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### Motivators, concerns, and barriers to adoption of preexposure prophylaxis for HIV prevention among gay and bisexual men in HIV-serodiscordant male relationships

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## Motivators, concerns, and barriers to adoption of preexposure prophylaxis for HIV prevention among gay and bisexual men in HIV-serodiscordant male relationships

Ronald A. Brooks<sup>a\*</sup>, Rachel L. Kaplan<sup>b</sup>, Eli Lieber<sup>c</sup>, Raphael J. Landovitz<sup>d</sup>, Sung-Jae Lee<sup>e</sup> and Arleen A. Leibowitz<sup>f</sup>

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The purpose of this study was to identify factors that may facilitate or impede future adoption of preexposure prophylaxis (PrEP) for HIV prevention among gay and bisexual men in HIV-serodiscordant relationships. This qualitative study utilized semistructured interviews conducted with a multiracial/-ethnic sample of 25 gay and bisexual HIV-serodiscordant male couples ( $n = 50$  individuals) recruited from community settings in Los Angeles, CA. A modified grounded theory approach was employed to identify major themes relating to future adoption of PrEP for HIV prevention. Motivators for adoption included protection against HIV infection, less concern and fear regarding HIV transmission, the opportunity to engage in unprotected sex, and endorsements of PrEP's effectiveness. Concerns and barriers to adoption included the cost of PrEP, short- and long-term side effects, adverse effects of intermittent use or discontinuing PrEP, and accessibility of PrEP. The findings suggest the need for a carefully planned implementation program along with educational and counseling interventions in the dissemination of an effective PrEP agent.

**Keywords:** preexposure prophylaxis; biomedical strategy; HIV prevention; gay men; bisexual men; racial/ethnic minority

### Introduction

Preexposure prophylaxis (PrEP) is a biomedical approach to HIV prevention that involves daily use of existing HIV antiretroviral medications by uninfected individuals as a means of reducing their risk of HIV infection. Results of the first efficacy trial found that daily use of tenofovir plus emtricitabine (Truvada) reduced the risk of HIV infection among men who have sex with men (MSM) by 44% and among participants with greater adherence to the daily regimen by 74% (Grant et al., 2010). Additional PrEP trials are evaluating the safety and efficacy of two HIV antiretroviral medications, tenofovir and Truvada, with other high-risk populations (AVAC, 2009).

The population-level effectiveness of PrEP will depend on its acceptability, accessibility, adoption, and sustainability as part of a comprehensive HIV prevention strategy. Without these essential components, even the most highly efficacious PrEP medication will have little impact in reducing HIV infections. To date, little research has focused on the social and behavioral issues associated with PrEP adoption. Previous studies focused on PrEP knowledge and

use of PrEP (Kellerman et al., 2004; Liu et al., 2008) and attitudes and potential use of PrEP among MSM (Mimiaga, Case, Johnson, Safren, & Mayer, 2009; Nodin, Carballo-Diéguez, Ventuneac, Balan, & Remien, 2008). Despite these studies, a gap exists in knowledge regarding potential adoption of PrEP among gay and bisexual men (GBM) in HIV-serodiscordant relationships, a specific target population for any future PrEP medication (Paxton, Hope, & Jaffe, 2007). As such, the goal of this study was to identify factors that may contribute to or hinder PrEP adoption by GBM in HIV-serodiscordant relationships. The study focused on a hypothetical PrEP medication that was proven safe and efficacious, and was ready for dissemination. The analysis focused on the individual perspectives of partners and their perceptions of PrEP as a potential HIV prevention tool.

### Methods

#### Participants

A purposive sample of 25 gay and bisexual HIV-serodiscordant male couples ( $n = 50$  individuals)

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residing in Los Angeles, CA, was recruited from local AIDS service organizations and screened over the phone to determine eligibility. Inclusion criteria specified that participants be male partners, at least 18 years of age, in an HIV-serodiscordant relationship, and that they had been together for a minimum of 12 months. Eligible and interested couples were scheduled for an interview. After providing informed consent, each partner participated, individually, in an in-depth interview lasting approximately 90 min. Participants were remunerated \$30 for their participation. The University of California, Los Angeles Institutional Review Board approved the study. Interviews were conducted by the first author, an experienced qualitative interviewer and co-investigator of the study.

### **Data collection**

Before each interview began, participants were provided with an explanation of the concept of PrEP followed by a description of how PrEP would be used to prevent HIV infection (i.e., daily use of an existing HIV medication). Participants were asked to confirm that they understood how PrEP would be used in HIV prevention, and any misunderstandings or questions were addressed.

A semistructured interview guide was used to gather information on participants' current safer sex practices and their opinion of a hypothetical PrEP medication that was shown to be 90% effective in preventing HIV infection. A list of interview questions and probes is included in Appendix 1. After the interview, a brief survey was administered to gather demographic characteristics and information on sexual behaviors.

### **Data analysis**

Digitally recorded interviews were transcribed verbatim. Transcripts were checked for accuracy and then uploaded into EthnoNotes, a web-based application for managing, integrating, and analyzing qualitative and mixed methods data (Sociocultural Research Consultants, Los Angeles, CA).

A modified grounded theory approach was employed to identify themes (Braun & Clarke, 2006; Strauss & Corbin, 1998) that might help explain and predict future uptake of PrEP among GBM in serodiscordant relationships. An extensive list of codes and their definitions was derived from the interview guide, interviewer field notes, and multiple readings of the transcripts. For example, the code "safer sex" was derived from the first question about methods used to prevent HIV transmission and was defined as what respondents are currently doing or

not doing to protect themselves or their partner from becoming infected with HIV. The coding team, consisting of the first author and a master's-level researcher, reviewed and discussed the codes and identified exemplar text associated with each code. The coders then independently coded two interviews. An intercoder reliability score was computed for the pretest (Cohen's Kappa statistic,  $k = 0.94$ ). The coding team then met again to discuss discrepancies in their coding and to reach consensus on the final list of codes. The coding team then coded two additional interviews and achieved an intercoder reliability score of  $k = 0.93$  for the final codes. All codes were entered into EthnoNotes and tagged to their associated segments of text for all interviews. Text segments were then sorted into general categories and were reviewed by the coding team to identify emergent themes and to identify recurring patterns of responses to assess prevalence of themes. The results represent findings organized by the final themes identified in the analysis. Differences based on HIV status are noted throughout the results.

Survey data were analyzed using SPSS statistical software. Descriptive statistics were used to describe the overall sample, and chi-square statistics were used to assess associations between HIV status and demographic characteristics and sexual behaviors.

### **Results**

A demographic and sexual behavior profile of study participants is provided in Table 1. Significant differences were noted by HIV status in employment, income, and insurance type. For sexual behaviors, a larger percentage (44%) of HIV-negative participants reported sex outside of their relationship. Significant differences were also noted by HIV status in receptive and insertive anal intercourse with current partner.

#### **Safer sex practices**

HIV prevention strategies among participants ranged from strict adherence to safer sex practices, to more unconventional harm reduction strategies (e.g., strategic positioning), to a complete disregard for HIV prevention. For the majority (56%) of participants, condom use was their primary prevention strategy. These participants perceived condoms as a necessary tool when engaging in sex with their serodiscordant partner. For others, a harm reduction strategy was employed; this included strategic positioning and withdrawal. For a few men, condoms were completely disregarded. Table 2 includes participant quotes describing these strategies.

Table 1. Sociodemographic characteristics and sexual behaviors of participants by HIV status ( $n = 50$ ).

Characteristics	HIV status		Total ( $n = 50$ ), $n$ (%)
	Negative ( $n = 25$ ), $n$ (%)	Positive ( $n = 25$ ), $n$ (%)	
Age: Mean (SD)	37.3 (10.8)	39.2 (7.9)	38.2 (9.4)
Race/ethnicity			
Hispanic/Latino	8 (32%)	7 (28%)	15 (30%)
White/Caucasian	5 (20%)	6 (24%)	11 (22%)
Black/African American	10 (40%)	8 (32%)	18 (26%)
Mixed race, Asian/Pacific Islander, and American Indian	2 (8%)	6 (12%)	6 (12%)
Education			
Less than high school	3 (12%)	7 (28%)	10 (20%)
High school diploma/GED	6 (24%)	6 (24%)	12 (24%)
Some college/college degree	16 (64%)	12 (48%)	28 (56%)
Sexual orientation			
Gay/homosexual	19 (76%)	16 (64%)	35 (70%)
Bisexual	6 (24%)	8 (36%)	14 (30%)
Relationship in months: Mean (SD)	40.6 (54.5)	41.8 (54.5)	41.2 (54.0)
Employment status <sup>a</sup>			
Working (full time or part time)	10 (40%)	3 (12%)	13 (26%)
Permanent disability	3 (12%)	13 (52%)	16 (32%)
Unemployed	9 (36%)	7 (28%)	16 (32%)
Retired or other	3 (12%)	2 (8%)	5 (10%)
Annual income <sup>b</sup>			
\$0–\$19,999	14 (56%)	21 (84%)	35 (70%)
> \$20,000	11 (44%)	4 (16%)	15 (30%)
Insurance coverage	14 (56%)	15 (60%)	29 (58%)
Insurance type <sup>c</sup>			
Private insurance or HMO	8 (32%)	0 (0%)	8 (16%)
Medicaid/Medicare	6 (24%)	15 (60%)	21 (42%)
No insurance	11 (44%)	10 (40%)	21 (42%)
Seen by a doctor in the past 12 months	21 (84%)	25 (100%)	46 (92%)
<b>Sexual behaviors in past six months</b>			
Sex outside of relationship			
Yes	11 (44%)	6 (24%)	17 (34%)
Used condom last time receptive partner in anal sex with casual partner			
Yes	3 (12%)	0 (0%)	3 (6%)
No	3 (12%)	2 (8%)	5 (10%)
Did not engage in receptive anal sex	19 (76%)	23 (92%)	42 (84%)
Used condom last time receptive partner in anal sex with current partner <sup>d</sup>			
Yes	6 (24%)	11 (44%)	17 (34%)
No	5 (20%)	9 (36%)	14 (28%)
Did not engage in receptive anal sex	14 (56%)	5 (20%)	19 (38%)
Used condom last time insertive partner in anal sex with casual partner			
Yes	4 (16%)	2 (8%)	6 (12%)
No	6 (24%)	2 (8%)	8 (16%)
Did not engage in insertive anal sex	15 (60%)	21 (84%)	36 (72%)

Table 1 (Continued)

Characteristics	HIV status		
	Negative ( <i>n</i> = 25), <i>n</i> (%)	Positive ( <i>n</i> = 25), <i>n</i> (%)	Total ( <i>n</i> = 50), <i>n</i> (%)
Used condom last time insertive partner in anal sex with current partner <sup>e</sup>			
Yes	9 (36%)	6 (24%)	15 (30%)
No	12 (48%)	6 (24%)	18 (36%)
Did not engage in insertive anal sex	4 (16%)	13 (52%)	17 (34%)

<sup>a</sup>  $\chi^2 = 10.47, p = 0.02.$

<sup>b</sup>  $\chi^2 = 4.67, p = 0.03.$

<sup>c</sup>  $\chi^2 = 11.90, p = 0.003.$

<sup>d</sup>  $\chi^2 = 6.88, p = 0.03.$

<sup>e</sup>  $\chi^2 = 7.37, p = 0.03.$

### Motivators for PrEP adoption

Participants articulated four distinct motivators for adoption of PrEP; each is described in the following subsections. Table 3 includes sample participant quotes exemplifying each of these motivators.

#### Protection against HIV

Protection against HIV infection was a primary motivator for future PrEP adoption and was expressed by both HIV-positive and HIV-negative participants. A few participants also suggested that PrEP would provide an additional layer of protection, serving as a backup to their current condom use. Some HIV-positive participants viewed PrEP as a way to protect their partner from the emotional, mental, and physical toll of living with HIV.

#### Reduction in concern and fear regarding HIV transmission

Less concern and fear of possible transmission of HIV during sexual encounters with their serodiscordant partner was another motivator for PrEP adoption expressed by many participants, regardless of HIV status. Participants indicated that PrEP would help decrease the stress associated with having a sexual relationship with an HIV-serodiscordant partner and increase their level of sexual comfort.

#### Unprotected sex

The opportunity to engage in unprotected sex with their serodiscordant partner was articulated by both HIV-positive and HIV-negative participants as an additional motivator for PrEP adoption. For some, PrEP may be seen as a substitute for condoms, offering

Table 2. Participant statements regarding current HIV prevention strategies.

#### Consistent condom use

- With my partner currently we are using condoms anytime we have intercourse. That's about it; we use condoms to protect ourselves. (HIV+, Hispanic, age 21)
- I use condoms. I put um lubricant inside and outside the condom and I try to have as little activity as possible without using condoms. (HIV-, Hispanic, age 31)

#### Strategic positioning and withdrawal

- When I bottom, yes, definitely we do [use condoms]. When I top, sometimes, but not always . . . not so much now when I top. (HIV-, mixed race, age 44)
- Well, I'm the bottom. I don't top him. That's it right now. (HIV+, mixed race, age 26)
- Well, we have unprotected sex, but there is never any ejaculate that goes into him, you know what I mean. I don't cum in him or cum in his mouth, you see, it's just like body shots or whatever. (HIV+, Caucasian, age 33)
- I think the most that I do is to pull out before I cum, or as I'm feeling myself to cum I stop. (HIV+, African America, age 47)

#### Unprotected sex

- To be honest with you, we don't [use condoms]. I have been with him for almost two years now, and I have never had protected sex and I got my blood work yesterday and I am still negative. (HIV-, Hispanic, age 29)
- He is always wanting to have sex, to just have sex, I've asked him to use condoms but he won't use them. (HIV+, African American, age 50)

Table 3. Participant statements regarding motivators for PrEP adoption.

**Protection against HIV**

- I would definitely take it because it would help and hopefully prevent me from ever becoming infected as long as I stay on that regimen. (HIV -, African American, 43)
- I would want him to use it because it gives him a better chance of surviving negative or being negative longer. (HIV +, African American, 47)
- I started off with the condom; I'm kinda like safe with that, I know that will always be there, so a pill would kinda be like a backup. (HIV -, Hispanic, 28)
- I would definitely want my partner to take it because I wouldn't want him to go through the same things that I have to go through. Life gets a lot more difficult, you go through depression, you go through many pains, emotionally and physically. (HIV +, Hispanic, 33)

**Reduction in concern and fear regarding HIV transmission**

- I would be less uptight about the whole idea of having sex with an HIV positive person. (HIV -, Caucasian, 41)
- I would have less concern with it [HIV transmission], you know, if the pill was there. (HIV +, Hispanic, 49)
- I would take it for better sex with my partner and not having the stress on my brain, worried about whether or not we did something wrong and did I contract the virus. (HIV -, African American, 44)

**Unprotected sex**

- I would feel more safe about having unprotected sex with my partner. I wouldn't be so scared about getting infected because I would be taking this pill and I see it on the same level as using condoms, it's a way of protecting yourself. So if my partner has trouble using condoms, then I could use the pill and be just as safe, and that's good, and then we could both enjoy having unprotected sex and not having to deal with the issues we might have using condoms. (HIV-, Caucasian, 26)
- I would probably end up thinking well, after taking it for a while, like a month or two, I would probably feel like okay, I can stop using condoms, because it would've build up in my body apparently. (HIV -, Hispanic, 40)
- I would want to take it so that I don't have to worry about condoms, I don't have to worry about infection, and I can just have sex whenever, wherever, and however I want (HIV -, mixed race, 44)

**Endorsement of PrEP**

- I would actually like to meet somebody that actually took the pill and told me, ok, this is what happens to you, this is what happens to your body, this is how you feel, you might get dizzy. (HIV -, Hispanic, 28)
- Personally, I would wait to get some testimonials from people like in a year or two, or maybe 6 months, or hear someone in the doctor's office say, "I'm on it and I've had sex with people with HIV," or whatever, then I would say, ok. I would take a personal opinion of somebody who has been on it who has had sex and is not infected. (HIV -, mixed race, 44)
- I just don't believe anything I see on TV or in a newspaper. I'd rather hear it from a doctor, in person, one-on-one . . . or therapists, people that are more involved in it. (HIV +, Hispanic, 33)

users a false sense of protection. Still other participants associated PrEP with greater sexual freedom.

***Endorsement of PrEP***

A personal testimonial of PrEP's effectiveness from an existing PrEP user was identified as a motivator for adoption. Some participants indicated that they would "wait and see" what happens when PrEP is implemented in order to gain insight on PrEP from early adopters. Still other participants suggested that PrEP adoption would be more likely if a medical professional they trusted recommended it.

***Concerns and barriers to PrEP adoption***

Participants raised four distinct concerns and potential barriers to PrEP adoption. These are described in

the following subsections. Table 4 includes quotes illustrating these concerns and barriers.

***Cost of PrEP***

Cost emerged as a major barrier to future PrEP adoption for most participants. Participants, regardless of status, recognized that since PrEP will involve use of an HIV medication it will be expensive. To offset its high cost, some participants offered cost-saving strategies they might employ if using PrEP, such as rationing pills or coital dosing. For broad uptake, participants suggested that PrEP would need to be relatively inexpensive compared with other prevention tools.

Because of its presumed high cost, some participants indicated that some type of public assistance program would be necessary in order to make PrEP affordable and that such a program should offer

Table 4. Participant statements regarding concerns and barriers to PrEP adoption.

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**Cost of PrEP**

- The only obstacle I can foresee is financially, depending on the cost of the medication, and if it is an HIV medication, I know its going to be extremely high because most of them are. (HIV+, African American, 47)
- Some of these medications on the market are prohibitive, because they say “they gotta be that much.” Cost probably would be one of the top concerns or issues. (HIV-, Caucasian, 41)
- “Who pays for this thing? I don’t have insurance like that. I have to pay out of my pocket for prescriptions. I’m not gonna. That stuff’s probably expensive. (HIV-, African American, 43)
- I would try to ration my pills. I would get a bottle and I would not take them every day. I would take them probably every time I think I’m gonna use them for sex. (HIV-, African American, 33)
- It would have to be almost the same price as buying condoms for people to really want to use it. (HIV+, African American, 48)

**Need for public assistance programs for PrEP**

- If it’s going to help prevent or decrease the number of infections or whatever, I’m sure there’s going to be some kind of program that will help people that can’t afford to get it. (HIV-, African American, 43)
- I know my partner doesn’t pay for his medication. I would want to know if there was any sort of help like that for negative people. If there was any sort of funding or programs for partners that are negative. (HIV-, Hispanic, 22)

**Side effects**

- The only thing that I would kind of hesitate with is because they are strong chemicals that you’re putting into your body and I don’t know what the side effects would be, or long-term effects. So that would be the only concern about the effects that the chemicals you are putting in your body would have, besides preventing HIV, what else it may do in the long term. (HIV-, Caucasian, 26)
- The reasons why I wouldn’t want him to try it, is to just make sure it’s not going to affect him in any other way, affect his liver or heart or anything like that, or his brain. Sometimes they don’t know the side effects until like 40 years later when they find out that, oh, it’s causing this, it’s causing that. (HIV+, Hispanic, 33)
- I would try it and hope that I don’t get any major side effects that would keep me off of it, not the common headaches and a little diarrhea in the beginning and stuff that will go away, I mean something that would linger. (HIV-, Caucasian, 41).

**Intermittent use and discontinuing PrEP**

- What if you miss a pill, then what happens? Do you have a higher risk of getting infected? (HIV-, Hispanic, 28)
- What type of reaction would it have on me if I stopped taking it, and then I started back on it again if I got with another partner that is HIV positive? (HIV-, African American, 44)
- So I’m thinking, ok, now I’m HIV negative so if I’m taking this every day what is that going to do to me if I stop taking it? (HIV-, Caucasian, 41)

**Accessibility of PrEP**

- How difficult will it be to get a prescription for it? (HIV-, African American, 56)
  - What are the steps I have to go through to get it? I mean, can I just go and say “can I have this pill” to my doctor or pharmacist... What are the requirements, or do I have to jump through hoops to get the pill? (HIV-, mixed race, 44)
  - You would have to get a prescription from a doctor, so that will be annoying. If you go to a doctor and say I need the PrEP pill do you think he’s gonna give them right over to you? He is not going to test you for HIV?. (HIV-, African American, 33)
  - See, that [prescription required for PrEP] would be the thing that would sort of keep us, that would be I guess the demarcation because you can get condoms over-the-counter, but you have to go get a prescription for this, so you have to tell your doctor that you’re sexually active. (HIV+, Hispanic, 49)
- 

PrEP at a discount price or for free to low-income or un/underinsured populations as part of local HIV prevention efforts. This perspective seemed to be influenced by participants’ familiarity with existing public assistance programs such as the AIDS Drug Assistance Program.

*Side effects*

The side effects of PrEP in HIV-negative individuals were raised by many of the participants as a major

concern regarding PrEP adoption. However, in considering future PrEP adoption, participants differentiated between minor side effects that diminish over time and major problems that may surface after long-term use.

*Intermittent use and discontinuing PrEP*

Exclusive to HIV-negative participants was a concern about the effects of missing doses, intermittent use of PrEP, and discontinuing PrEP. One concern was



whether discontinuing PrEP would increase susceptibility to HIV infection.

#### *Accessibility of PrEP*

Participants identified accessibility to PrEP as a possible barrier to adoption. Because PrEP will consist of a prescription medication, participants presumed that it would be a challenge to access, and they expressed concern regarding the requirements or procedures necessary to receive it. A few participants were concerned about the amount of information regarding their sexual behaviors they would have to reveal to a medical provider in order to receive PrEP.

#### *PrEP and PEP knowledge*

At the conclusion of the interview, participants were asked whether they had heard of PrEP before the interview. They were also asked whether they had any knowledge of postexposure prophylaxis (PEP). None of the participants had previously heard of PrEP; two participants had heard of but never used PEP.

### **Discussion**

This investigation revealed a number of motivators for the future adoption of PrEP among racial/ethnic and low-income GBM in HIV-serodiscordant relationships, including protection against HIV infection, less concern and fear regarding HIV transmission, the opportunity to engage in unprotected sex, and endorsements of PrEP's effectiveness. Participants also identified factors that may impede PrEP adoption, including cost, side effects, adverse effects of not using PrEP as prescribed, and accessibility of PrEP by low-income and un/underinsured populations. These findings offer implications in two important areas. First, the findings underscore the importance of developing an educational and behavioral intervention to be provided in conjunction with PrEP in order to support its proper use as a supplemental prevention tool and limit risk compensation. Second, the results offer critical information on potential impediments to PrEP adoption that will need to be addressed as part of any PrEP implementation program.

A significant motivator for PrEP adoption was protection against HIV transmission, either as primary protection or as an added layer of protection. The protection conferred by PrEP may benefit uninfected GBM in HIV-serodiscordant relationships who are at increased risk of infection due to the

potential for multiple sexual exposures over time. Even during protected sexual acts, there is the potential for accidental exposure to HIV resulting from condom breakage or slippage. Estimates of condom breakage during anal intercourse among MSM range from 1.8% to 11%, and estimates of condom slippage range from 3.8% to 15% (Silverman & Gross, 1997). In these instances, PrEP can serve as an added layer of protection. Furthermore, while condoms remain the gold standard for preventing sexual transmission of HIV, the use of PrEP as an interim or short-term method could benefit GBM who are less capable of insisting on condoms with their partner.

A major challenge confronting HIV-serodiscordant gay couples involves an underlying and constant fear of HIV transmission and a struggle to maintain sexual intimacy in the presence of HIV infection (Palmer & Bor, 2001; Remien, Wagner, Dolezal, & Carballo-Diéguez, 2003). Similar to previous findings, participants in this study also reported a persistent concern and fear of HIV transmission. This was coupled with a lack of or decrease in sexual intimacy due to the difference in HIV status of their partner. Accordingly, another motivator for PrEP adoption was that it would lessen the tension and anxiety associated with engaging in sex with an HIV-serodiscordant partner and increase sexual comfort. Thus, an unforeseen advantage of PrEP may be its utility in reducing the psychological distress present in some HIV-serodiscordant relationships.

A concern associated with the future availability of PrEP is behavioral disinhibition and risk compensation (Golub, Kowalczyk, Weinberger, & Parsons, 2010). As noted in this investigation, a significant motivator for PrEP adoption was the opportunity to engage in unprotected sex with their serodiscordant partner. While it is unknown whether behavioral disinhibition or risk compensation will occur with PrEP, it has been shown that uptake of antiretroviral therapy and its associated lower perceived transmission risk led to increases in sexual risk taking among MSM (Crepaz, Hart, & Marks, 2004; Elford, 2006). If behavioral disinhibition does occur with PrEP, and if the medication confers imperfect protection, which is a near certainty, or is taken irregularly, GBM may actually increase their chance of infection. Of even greater concern is that the safer sex norms of GBM in HIV-serodiscordant couples may shift toward less condom use if the HIV-negative partner is taking PrEP and is, therefore, theoretically protected from acquiring HIV. To help ensure that PrEP does not replace condoms, prevention programs will need to offer PrEP as one component of a comprehensive

HIV prevention package that includes risk reduction counseling and condoms.

The declaration of either PrEP trial medication as efficacious will not automatically guarantee its adoption. However, without sufficient uptake, even the most efficacious PrEP medication will have little impact in reducing HIV transmission. In this investigation, a facilitator for uptake of PrEP was the availability of testimonials from current PrEP users regarding side effects and its effectiveness in preventing HIV infection. Still other participants suggested that if a trusted professional recommended PrEP they would consider using it. To encourage uptake and to help address concerns and allay fears of at-risk racial/ethnic GBM will require developing culturally appropriate educational and social marketing materials targeting this population.

Participants in this study were clearly aware of the prohibitively high cost of HIV medications and saw that as a potential barrier to adoption. At present, the annual cost of the PrEP clinical trial drugs, tenofovir and Truvada, is approximately \$7000 and \$10,500, respectively (Project Inform, 2009). In addition to medication cost, there are associated costs, such as regular HIV screening, doctor visits, and other tests to monitor side effects and other outcomes that will be required. These combined costs may make PrEP unaffordable and severely limit its uptake, particularly among low-income GBM, resulting in a disparity in access to PrEP.

Study participants suggested that government funding would be needed to provide access to PrEP for economically disadvantaged populations. However, determination of whether public funding will be used to offer PrEP will involve consideration of its cost-effectiveness relative to other prevention strategies. One study of PrEP's cost-effectiveness found it "an unattractive intervention from a US-based cost-effectiveness perspective" (Paltiel et al., 2009). In contrast, Desai and colleagues (2008) determined that PrEP could be cost-effective in high-risk populations. With a significant number of new HIV infections occurring in lower income populations, government funding for PrEP will be an important link to accessibility.

A concern about the potential side effects of PrEP included side effects that may result from taking the medication, to problems associated with missing doses, intermittent use, discontinuing PrEP, or long-term use. While outcomes of the completed safety trial indicated no significant biomedical safety issues among HIV-negative MSM (Grohskopf et al., 2010), the results from this and the remaining trials will not address all the issues raised by participants – particularly long-term effects. The concerns around inter-

mittent and coital dosing identified in this investigation are being evaluated in a PrEP clinical trial to better understand the biological implications of alternative dosing strategies. If effective, these alternative dosing strategies may help address some of the concerns expressed by GBM in this investigation and would also help lower the cost of using PrEP and thus increase its accessibility. A major part of implementing PrEP will be the need to ensure adherence to the required regimen in order to maintain its protective effect.

In this investigation, participants identified the need to visit a medical provider, secure a doctor's prescription, and take an HIV test as potential barriers to utilizing PrEP. Because PrEP will involve a prescription medication, initial programs for delivery will need to be clinic-based. In addition, use of PrEP will require an HIV test in order to ensure that the individual receiving PrEP is HIV negative, along with regularly scheduled testing to confirm non-seroconversion, and ongoing medical consultation to monitor side effects and other problems. The multiple steps required to receive and use PrEP, along with discussions of sexual behaviors with medical providers, may prove insurmountable for some racial/ethnic minority GBM and, as a result, limit its uptake among this population. This particular finding highlights the importance of utilizing trusted community-based settings, recognized for their acceptance of GBM, in the dissemination of a future PrEP medication.

The results of this study should be interpreted within the study's limitations. First, lay individuals may have found it difficult to comment on a hypothetical PrEP medication; we believe, however, that the PrEP tutorial and the opportunity to ask questions about PrEP prior to beginning the interview may have helped mitigate this potential problem. Second, the study focused solely on a highly efficacious PrEP medication and therefore the results do not reflect perceptions of PrEP at different efficacy levels. Finally, while the study design limits generalizability to the larger community of GBM, the findings are likely transferable to other similar populations.

PrEP is a novel HIV prevention strategy that could help reduce HIV transmission, particularly among high-risk populations. However, with its potential benefit come numerous challenges to its implementation, acceptance, adoption, and sustainability. Addressing these challenges and ensuring equitable distribution of a future PrEP medication will require a multidisciplinary approach involving social and behavioral scientists, the public health

community, policymakers, community planning groups, and local stakeholders.

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### Appendix 1. Interview questions and probes

Tell me what different things you do with your current partner to prevent HIV infection?

Probes:

- What, if any, problems do you have using condoms
- Believe to be best method for prevention
- Limit sex to nonpenetrative intercourse
- Oral sex only
- Insertive/receptive partner only
- Mutual masturbation
- Regular HIV testing
- Monitoring viral load
- Methods used with partners outside current relationship

Describe for me your feelings about the risk [of becoming infected from your current partner] [of transmitting HIV to your current partner].

Probes:

- How has HIV affected your relationship with your partner?
- Trust that partner would not take the risk (HIV negative only)

Tell me what you think of this new strategy for preventing HIV infection?

Probes:

- Trust that PrEP would work
- How much trust would you have in the findings from the scientists who studied the PrEP pill?
- Acceptable for you/partner
- Acceptable for your friends

What are some reasons why you would or would not want to use [have your partner use] this PrEP pill as a way of preventing HIV infection?

Probes:

- Would you feel more protected from contracting [transmitting] HIV?
- Less condom use
- Worry less about [becoming infected/ infecting my partner]
- Greater intimacy with partner
- Negative partner reaction
- Concerns about side effects
- Obstacles to accessing the PrEP drug [you/partner]
- Adherence to the daily regimen [you/partner]
- Cost of the PrEP drug

What are some concerns you might have about [your partner] taking this PrEP pill?

Probes:

- Side effects of the HIV medications
- Concern that it will stop working

- Becoming infected with HIV
- Stigma/discrimination associated with HIV medications
- Access (being able to get PrEP)
- Remembering to take it every day

If you [If your partner] were to take this PrEP pill, how would your feelings about the risk of contracting HIV from your partner [transmitting HIV to your partner] change?

Probes:

- Less concern
- Less anxiety
- No change

If you [If your partner] were to take this PrEP pill, how would your feelings about the need to practice safer sex change?

Probes:

- How might you change your sexual behaviors?
- More awareness of other sexually transmitted diseases
- How would this impact your condom use?
- Increase in risky sexual behavior

If this PrEP pill were available tomorrow, what would you want to know about the pill to help you decide if it is something you would take [your partner should take]?

Probes:

- How would knowing the possible side effects of this pill impact your decision?
- How would knowing the price of this daily pill impact your decision?
- How would knowing the long-term effects of this pill impact your decision?

Since this medication is already being used by people who are HIV positive, how would you feel about [about your partner] taking this medication even though you don't [he doesn't] have HIV.

Probes:

- Do you think you/your partner would feel any stigma?
- Would you tell your friends if you were [partner was] taking PrEP?
- How might your friends react if you told them you were [partner was] taking PrEP?