et al., 2012; Mustanski et al., 2013), participants were asked, “Suppose that PrEP is at least 90% effective in preventing HIV when taken daily. How likely would you be to take PrEP if it were available for free?” with responses ranging from “I would definitely take it” to “I would definitely not take it.” Participants who responded that they would definitely or probably take PrEP were coded as being willing to take PrEP.

Intentions to take PrEP: In contrast to hypothetical willingness, we sought to assess behavioral intentions to actually begin PrEP based on a real-world situation. To do this, participants were asked, “PrEP is currently available with a prescription from your doctor and research has shown that a majority of insurance companies cover most or all of the costs of PrEP. Do you plan to begin PrEP?” Response options ranged from “Yes, I will definitely begin taking PrEP” to “No, I definitely will not begin taking PrEP.” Participants who responded that they would definitely or probably begin taking PrEP were coded as intending to take PrEP. Those participants who indicated they intended to take PrEP were also asked a follow-up question regarding how soon they planned to begin taking PrEP.

Statistical Analyses

Across analyses, we utilized the three group classification of PrEP willingness and intentions as the outcome. Participants who were unwilling to take PrEP were classified as *Unwilling*, those who were willing to take it but expressed no intention to take it were classified as *Willing*, and those who expressed intentions to take it were classified as *Intending*. We began by examining the bivariate association between demographic, behavioral, structural, and psychological variables and the three groups using chi-square tests of independence and analysis of variance (ANOVA), as appropriate. Significant chi-square results were followed up using an examination of the standardized residuals and Bonferroni-adjusted post-hoc tests to determine which cells significantly deviated from their expected values, while significant ANOVA results were followed with Games-Howell-adjusted post-hoc analyses. We next conducted a multinomial logistic regression with all of the factors entered simultaneously to examine their independent association with the three

group outcome. Because the *Intending* group was the group of interest (i.e., several other studies have compared the difference between unwilling and willing participants), we used the *Intending* group as the referent and reversed the sign of the betas such that each odds ratio corresponded to the odds of being *Intending* versus either *Unwilling* or *Willing*.

Results

Of the 1,071 men enrolled at baseline, 950 (88.7%) fully completed the 6-month PrEP survey. We excluded from analyses two men who indicated they had been diagnosed with HIV since baseline, 56 men who said they were actively prescribed PrEP at the time of the survey, and 12 men who said they had previously been prescribed PrEP. This resulted in an analytic sample of 880 HIV-negative, PrEP-naïve GBM.

The demographic characteristics of the full sample are shown in Table 1. As can be seen, slightly more than one-quarter of the sample were men of color, a large majority were gay-identified, more than half had at least a college degree, there was a diversity of income ranges and geographic regions of residence represented, and the sample was nearly evenly split between being single and partnered. More than 90% of the men had health insurance, almost three-quarters had a PCP—with 59% having a PCP who knew that they had sex with other men—and nearly two-thirds had a provider they felt they could go to for PrEP. The mean age was approximately 41 and ages ranged from 18 to 79. Information about PrEP-specific and behavioral factors is displayed in Table 2. Nearly one-third of men believed PrEP to be at least 90% effective and another 31% said they were unsure about PrEP's efficacy. Similarly, slightly more than one-third believed they were an appropriate candidate for PrEP, though nearly 27% said they were unsure. Slightly more than one-third had engaged in sexual transmission risk (i.e., CAS with HIV-positive or unknown status main partners or any casual partners) in the 3 months prior to baseline, approximately 6% of the sample tested positive for an STI at baseline, and 5% had engaged in club drug use in the 3 months prior to baseline. Overall, 42.6% of men were *Unwilling* to take PrEP, 41.4% were *Willing* but not intending to take it, and 15.9% were *Intending* to take it.

Though not displayed within the tables, there are two things worth noting. First, among the men who were *Intending* to take PrEP, 20% intended to do so within 1 month, 38% intended to do so within 2-3 months, and another 31% intended to do so within the next year. Second, we examined whether men might be objectively classified as good candidates for PrEP based on having had sexual HIV transmission risk in the 3 months prior to baseline or having a positive STI result at baseline. Overall, more than one-third (39.3%, $n = 346$) of the sample met one or both of these criteria for HIV risk. However, 37.0% ($n = 87$) of those who said they were unsure if they were an appropriate candidate for PrEP and 21.3% ($n = 68$) of those who said they were *not* good candidates for PrEP were at high risk for HIV infection using these criteria. In fact, nearly half (48.3%, $n = 155$) of those men classified as being at high risk for HIV infection based on these two variables alone were either unsure of their appropriateness for PrEP or said they were inappropriate candidates for PrEP.

There were bivariate differences between the three groups of PrEP willingness and intentions on race/ethnicity, educational attainment, income level, geographic region of

residence, relationship status, and age (see Table 1). Post-hoc analyses revealed that the omnibus effect for race/ethnicity was driven by a significantly greater proportion of Black men who were *Intending* to take PrEP than White men. A significantly higher proportion of men with a high school degree or less were *Intending* to take PrEP than men with higher education and a significantly higher proportion of men earning \$20,000 per year or less were *Intending* to take PrEP than men earning \$75,000 or more. The regional differences resulted from a significantly lower proportion of men from the South who were *Unwilling* to take PrEP compared to men from the Midwest. Finally, in regards to relationship status, a significantly greater proportion of single men were *Willing* and *Intending* and a lower proportion were *Unwilling* than those in relationships. We also found differences by age, with those *Intending* to take PrEP being the youngest and those *Unwilling* being the oldest.

There were also bivariate associations between the three PrEP groups and the perceived efficacy of PrEP, perceived appropriateness of oneself as a candidate for PrEP, having a potential PrEP provider, having engaged in sexual transmission risk at baseline, and having received an STI diagnosis at baseline, as Table 2 shows. Post-hoc analyses revealed that the omnibus effect regarding the efficacy of PrEP was driven by a significantly higher proportion of men who believed PrEP to be 90% efficacious or higher *Intending* to take PrEP compared to those who were unsure of PrEP's efficacy. Men who believed they were appropriate candidates for PrEP had the highest proportion *Intending* to take PrEP and those who believed they were not appropriate candidates had the lowest proportion *Intending* to take PrEP. The differences for having a potential PrEP provider were driven by a greater proportion of men without a PrEP provider in the *Willing* group and a lower proportion of them in the *Unwilling* group. Finally, the proportion of men *Intending* to take PrEP was higher among those who had engaged in sexual transmission risk behavior compared to those who had not and among those who had received an STI diagnosis compared to those who had not.

We also examined mean differences across the three groups in the psychological measures and found significant differences on two of the PrEP-related barriers subscales as Table 3 shows. Post-hoc tests revealed that men who were *Unwilling* to take PrEP were significantly higher in the perceived health consequences of PrEP and lower in perceived provider concerns than men in both other groups. There were no differences for any of the four condom motivations subscales, anticipated HIV stigma, or the PrEP-related social stigma subscale of the PrEP barriers scale.

Finally, we compared the men in the *Intending* group to those in the *Unwilling* and *Willing* groups using multinomial logistic regression models to determine which variables had independent predictive power in distinguishing this group from the others. We found that all variables that distinguished the *Intending* group from the *Willing* group also distinguished them from the *Unwilling* group, though some additional variables distinguished the *Intending* men from the *Unwilling* men (see Table 4). Specifically, four characteristics were statistically significant and consistent across both models. Compared with men with a college degree or more, those with a high school degree or less had higher odds of *Intending* to take PrEP. Compared to men who were unsure about PrEP's efficacy, those who believed PrEP was at least 90% efficacious had higher odds of *Intending* to take PrEP. Compared to

those who were unsure about who is an appropriate candidate for PrEP, those who saw themselves as appropriate candidates for PrEP had higher odds of *Intending* to take PrEP while those who saw themselves as inappropriate candidates for PrEP had lower odds of *Intending* to take PrEP, suggesting the unsure men fall somewhere between these two other groups with regard to their PrEP intentions. Finally, men who were more motivated not to use condoms because they perceived their partners would not want to (i.e., greater partner pressure for condom non-use) had higher odds of *Intending* to take PrEP.

Discussion

Findings from this national sample of GBM demonstrate a meaningful distinction between hypothetical willingness and behavioral intentions to use PrEP, and the importance of measuring both constructs in order to determine stage of change with respect to PrEP uptake. Bivariate differences among these groups illustrate the importance of demographic factors such as race and socioeconomic status (i.e., education and income), individual risk perception and beliefs about PrEP, and relational factors in a manner consistent with the theory of planned behavior. Results from the multivariable model highlight the unique relevance of education, PrEP awareness (i.e., perceived efficacy, perceived appropriateness of oneself as a PrEP candidate) and relational concerns about partner pressure not to use condom in understanding PrEP intentions.

These results suggest that the distinction between *willingness* or receptivity to PrEP and actual *intentions* or planned behavioral action to take PrEP is meaningful. Although much of the literature has focused on hypothetical acceptability of or willingness to take PrEP, these data highlight the importance of simultaneously considering behavioral intentions to do so. We found a large proportion of men who expressed willingness to take PrEP without any intentions to initiate a PrEP regimen, with only 28% of men who were willing to take PrEP actually intending to take it (only 16% of the full sample). These results can be understood in terms of the Transtheoretical Model of change. Among men for whom PrEP is objectively indicated, individuals characterized as unwilling to go on PrEP can be thought of as displaying a pattern of readiness and behavioral activity consistent with the pre-contemplative stage of change. Individuals in this group not only have no plans to start PrEP, they are not considering it as a potential option despite an objective indication for its potential utility. In contrast, those willing but not intending to take PrEP showed a pattern consistent with the Transtheoretical Model stage of contemplation. Namely, they were receptive to considering a new behavior but had no concrete behavioral action steps planned to do so. Finally, those who intended to take PrEP can be viewed as being in the preparation stage within the Transtheoretical Model. Almost all of these men intended to initiate PrEP within a year, with more than half intending to do so within three months.

One advantage of the current study was the ability to examine the characteristics of individuals at these various stages of change with respect to PrEP in a national sample of men in the U.S. Within bivariate analyses, many of the groups who would be a high priority candidates for PrEP—men of color, men with lower income and education, men from the South, younger men, and those with increased HIV risk indicators—were also those most likely to intend to take PrEP. This finding might be understood within the Theory of Planned

Behavior. As public health research and messaging campaigns have targeted these groups, they may also have established a global norm in which these groups are viewed (by themselves and others) as being at high risk for HIV infection. Such a global norm would be expected to be associated with increased PrEP intentions within this theoretical model, and highlights the growing importance of programs that are designed to facilitate PrEP initiation among these groups. However, these findings also highlight an important paradox—namely, that these groups who are at the highest risk for HIV and most interested in PrEP are also those who are least likely to have access to PrEP. This finding underscores the importance of structural interventions and policy changes aimed at increasing access for men of color, men with low socioeconomic resources, younger men, and men living in areas with a higher burden of HIV infection.

Findings also suggested that beliefs about the effectiveness of PrEP, perceptions of being an appropriate candidate for PrEP, engaging in sexual HIV transmission risk, and a recent STI infection distinguished between groups. Notably, findings point to a complex association of perceived appropriateness for PrEP and more objectively ascertained HIV risk. A substantial proportion of participants behaviorally classified as appropriate for PrEP either identified themselves as inappropriate candidates or were unsure. Disparities between behavior and perceived need for PrEP may arise for at least two reasons. One possibility is that individuals are unaware of characteristics that indicate the need for PrEP, while a second possibility is that individuals may underestimate the risk associated with their behavior as a mechanism to reduce anxiety. These findings suggest a need for sexual histories to be taken during routine physical examinations to facilitate assessment by medical professionals along with more general health education regarding the risks associated with different sexual behaviors and HIV and the criteria that suggests PrEP as an appropriate preventive tool. That being said, it is also worth noting that neither engagement in risk behavior nor recent STI diagnosis were associated with PrEP intentions within the multivariable model, suggesting that their predictive power may be overshadowed by some of the demographic or psychological factors associated with PrEP intentions. Future research is needed to more thoroughly investigate discrepancies between perceived and objective indicators of HIV risk and appropriateness of PrEP.

Notably, relational concerns that work to inhibit condom use emerged as the only significant psychological factor to differentiate those intending to take PrEP from the two other groups in multivariable analyses, despite the absence of a significant bivariate association. Greater endorsement of partner pressure as a motivation for condom non-use was positively associated with the odds of intending to use PrEP. Put another way, men who avoided using condoms because they believed their partners would not want to use them were more likely to intend to begin PrEP. Such relational concerns have also been linked to the non-use of condoms during sex (Golub et al., 2012; Starks et al., 2014). Recently, a decision-making model was proposed in which relational concerns are linked to communication skills and involved in indirect pathways leading from adult attachment to CAS (Starks et al., in press). This points to a potentially powerful opportunity for targeting PrEP interventions to a population at high risk of sexual HIV transmission. PrEP is an individually-administered harm reduction strategy and requires relatively little negotiation with a sex partner to employ. It may therefore be a particularly appealing intervention strategy for individuals

who have difficulties communicating effectively with sex partners, experience high levels of anxiety around interpersonal rejection, or have specific concerns about the interpersonal connotations of condom use during sex.

Several other clinical implications arise from these findings. Taken together, these results point to the need for providers and public health campaigns to develop multiple messages related to PrEP. Consistent with principles of Motivational Interviewing (Miller & Rollnick, 2012), such messages should be tailored to stage of change and reflect the characteristics of individuals at these varying levels of readiness. Individuals who are presently unwilling to use PrEP may respond best to interventions that invite them to think about PrEP without substantial pressure to initiate it immediately while simultaneously providing HIV risk education and correcting PrEP misinformation (e.g., about its efficacy). Merely inducing these individuals to think about why they do not want to use PrEP may increase their openness to considering why, when, or under what circumstances they might find PrEP useful. In contrast, those who are hypothetically willing to take PrEP but have no plans to do so may be most receptive to balanced presentations of information—approaches that acknowledge both the risks and benefits of PrEP while emphasizing potential relevance to the individual's life and addressing specific identified barriers may help these individuals resolve their ambivalence around PrEP. Finally, those intending to take PrEP may respond to interventions that provide information about and help to facilitate direct action (e.g., ads that list PrEP providers or provide information about taking steps to get on PrEP).

Limitations

Although the current approach had many strengths, there are also limitations worth noting. First, while this is a national sample that was recruited in such a way that was closely representative of the U.S. population of same-sex households, it may also be limited by this approach. For example, this sample was not recruited based on risk factors and thus are not all appropriate candidates for PrEP. In addition, because it was designed to represent the U.S., it underemphasizes certain groups, such as men of color, who are disproportionately affected by HIV and for whom PrEP may be most helpful. The data on PrEP were collected as part of an optional, standalone survey conducted six months after the baseline. Although this is a strength in that it allowed for examining longitudinal rather than cross-sectional associations, it may be that variables such as sexual risk or substance use changed within the six month period and these changes were unable to be modeled within the current analyses. The questions regarding hypothetical willingness and behavioral intentions to take PrEP differed in ways that went beyond a simple difference in asking about hypothetical versus actual likelihood to take PrEP. Although we considered it a strength that the hypothetical willingness description included a more ideal scenario (e.g., PrEP as free) while the behavioral intentions was more real world (e.g., PrEP is likely to be covered by insurance), future studies are needed to systematically vary only the aspects of willingness versus intentions to identify to what extent these constructs alone differ. Finally, as with many behavioral studies, the majority of the variables examined were self-reported, and thus are limited by the biases inherent to such an approach.

Conclusions

The current study demonstrated a clear distinction between willingness to take PrEP and behavioral intentions to do so. We also found that men who are at the highest risk for HIV infection—men of color, young men, those from low socioeconomic status, and those from the south—also had the highest willingness and intentions to begin PrEP, though paradoxically are least likely to have access to PrEP. Taken together, we believe that these two findings help to explain the relatively slow uptake of PrEP among GBMSM in the U.S. and also provide meaningful targets for intervention development. Specifically, we interpret the findings in light of two prominent theories of health behavior and suggest that intervention techniques such as Motivational Interviewing might be used to help facilitate movement along the spectrum from unwillingness to take PrEP, willingness but lack of intention, intentions to begin PrEP, and eventual PrEP initiation. However, structural interventions and policy changes are also needed to increase access to PrEP among those who need it most (and already have high interest in it). Future research is needed that continues to distinguish between hypothetical willingness to take PrEP and behavioral intentions to do so and longitudinally examines predictors of movement across the spectrum from PrEP unwillingness all the way to initiation and maintenance of a PrEP regimen.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

The *One Thousand Strong* study was funded by a research grant from the National Institute on Drug Abuse (R01-DA036466: Jeffrey T. Parsons & Christian Grov, MPIs). H. Jonathon Rendina was supported by a Career Development Award from the National Institute on Drug Abuse (K01-DA039030). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The authors have no other disclosures.

Portions of this manuscript were presented at the 10th International Conference on HIV Treatment and Prevention Adherence of the International Association of Providers in AIDS Care (IAPAC), June 30, 2015, and the 143rd Annual Meeting of the American Public Health Association (APHA), November 3, 2015.

The authors would like to acknowledge the contributions of the other members of the *One Thousand Strong* Study Team (Ana Ventuneac, Demetria Cain, Mark Pawson, Michael Castro, Ruben Jimenez, Chloe Mirzayi, Brett Millar, Raymond Moody, and Jonathan Lassiter) and other staff from the Center for HIV/AIDS Educational Studies and Training (Chris Hietikko, Andrew Cortopassi, Brian Salfas, Doug Keeler, Qurrat-Ul Ain, Chris Murphy, and Carlos Ponton). We would also like to thank the staff at Community Marketing Inc. (David Paisley, Heather Torch, and Thomas Roth) as well as Patrick Sullivan, Jessica Ingersoll, Deborah Abdul-Ali, and Doris Igwe at the Emory Center for AIDS Research (P30-AI050409). Finally, we thank Jeffrey Schulden at NIDA and all of our participants in the *One Thousand Strong* study.

References

- Aghaizu A, Mercey D, Copas A, Johnson AM, Hart G, Nardone A. Who would use PrEP? Factors associated with intention to use among MSM in London: a community survey. *Sexually Transmitted Infections*. 2013; 89:207–211. [PubMed: 23015689]
- Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991; 50:179–211.
- Ajzen, I.; Fishbein, M. *Understanding Attitudes and Predicting Social Behavior*. Prentice Hall; Upper Saddle River: 1980.

- Al-Tayyib AA, Thrun MW, Haukoos JS, Walls NE. Knowledge of pre-exposure prophylaxis (PrEP) for HIV prevention among men who have sex with men in Denver, Colorado. *AIDS and Behavior*. 2014; 18:340–347. [PubMed: 23824227]
- Albarracín D, Johnson BT, Fishbein M, Muellerleile PA. Theories of reasoned action and planned behavior as models of condom use: a meta-analysis. *Psychological Bulletin*. 2001; 127:142. [PubMed: 11271752]
- Anderson PL, Glidden DV, Liu A, Buchbinder S, Lama JR, Guanira JV, et al. Emtricitabine-tenofovir concentrations and pre-exposure prophylaxis efficacy in men who have sex with men. *Science Translational Medicine*. 2012; 4:151ra125–151ra125.
- Ayala G, Makofane K, Santos G-M, Beck J, Do TD, Hebert P, et al. Access to basic HIV-related services and PrEP acceptability among men who have sex with men worldwide: barriers, facilitators, and implications for combination prevention. *Journal of Sexually Transmitted Diseases*. 2013; 2013:2013.
- 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 and STDs*. 2010; 24:689–691. [PubMed: 20863247]
- Berger BE, Ferrans CE, Lashley FR. Measuring stigma in people with HIV: psychometric assessment of the HIV Stigma scale. *Research in Nursing and Health*. 2001; 24:518–529. [PubMed: 11746080]
- Brooks RA, Landovitz RJ, Kaplan RL, Lieber E, Lee S-J, Barkley TW. Sexual risk behaviors and acceptability of HIV pre-exposure prophylaxis among HIV-negative gay and bisexual men in serodiscordant relationships: a mixed methods study. *AIDS patient care and STDs*. 2012; 26:87–94. [PubMed: 22149764]
- Calderon Y, Leider J, Cowan E, Brusalis C, Mantell J, Sandfort T. HIV pre-exposure prophylaxis (PrEP)-knowledge and attitudes among a New York City emergency department patient population. *Retrovirology*. 2012; 9:P94.
- CDC. Estimated HIV Incidence in the United States, 2007–2010. *HIV Surveillance Supplemental Report*. 2012; 17.
- CDC. US Department of Health and Human Services; Atlanta: 2015. *HIV Surveillance – Epidemiology of HIV Infection (through 2013)*.
- Galea JT, Kinsler JJ, Salazar X, Lee S-J, Giron M, Sayles JN, et al. Acceptability of pre-exposure prophylaxis as an HIV prevention strategy: barriers and facilitators to pre-exposure prophylaxis uptake among at-risk Peruvian populations. *International Journal of STD and AIDS*. 2011; 22:256–262. [PubMed: 21571973]
- Galindo GR, Walker J, Hazelton P, Lane T, Steward WT, Morin SF. Community member perspectives from transgender women and men who have sex with men on pre-exposure prophylaxis as an HIV prevention strategy: implications for implementation. *Implementation Science*. 2012; 7:116. [PubMed: 23181780]
- Gallagher T, Link L, Ramos M, Bottger E, Aberg J, Daskalakis D. Self-perception of HIV risk and candidacy for pre-exposure prophylaxis among men who have sex with men testing for HIV at commercial sex venues in New York City. *LGBT Health*. 2014; 1:218–224. [PubMed: 26789715]
- Gamarel KE, Golub SA. Intimacy motivations and pre-exposure prophylaxis (PrEP) adoption intentions among HIV-negative men who have sex with men (MSM) in romantic relationships. *Annals of Behavioral Medicine*. 2014; 49:177–186.
- Golub SA, Gamarel KE, Rendina HJ, Surace A, Lelutiu-Weinberger CL. From efficacy to effectiveness: facilitators and barriers to PrEP acceptability and motivations for adherence among MSM and transgender women in New York City. *AIDS Patient Care and STDs*. 2013; 27:248–254. [PubMed: 23565928]
- Golub SA, Kowalczyk W, Weinberger CL, Parsons JT. Preexposure prophylaxis and predicted condom use among high-risk men who have sex with men. *Journal of acquired immune deficiency syndromes (1999)*. 2010; 54:548. [PubMed: 20512046]
- Golub SA, Starks TJ, Payton G, Parsons JT. The critical role of intimacy in the sexual risk behaviors of gay and bisexual men. *AIDS and Behavior*. 2012; 16:626–632. [PubMed: 21630012]
- Grant, RM. International Association of Providers of AIDS Care; Dissemination of PrEP Innovations; Paris, France. 2015.

- Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*. 2010; 363:2587–2599. [PubMed: 21091279]
- Grov C, Cain D, Rendina HJ, Ventuneac A, Parsons JT. Characteristics Associated With Urethral and Rectal Gonorrhea and Chlamydia Diagnoses in a US National Sample of Gay and Bisexual Men: Results From the One Thousand Strong Panel. *Sexually Transmitted Diseases*. 2016a; 43:165–171. [PubMed: 26859803]
- Grov C, Cain D, Whitfield TH, Rendina HJ, Pawson M, Ventuneac A, et al. Recruiting a US National sample of HIV-negative gay and bisexual men to complete at-home self-administered HIV/STI testing and surveys: challenges and opportunities. *Sexuality Research and Social Policy*. 2016b; 13:1–21. [PubMed: 26858776]
- Grov C, Whitfield TH, Rendina HJ, Ventuneac A, Parsons JT. Willingness to Take PrEP and Potential for Risk Compensation Among Highly Sexually Active Gay and Bisexual Men. *AIDS and Behavior*. 2015:1–11. [PubMed: 24668254]
- Herbenick D, Reece M, Schick V, Sanders SA, Dodge B, Fortenberry JD. Sexual behavior in the United States: results from a national probability sample of men and women ages 14–94. *The journal of sexual medicine*. 2010; 7:255–265. [PubMed: 21029383]
- Holt M, Murphy DA, Callander D, Ellard J, Rosengarten M, Kippax SC, et al. Willingness to use HIV pre-exposure prophylaxis and the likelihood of decreased condom use are both associated with unprotected anal intercourse and the perceived likelihood of becoming HIV positive among Australian gay and bisexual men. *Sexually Transmitted Infections*. 2012
- Khawcharoenporn T, Kendrick S, Smith K. HIV risk perception and preexposure prophylaxis interest among a heterosexual population visiting a sexually transmitted infection clinic. *AIDS Patient Care and STDs*. 2012; 26:222–233. [PubMed: 22404427]
- King HL, Keller SB, Giancola MA, Rodriguez DA, Chau JJ, Young JA, et al. Pre-Exposure Prophylaxis Accessibility Research and Evaluation (PrEPARE Study). *AIDS and Behavior*. 2014; 18:1722–1725. [PubMed: 25017425]
- Kuhns LM, Reisner SL, Mimiaga MJ, Gayles T, Shelendich M, Garofalo R. Correlates of PrEP Indication in a Multi-Site Cohort of Young HIV-Uninfected Transgender Women. *AIDS and Behavior*. 2015:1–8. [PubMed: 24668254]
- Liu AY, Cohen SE, Vittinghoff E, Anderson PL, Doblecki-Lewis S, Bacon O, et al. Preexposure prophylaxis for HIV infection integrated with municipal-and Community-based sexual health services. *JAMA internal medicine*. 2015:1–11.
- Mera, R.; McCallister, S.; Palmer, B.; Mayer, G.; Magnuson, D.; Rawlings, K. Truvada (TVD) for HIV pre-exposure prophylaxis (PrEP) utilization in the United States (2013–2015) 21st International AIDS Conference Durban; Africa. 2016.
- Mermin J. HIV Guidelines Updated: Four Groups That Should Receive PrEP. 2014
- Miller, WR.; Rollnick, S. Motivational interviewing: Helping people change. Guilford press; 2012.
- Mimiaga MJ, Case P, Johnson CV, Safren SA, Mayer KH. Preexposure antiretroviral prophylaxis attitudes in high-risk Boston area men who report having sex with men: limited knowledge and experience but potential for increased utilization after education. *Journal of acquired immune deficiency syndromes (1999)*. 2009; 50:77–83. [PubMed: 19295337]
- 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 and Behavior*. 2013; 17:2173–2179. [PubMed: 23128980]
- Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *American Journal of Health Promotion*. 1997; 12:38–48. [PubMed: 10170434]
- Purcell DW, Johnson CH, Lansky A, Prejean J, Stein R, Denning P, et al. Estimating the population size of men who have sex with men in the United States to obtain HIV and syphilis rates. *Open AIDS Journal*. 2012; 6:98–107. [PubMed: 23049658]
- Saberi P, Gamarel KE, Neilands TB, Comfort M, Sheon N, Darbes LA, et al. Ambiguity, Ambivalence, and Apprehensions of Taking HIV-1 Pre-Exposure Prophylaxis among Male Couples in San Francisco: A Mixed Methods Study. *PLoS ONE*. 2012; 7:e50061. [PubMed: 23166819]

- Sheeran P, Orbell S. Do intentions predict condom use? Meta-analysis and examination of six moderator variables. *British Journal of Social Psychology*. 1998; 37:231–252. [PubMed: 9639864]
- Sheeran P, Taylor S. Predicting Intentions to Use Condoms: A Meta-Analysis and Comparison of the Theories of Reasoned Action and Planned Behavior1. *Journal of Applied Social Psychology*. 1999; 29:1624–1675.
- 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 Education and Prevention*. 2012; 24:408. [PubMed: 23016502]
- Smith DK, Van Handel M, Wolitski RJ, Stryker JE, Hall HI, Prejean J, et al. Vital signs: estimated percentages and numbers of adults with indications for preexposure prophylaxis to prevent HIV acquisition—United States, 2015. *MMWR Morb Mortal Wkly Rep*. 2015; 64:1291–1295. [PubMed: 26606148]
- Starks TJ, Castro MA, Miller BM, Castiblanco JP. Modeling interpersonal correlates of condomless anal sex among gay and bisexual men: An application of attachment theory. *Archives of Sexual Behavior*. in press.
- Starks TJ, Payton G, Golub SA, Weinberger CL, Parsons JT. Contextualizing condom use: Intimacy Interference, stigma, and unprotected sex. *Journal of Health Psychology*. 2014; 19:711–720. [PubMed: 23520349]
- Starks TJ, Rendina HJ, Breslow AS, Parsons JT, Golub SA. The psychological cost of anticipating HIV stigma for HIV-negative gay and bisexual men. *AIDS and Behavior*. 2013; 17:2732–2741. [PubMed: 23420102]
- USFDA. FDA approves first drug for reducing the risk of sexually acquired HIV infection. 2012
- Volk JE, Marcus JL, Phengrasamy T, Blechinger D, Nguyen DP, Follansbee S, et al. No new HIV infections with increasing use of HIV preexposure prophylaxis in a clinical practice setting. *Clinical Infectious Diseases*. 2015; 61:1601–1603. [PubMed: 26334052]
- Webb TL, Sheeran P. Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*. 2006; 132:249. [PubMed: 16536643]

Research Highlights

- We compared hypothetical willingness and behavioral intentions to take PrEP
- Many more people were hypothetically willing to take PrEP than intended to take it
- Intending to begin PrEP was most common among men most at risk for HIV
- Paradoxically, men intending to begin PrEP were those with the least access to it
- The willingness-intentions discrepancy make help explain low rates of PrEP uptake

Table 1

Demographic and structural characteristics and their associations with willingness to take and intentions to initiate PrEP.

	PrEP Willingness and Intentions								$\chi^2(df)$
	Full Sample (N = 880)		Unwilling (n = 375)		Willing (n = 365)		Intending (n = 140)		
	n	%	n	%	n	%	n	%	
Race/ethnicity									22.0 (6)***
Black	62	7.0	20	32.3	23	37.1	19	30.6	
Latino	111	12.6	44	39.6	51	45.9	16	14.4	
White	634	72.0	290	45.7	257	40.5	87	13.7	
Other/multiracial	73	8.3	21	28.8	34	46.6	18	24.7	
Sexual Orientation									0.3 (2)
Gay	837	95.1	358	42.8	347	41.5	132	15.8	
Bisexual	43	4.9	17	39.5	18	41.9	8	18.6	
Education									29.9 (4)***
High school degree or less	64	7.3	12	18.8	31	48.4	21	32.8	
Some college or Associate's degree	323	36.7	125	38.7	144	44.6	54	16.7	
Bachelor's degree or more	493	56.0	238	48.3	190	38.5	65	13.2	
Income									27.4 (6)***
Less than \$20k per year	176	20.0	55	31.3	80	45.5	41	23.3	
\$20k to \$49k per year	294	33.4	113	38.4	132	44.9	49	16.7	
\$50k to \$74k per year	166	18.9	77	46.4	68	41.0	21	12.7	
\$75k or more per year	244	27.7	130	53.3	85	34.8	29	11.9	
Geographic Region									14.6 (6)*
Northeast	172	19.5	80	46.5	64	37.2	28	16.3	
Midwest	152	17.3	78	51.3	58	38.2	16	10.5	
South	309	35.1	109	35.3	141	45.6	59	19.1	
West	247	28.1	108	43.7	102	41.3	37	15.0	
Relationship Status									31.0 (2)***
Single	450	51.1	155	34.4	201	44.7	94	20.9	
Partnered	430	48.9	220	51.2	164	38.1	46	10.7	
Health Insurance									2.5 (2)
No	79	9.0	27	34.2	38	48.1	14	17.7	
Yes	801	91.0	348	43.3	327	40.8	126	15.7	
Primary Care Provider									4.81 (4)
No	224	25.5	82	36.6	104	46.4	38	17.0	
Yes, not "out" to PCP	134	15.2	58	43.3	56	41.8	20	14.9	
Yes, "out" to PCP	522	59.3	235	45.0	205	39.3	82	15.7	
	M	SD	M	SD	M	SD	M	SD	F(2, 877)

	PrEP Willingness and Intentions								
	Full Sample (<i>N</i> = 880)		Unwilling (<i>n</i> = 375)		Willing (<i>n</i> = 365)		Intending (<i>n</i> = 140)		$\chi^2(df)$
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Age (<i>Mdn</i> = 39.0)	40.6	13.9	43.1	13.5	39.7	14.2	36.2	12.9	14.0 ***

Note. Row percentages are displayed.

* *p* = 0.05.

** *p* = 0.01.

*** *p* = 0.001.

Table 2

PrEP-specific and behavioral characteristics and their associations with willingness to take and intentions to initiate PrEP.

	PrEP Willingness and Intentions									$\chi^2(df)$
	Full Sample (<i>N</i> = 880)		Unwilling (<i>n</i> = 375)		Willing (<i>n</i> = 365)		Intending (<i>n</i> = 140)			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Perceived Efficacy of PrEP										43.1 (8) ***
More than 90%	289	32.8	96	33.2	120	41.5	73	25.3		
75-89%	183	20.8	73	39.9	82	44.8	28	15.3		
50-74%	99	11.3	45	45.5	40	40.4	14	14.1		
Less than 50%	37	4.2	20	54.1	12	32.4	5	13.5		
Unsure	272	30.9	141	51.8	111	40.8	20	7.4		
Appropriate Candidate for PrEP										279.7 (4) ***
No	319	36.3	234	73.4	80	25.1	5	1.6		
Yes	326	37.0	48	14.7	166	50.9	112	34.4		
Unsure	235	26.7	93	39.6	119	50.6	23	9.8		
Has Potential PrEP Provider										23.6 (2) ***
No	337	38.3	109	32.3	166	49.3	62	18.4		
Yes	543	61.7	266	49.0	199	36.6	78	14.4		
Sexual HIV Transmission Risk										54.5 (2) ***
No	555	63.1	287	51.7	203	36.6	65	11.7		
Yes	325	36.9	88	27.1	162	49.8	75	23.1		
STI Diagnosis										8.2 (2) *
No	825	93.8	360	43.6	340	41.2	125	15.2		
Yes	55	6.3	15	27.3	25	45.5	15	27.3		
Club Drug Use										0.8 (2)
No	836	95.0	358	42.8	347	41.5	131	15.7		
Yes	44	5.0	17	38.6	18	40.9	9	20.5		

Note. Row percentages are displayed.

* p 0.05.

** p 0.01.

*** p 0.001.

Table 3
Psychological factors and their associations with willingness to take and intentions to initiate PrEP.

	PrEP Willingness and Intentions									
	Full Sample (N = 880)		Unwilling (n = 375)		Willing (n = 365)		Intending (n = 140)			
	M	SD	M	SD	M	SD	M	SD	F(2, 877)	
Condom Use Motivations - Risk Reduction	4.14	0.83	4.12	0.87	4.15	0.82	4.17	0.77		0.20
Condom Non-Use Motivations - Intimacy Interference	2.16	0.95	2.09	0.95	2.19	0.93	2.27	0.97		2.08
Condom Non-Use Motivations - Pleasure Reduction	2.95	1.12	2.87	1.13	3.01	1.09	3.01	1.17		1.67
Condom Non-Use Motivations - Sexual Pressure	1.76	0.79	1.72	0.81	1.75	0.73	1.87	0.86		2.09
Anticipated HIV Stigma	2.62	0.62	2.60	0.59	2.63	0.63	2.62	0.70		0.22
Barriers - Health Consequences	3.07	0.72	3.22	0.69	2.98	0.72	2.87	0.74	16.59***	
Barriers - Social Stigma	1.70	0.75	1.72	0.75	1.69	0.73	1.68	0.80		0.18
Barriers - Provider Concerns	1.92	0.99	1.75	0.91	2.05	1.01	2.08	1.07	10.90***	

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

Table 4

Results of a multinomial logistic regression predicting PrEP intentions.

	Intending (Reference: Unwilling)			Intending (Reference: Willing)		
	<i>B</i>	<i>SE</i>	<i>AOR</i>	<i>B</i>	<i>SE</i>	<i>AOR</i>
<u>Categorical Predictors</u>						
Race/ethnicity (Ref: White)						
Black	0.70	0.47	2.01	0.65	0.38	1.91
Latino	-0.30	0.40	0.74	-0.20	0.35	0.82
Other/multiracial	0.98	0.44	2.66 [*]	0.46	0.36	1.59
Bisexual Orientation (Ref: Gay)	0.18	0.60	1.20	0.09	0.50	1.09
Education (Ref: Bachelor's or more)						
High school degree or less	1.83	0.51	6.24 ^{***}	0.78	0.38	2.17 [*]
Some college or Associate's degree	0.28	0.28	1.33	0.08	0.25	1.08
Income (Ref: Less than \$20k per year)						
\$20k to \$74k per year	-0.49	0.35	0.62	-0.22	0.28	0.81
\$75k or more per year	-0.82	0.42	0.44 [*]	-0.23	0.36	0.79
Geographic Region (Ref: South)						
Northeast	-0.33	0.35	0.72	0.01	0.30	1.01
Midwest	-0.88	0.40	0.42 [*]	-0.34	0.36	0.71
West	-0.47	0.32	0.62	-0.11	0.28	0.90
Partnered Relationship Status (Ref: Single)	-0.57	0.28	0.57	-0.44	0.24	0.65
Health Insurance (Ref: No)	0.20	0.48	1.22	0.26	0.39	1.30
Primary Care Provider (Ref: No)						
Yes, not "out" to PCP	-0.32	0.44	0.72	-0.08	0.38	0.93
Yes, "out" to PCP	0.36	0.34	1.44	0.30	0.29	1.35
Perceived Efficacy of PrEP (Ref: Unsure)						
90% or more	0.97	0.36	2.65 ^{**}	0.75	0.32	2.11 [*]
Less than 90%	0.67	0.35	1.96	0.51	0.32	1.66
Appropriate Candidate for PrEP (Ref: Unsure)						
Yes	1.86	0.33	6.43 ^{***}	1.01	0.29	2.76 ^{***}
No	-2.33	0.53	0.97 ^{***}	-1.10	0.53	0.33 [*]
Has Potential PrEP Provider (Ref: No)	-0.30	0.31	0.74	0.06	0.27	1.06
Sexual HIV Transmission Risk (Ref: No)	0.41	0.28	1.50	-0.02	0.24	0.98
STI Diagnosis (Ref: No)	0.59	0.50	1.80	0.29	0.38	1.34
Club Drug Use (Ref: No)	-0.62	0.56	0.54	-0.15	0.46	0.86
<u>Continuous Predictors</u>						
Age	0.00	0.01	1.00	-0.01	0.01	0.99
Condom Use Motivations - Risk Reduction	0.22	0.12	1.24	0.03	0.16	1.03
Condom Non-Use Motivations - Intimacy						
Interference	0.13	0.20	1.14	0.01	0.17	1.01

	Intending (Reference: Unwilling)			Intending (Reference: Willing)		
	<i>B</i>	<i>SE</i>	<i>AOR</i>	<i>B</i>	<i>SE</i>	<i>AOR</i>
Condom Non-Use Motivations - Pleasure Reduction	-0.08	0.15	0.93	-0.11	0.14	0.89
Condom Non-Use Motivations - Sexual Pressure	0.43	0.22	1.54 *	0.38	0.19	1.46 *
Anticipated HIV Stigma	-0.12	0.24	0.89	-0.06	0.21	0.94
Barriers - Health Consequences	-0.63	0.19	0.53 ***	-0.16	0.16	0.85
Barriers - Social Stigma	-0.28	0.23	0.75	-0.02	0.20	0.98
Barriers - Provider Concerns	0.51	0.18	1.66 **	0.09	0.15	1.09

*
p 0.05.

**
p 0.01.

p 0.001.