Attitudes Towards PrEP and Anticipated Condom Use Among Concordant HIV-Negative and HIV-Discordant Male Couples

Colleen C. Hoff, PhD,¹ Deepalika Chakravarty, MS,^{1,2} Anja E. Bircher, MA,¹ Chadwick K. Campbell, MPH,¹ Kirk Grisham, MPH,³ Torsten B. Neilands, PhD,² Patrick A. Wilson, PhD,³ and Shari Dworkin, PhD, MS⁴

Abstract

Since the July 2012 approval by the FDA of emtricitabine/ tenofovir disoproxil fumarate (Truvada) for use as pre-exposure prophylaxis (PrEP) against HIV, its feasibility and acceptability has been under study. HIV-discordant couples are likely targets for PrEP but little is known about how this new prevention tool impacts relationships. We examined, among gay male couples, the acceptability of individual and partner use of PrEP and intentions to use condoms with primary and outside partners in the context of PrEP use. Data are from two independent samples of couples recruited in the San Francisco bay area and New York City—a qualitative one ($N=48$ couples) between March and November, 2011, and a quantitative one ($N=171$ couples) between June, 2012 and May, 2013. Data were categorized by couple HIV status and general linear models; chi-square tests of independence were used to examine condom-use intentions with primary and outside partners, by sexual risk profile, and race. Almost half of the HIV-negative couples felt PrEP was a good HIV prevention strategy for themselves and their partner. Over half reported that they would not change their current condom use if they or their partner were taking PrEP. However, approximately 30% of HIV-negative couples reported that they would stop using condoms or use them less with primary and outside partners if they were on PrEP or if their partner was on PrEP. A large percentage of couples view PrEP positively. However, to ensure safety for both partners, future programing must consider those who intend not to use condoms while on PrEP.

Introduction

IN JULY OF 2012, EMTRICITABINE/ TENOFOVIR DISOPROXIL FUMARATE (Truvada) became the first drug to be approved by the US Food and Drug Administration (FDA) for use as pre-exposure prophylaxis (PrEP) in combination with safer sex practices to reduce the risk of sexually acquired HIV infection in adults at high risk. Further, in May 2014, the US Centers for Disease Control (CDC) released clinical practice guidelines for providers prescribing PrEP,¹ and in July 2014 the World Health Organization (WHO) suggested that all men who have sex with men (MSM) consider taking PrEP prophylactically in conjunction with other risk reduction strategies (e.g., condoms).²

PrEP has been found to be effective through trials conducted across the globe^{3,4} with different populations, including dis-

cordant heterosexual couples⁵ and MSM.⁶ The iPREX trial showed a 44% reduction in HIV incidence in MSM and transgender women who used PrEP.⁶ Reductions in incidence increased to 73% when medication adherence was greater than 90%. Most recently, it was reported that no new infections occurred when blood spot testing indicated drug levels associated with using 4–6 tablets per week.⁷ Studies examining the efficacy of PrEP in conjunction with adherence rates continue to be conducted; this is important because people taking PrEP outside of a large trial may have different experiences than those participating in a trial where behaviors are monitored closely and regularly. Nevertheless, the general consensus of these large trials is that PrEP is a promising biological HIV prevention intervention for adherent high risk individuals.

Since the release of the results from these trials, and in anticipation of PrEP becoming more widely available,

¹Center for Research and Education on Gender and Sexuality, San Francisco State University, San Francisco, California.

²Center for AIDS Prevention Studies, and ⁴Department of Social and Behavioral Sciences, University of California at San Francisco, San Francisco, California.

³Columbia University, Mailman School of Public Health, New York City, New York.

several studies have explored its feasibility and acceptability. A highly debated aspect of PrEP feasibility and acceptability is the possibility of risk compensation, that is, the increase in sexual risk behavior due to a sense of security provided by PrEP. Notably, two PrEP trials indicated no evidence of risk compensation, with participant risk behavior remaining stable or decreasing over the course of PrEP use.^{8,9} Both trials reported decreased number of sexual partners during study participation and the iPREX trial participants reported increased condom use.⁶ Studies of MSM attitudes toward PrEP, however, indicated that motivation to use PrEP was associated with an intention to increase risk behavior and decrease condom use.^{10,11}

Additionally, a study of HIV-negative MSM in HIV discordant relationships indicated that recent unprotected anal intercourse (UAI) and greater HIV knowledge were associated with the belief that a condom is no longer needed while taking PrEP.¹² Risk compensation intentions were also reported based on the partner type. Specifically, among men who engage in UAI with their HIV-negative primary partner only, risk compensation intentions were highest among those who feel pressure from their partner not to use condoms; among men who engage in UAI with primary and non-main partners believed to be HIV-negative, risk compensation intentions were highest among those who believe condoms interfere with intimacy; among men who report UAI with men whose HIV status is unknown, risk compensation intentions were highest among those who felt condoms interfere with sexual pleasure.¹³

Additional examinations of factors associated with the feasibility and acceptability of PrEP use among MSM have been conducted. A randomized pilot study¹⁴ demonstrated the feasibility of PrEP use among young MSM, but self-reported adherence and plasma drug concentrations were low and the authors recommended that enhanced adherence counseling was needed. Some have identified non-white participants as more likely to be interested in PrEP,^{15, 6} while others have not found race/ethnicity to be predictive of interest in PrEP.¹⁷ Another study indicated that participants who were older, had recently engaged in UAI, and/or perceived themselves to be at heightened risk of HIV infection were more likely to be interested in PrEP.¹⁸ Other factors that have been found to increase interest in PrEP include less knowledge about PrEP and antiretroviral therapy as well as lower levels of education.¹⁹ Participants' HIV status and the status of their partners have also been considered in assessing attitudes toward PrEP, with a study of Australian MSM indicating no difference in attitudes between HIV-negative and HIV-positive participants,²⁰ while a study of Thai MSM indicated decreased interest in PrEP use due to having an HIV-negative partner.²¹

Few studies have focused on MSM couples. However, one that did suggested that behavioral interventions to improve utilization should be targeted to sex-partner type, given that main partners were viewed as a support for taking PrEP but casual partners were associated with barriers to PrEP disclosure.²² One study of MSM couples found that participants' concerns about risk compensation may decrease their interest in PrEP,²³ and another study found that concerns about intermittent use was considered a barrier to PrEP use.²⁴ In contrast, higher HIV risk perception, intimacy motivations for condomless sex, recent condomless anal sex with outside

partners, education, and age were each independently associated with PrEP adoption intentions. However, when assessed in a multivariate model, only age, education, and intimacy motivations for condomless sex were significantly associated with PrEP adoption.²⁵

Despite this increasing body of knowledge about PrEP acceptability, there are limited data on this topic from a dyadic perspective. For instance, questions remain about how being in a relationship and having a primary partner influences PrEP use and subsequent condom use. Specifically, it is unclear how men feel about their partners' PrEP use as well as their own. Moreover, it is not clear if couple serostatus (i.e., concordant HIV-negative vs. HIV-discordant) influences either interest or acceptability of taking PrEP for one or both partners or condom use with primary and outside partners.

The present study of concordant HIV-negative and HIV-discordant male couples attempts to contribute in a novel way to our understanding of PrEP uptake and intended sexual behaviors in the context of PrEP use by examining the acceptability of individual and partner use of PrEP among male couples. In addition, we explored intentions to use condoms with primary and outside partners among high- and low-risk couples if one or both partners were hypothetically on PrEP. Finally, we explored by individual- and couple-race, the intentions to use condoms with primary and outside partners if one or both partners were hypothetically on PrEP.

Methods

The present study analyzes data from two independent samples of gay male couples from two distinct phases—quantitative and qualitative—of a broader study investigating relationship power, race, and HIV risk.

Recruitment and screening

Uniform recruitment and screening procedures were followed for both phases of data collection. Couples were recruited in the San Francisco and New York City metropolitan areas. Stratified, purposive sampling was used to recruit black, white, and interracial (black-white) couples of concordant HIV-negative and HIV-discordant serostatus. Using both active and passive recruitment strategies, participants were recruited from venues frequented by MSM. Staff placed recruitment cards, flyers, and posters, as well as conducted active recruitment in community-based venues, such as bars, community centers, churches, and local businesses. Advertisements were placed in local print media and online, and the research team reached out to specific staff members at community-based organizations and clinics who were willing to refer clients, patients, and members of their social and professional networks to participate in the study. Social media platforms such as Facebook and Grindr were also used to reach couples who are active online.

Interested MSM were screened individually via telephone. To be eligible, participants had to: identify as black or white as their primary racial identity, be at least 18 years old; have lived in the US since age 7 or younger; know their own and their partner's HIV status; and have been in their relationship for at least 6 months. Additionally, at least one partner in the relationship had to report engaging in anal sex within the previous 3 months. Men who identified as transgender were

not eligible nor were couples who provided discrepant reports of their partner's serostatus. Both partners had to individually satisfy the eligibility criteria to be eligible for participation as a couple. Eligible couples were given appointments to visit the study offices for participation. All study procedures were reviewed and approved by the IRB's at San Francisco State University, and Columbia University.

Study 1—Qualitative Interviews

Between March and November, 2011, 48 male couples were recruited across the two study locations.

Procedure. Six Master's-level research assistants were trained in qualitative research methods, interviewing skills, and the ethics of human subjects research over a 2-day period. Participants provided written informed consent prior to the start of the interview. Members of the couple were interviewed separately but simultaneously to ensure confidentiality and to elicit sensitive information that may not otherwise have been revealed in the presence of the partner. Interviews were guided by a semi-structured, qualitative interview guide with interviews lasting an average of 90 min. Interview questions are available from the corresponding author upon request. The interviews included the following domains: sexual relationship(s) and agreements, condom use decision-making, acceptability of PrEP, and sexual risk behavior. Each partner was paid \$40.00 as an incentive on completion.

Data analysis. Interviews were digitally recorded and transcribed verbatim, then reviewed for accuracy and grammatical errors. Using a Grounded Theory approach,^{26,27} members of the study team read and summarized 50% percent of the transcripts for use in the code development process. Once the codebook was established, four research staff members applied the codes to the remaining transcripts. Transana qualitative data analysis software was used to facilitate analysis.²⁸ To ensure reliability and consistency in coding, decision trails were maintained. In addition, one quarter of the transcripts were coded by an additional coder and verified by a staff member.

Study 2—Quantitative surveys

Between June, 2012 and May, 2013, a second independent sample of 171 couples was recruited across the two study locations to complete a survey in A-CASI (Audio Computer Assisted Self Interviews). The survey explored several domains including: sexual relationship(s) and agreements, condom use decision-making acceptability of PrEP, and sexual risk behavior. Each partner was paid \$40.00 as an incentive on completion.

Measures. Participant characteristics recorded included HIV status, sexual agreement type, age, relationship length, race, education, employment, and income.

Sex behavior. Participants responded to detailed questions about their sexual behavior in the past 3 months. The questions asked about the number of episodes of anal sex they had with their primary partner as well as with outside partners of HIV-positive, HIV-negative, and unknown serostatus. Fur-

ther questions queried about insertive and receptive anal sex, with and without ejaculation, and with and without condoms. Using these responses about anal sex as well as the participant's and his primary partner's serostatus, we created two separate risk variables: the counts of UAI with the primary partner (UAIPP) and the counts of UAI with any outside partner (UAIOUT). Further, each of these risk variables was dichotomized into zero episodes of UAI and at least one episode of UAI in the past 3 months.

PrEP. Participants were first provided a brief overview of PrEP—its purpose, how long it needs to be taken, and its documented physical side effects. This was followed by a variety of questions regarding PrEP: whether he had heard of PrEP, what he thought of PrEP as an HIV prevention strategy for himself and his primary partner (response options ranged from 'an extremely good strategy' to 'an extremely bad strategy'), the likelihood of using PrEP for himself ("How likely would you be to use PrEP if it were available to you?" with a 5-point response 'Not at all' to 'Extremely'), how effective would PrEP need to be in reducing the chance of contracting HIV for him to use it (responses ranged from 20% to 100% in increments of 20). The participant was then asked about his anticipated condom use behaviors in three different scenarios—if he himself were on PrEP, if his primary partner was on PrEP and if an outside partner was on PrEP (e.g., "If you were on PrEP, you would use condoms..." with responses ranging from 'A great deal more often' to 'A great deal less often' and 'Not at all'). Finally, the participant was queried about his likelihood of disclosing broken agreements to his primary partner if he were on PrEP (responses ranged from 'A great deal more likely' to 'A great deal less likely' and 'Would not disclose at all'), and whether the decision to use PrEP would be an individual or joint decision with his primary partner.

Data analyses. Two participants declined to answer the PrEP questions and were excluded for these analyses. The sample therefore consists of 340 individuals from 171 couples. All analyses were conducted in SAS V9.4. First, we generated frequencies and measures of central tendency in order to describe the sample characteristics. Owing to the exploratory nature of the present analyses, we categorized the sample from Study 2 into three groups—men in seroconcordant negative relationships, HIV-negative men in serodiscordant relationships, and HIV-positive men in serodiscordant relationships. All analyses were conducted separately for these three groups.

The two primary topics explored in-depth were: opinion about PrEP as a prevention strategy, and anticipated condom use behaviors if they were to use PrEP. General linear models (using PROC GENMOD) were used to compare the categorical responses to these questions by age and relationship length. In these instances of multiple comparisons, adjusted *p* values were obtained by applying the Bonferroni adjustment.

Further, all models pertaining to the men in seroconcordant negative relationships employed correlated residuals via an exchangeable correlation structure to account for both members of the dyads being included. We generated the overall frequencies (using PROC FREQ) of respondents' perception of PrEP as a prevention strategy and then further explored these using chi-square tests of independence in two

ways—first, by accounting for the presence or absence of UAI with primary and outside partners, and second, by accounting for individual and couple-race. For frequencies pertaining to men in seroconcordant negative relationships, the Rao-Scott chi-square (in PROC SURVEYFREQ) was used to account for the clustering of individuals within dyads. In all chi-square tests with low cell counts, Fisher's exact test was used. We similarly analyzed the responses to anticipated condom use behaviors—overall, by presence/absence of UAI, and by race categories.

Results

Of the 48 couples in the qualitative phase (Study 1), 26 (54%) were concordant HIV-negative and 22 (46%) were HIV-discordant (Table 1). There were 17 white, 16 black, and 15 interracial (black-white) couples in the sample. Approximately half of the couples were from each study site. The median age was 30 years (range: 18–66 years), and median relationship length was 1.6 years (range: 6 months to 36 years). Couple agreement types included both open (40%) and closed (56%); additionally, one couple reported a discrepant agreement (where one partner reported having an

open agreement and the other partner reported having a closed agreement) and one couple had no agreement. A majority (75%) of participants reported having at least some college education. A majority (81%) of the participants earned less than \$50,000 per year and 42% were unemployed.

Of the 171 couples in the quantitative phase (Study 2), 120 (70%) were concordant HIV-negative and 51 (30%) were serodiscordant (Table 1). There were 93 white, 41 black, and 37 interracial (black-white) couples in the sample. Approximately half of the couples were from each study site. The median age was 36.2 years (range: 19–71 years) and the median relationship length was 3 years (range: 6 months to 45 years). Couple agreement types included open (43%), closed (38%) and discrepant (19%). A majority (79%) of participants reported having at least some college education. More than half of the participants earned less than \$50,000 per year and 27% were unemployed.

Study 2: PrEP acceptability in the context of the primary relationship

Less than half the sample (46.2%) had ever heard of PrEP before, and 9.6% of the sample reported having taken PrEP

TABLE 1. SAMPLE CHARACTERISTICS

	<i>Qualitative</i>		<i>Quantitative</i>	
	n	%	n	%
Couple characteristics				
Relationship length (years) median (range)	1.58	(0.5–36)	3	(0.5–45)
<i>Number at each site</i>				
San Francisco Bay Area	25	(52.08)	81	(47.37)
New York City	23	(47.92)	90	(52.63)
<i>Serostatus</i>				
Concordant negative	26	(54.17)	120	(70.18)
Serodiscordant	22	(45.83)	51	(29.82)
<i>Race</i>				
Black	16	(33.33)	41	(23.98)
White	17	(35.42)	93	(54.39)
Black-white	15	(31.25)	37	(21.64)
<i>Sexual agreement type^a</i>				
Closed	27	(56.25)	65	(38.01)
Open	19	(39.58)	73	(42.69)
Discrepant ^b	1	(2.08)	33	(19.3)
Individual characteristics				
Age (years) median (range)	30	(18–66)	36.24	(19.39–71.39)
<i>Education</i>				
Completed high school or less	24	(25)	72	(21.17)
Some college/Associate degree/Bachelor's degree	55	(57.29)	104	(30.59)
Graduate degree	17	(17.71)	164	(48.23)
<i>Employment</i>				
Employed (full-time/self-employed)	41	(42.71)	188	(55.3)
Employed part-time	15	(15.62)	60	(17.65)
Unemployed	40	(41.68)	92	(27.06)
<i>Annual income</i>				
Less than \$20,000	40	(41.67)	121	(35.69)
\$20,000–\$49,999	37	(38.54)	111	(32.74)
\$50,000–\$79,999	8	(8.33)	63	(18.58)
\$80,000 and higher	11	(11.46)	44	(12.98)

^aIn the qualitative sample, one couple that reported not having an agreement, is omitted from this table.

^bA couple's agreement is categorized as discrepant if one partner reports it as closed and the other partner reports it as open.

before (data not shown in tables). Among the HIV-negative men in serodiscordant relationships, over half (51%) said they were ‘very much’ or ‘extremely’ likely to use PrEP if it was available to them, while a much lower percentage (27%) of men in seroconcordant HIV-negative relationships said the same. A majority (over 70%) of men conveyed that they would be willing to take PrEP if it was at least 80% effective in reducing the chance of contracting HIV. Roughly 80% of the HIV-negative men would inform their primary partner if they started taking PrEP, and over 75% said that the decision to use PrEP would be made jointly with their primary partner. A majority (80%) of HIV-positive men said they would be supportive of their primary partner’s decision to take PrEP. On the question of disclosure of broken agreements while on PrEP, the majority (63%) of HIV-negative participants said that being on PrEP would not change their likelihood of disclosing a broken agreement to their primary partner, 6% would not disclose a broken agreement at all, 18% would be less likely, while 13% would be more likely to disclose a break.

In the following presentation of the findings, all quotes are from Study 1 (qualitative phase), whereas all numbers (percentages, etc.) are from Study 2 (quantitative phase) unless otherwise stated.

Attitudes towards PrEP as an HIV prevention strategy for self and primary partner

Men in concordant HIV-negative relationships. Almost half of the men in concordant HIV-negative relationships felt that PrEP would be a good HIV prevention strategy for themselves and their partners (46% and 44%, respectively) (Table 2). Approximately 20% each perceived PrEP to be a bad HIV prevention strategy for themselves and their primary partner. This sentiment is illustrated in the following quote:

“I guess for those that want to have unprotected sex I guess it would be okay but I don’t think it’s a good idea, that’s just me” (Black, 43, HIV-).

Further, 34% each were ambivalent about PrEP as a HIV prevention strategy both for themselves and their primary partner. For some couples, this ambivalence seemed to stem from their current relationship status, as well as a questioning of how well this novel strategy will work. For example:

“If I was single and not in a relationship, I don’t know. I might consider taking it but I think I would take it in combination with still practicing safe sex because you know things could always break, something could always happen so maybe the

pill would be some extra insurance so I might consider taking it in conjunction with practicing safe sex if I was out there single” (White, 43, HIV-).

Men in serodiscordant relationships. Our data suggest that MSM in serodiscordant relationships may be more in favor of PrEP as a prevention strategy than men in concordant HIV-negative relationships. Fifty-seven percent of HIV-negative men with HIV-positive partners thought that PrEP would be a good prevention strategy for *themselves* versus 46% of those in HIV-negative relationships. Similarly, 66% of HIV-positive men with HIV-negative partners felt PrEP was a good prevention strategy for *their partners* versus 44% of those in HIV-negative relationships. This theme is represented in the following quotes from the two partners in one couple:

“I think it’s a positive thing especially for people that are at high risk. [My partner] and I have discussed it—about him possibly taking it—and have both kind of come to the conclusion that, yes, if it was made available it would be a wise thing for him to take because he’s at such a high risk being in a magnetic [discordant] couple” (White, 26, HIV+).

“I would still probably take it just because I know that every time that I sleep with him I’m being exposed to HIV” (White, 26, HIV-).

Twenty percent of the HIV-positive men with HIV-negative partners felt that for their partner, PrEP was neither a good or bad HIV prevention strategy. Few men in serodiscordant relationships felt that PrEP was a bad HIV prevention strategy.

Attitudes towards PrEP as a HIV prevention strategy, by sexual risk behavior and race

In Study 2, when analyzing men’s attitudes towards PrEP according to their sexual risk behavior, we did not find any statistically significant differences in attitudes by whether they reported UAI with primary and outside partners. Further, in analyzing men’s attitudes towards PrEP by their own race (black/white) as well as couple-level race (black/white/black-white), we did not find any significant statistical differences between the groups (data not shown in tables).

Relationship factors associated with PrEP as a HIV prevention strategy

Relationship length was associated with attitudes towards PrEP as an HIV prevention strategy only among HIV-

TABLE 2. STUDY 2: ATTITUDES ABOUT PREP AS AN HIV PREVENTION STRATEGY

<i>PrEP as a prevention strategy...</i>	N	<i>Bad</i>		<i>Neither good nor bad</i>		<i>Good</i>	
		n	(%)	n	(%)	n	(%)
<i>Men in +/- relationships:</i>							
(...for self)	239	47	(19.7)	82	(34.3)	110	(46)
(...for primary partner)	236	52	(22)	81	(34.3)	103	(43.6)
<i>HIV-negative men in +/- relationships:</i>							
(...for self)	51	5	(9.8)	17	(33.3)	29	(56.9)
<i>HIV-positive men in +/- relationships:</i>							
(...for primary partner)	50	7	(14)	10	(20)	33	(66)

positive men in serodiscordant relationships—those reporting an ambivalent attitude toward PrEP had a significantly (adjusted p -value: 0.048) longer relationship length (mean: 12.2 years) compared to those who consider it a good strategy (mean: 6.5 years). Age was not significantly associated with attitudes towards PrEP in any of the subgroups studied (data not shown in tables).

Anticipated condom use while on PrEP

The majority of participants reported that if they were on PrEP, they would use condoms at about the same rate as the present, regardless of their own and their partner's serostatus and also whether they engaged in UAI with their primary partner or an outside partner.

Men in concordant HIV-negative relationships. Over half (56%) of the men in HIV-negative couples reported that if they were taking PrEP they would use condoms at the same rate as they are currently using condoms (Table 3, rows which contain 'N=' in the second column). For example, one participant stated that:

"I wouldn't suddenly stop wearing condoms...It would help...It would allow me to feel much more relaxed and at ease with it but I would understand that it wouldn't mean that I

would be any—that I still would be putting myself at risk. It would just allow me to have lesser of a chance of getting contracted with HIV. That would make me feel better" (White, 24, HIV-).

However, 30% reported that they would not use condoms or would use condoms less if they themselves were taking PrEP. For example:

"If I were using it I would assume that I wouldn't have to use a condom" (Black, 19, HIV-).

Sixty-two percent reported that they would use condoms at their current rate if *their partner* was taking PrEP, while approximately 20% reported they would use condoms less or not at all. Fifty-seven percent said they would use condoms at the current rate if their outside partner was taking PrEP. Only 16% reported they would use condoms less or not at all with an *outside* partner taking PrEP. Interestingly, between 15% and 27% reported that they would use condoms more if *they themselves* were on PrEP (15%), if *their partner* was on PrEP (18%), or if an *outside partner* was on PrEP (27%).

Men in serodiscordant relationships. Discordant couples reported similar intentions to use condoms in the presence of PrEP use. Fifty-eight percent of HIV-negative men with HIV-

TABLE 3. STUDY 2. ANTICIPATED CONDOM USE IN THE PRESENCE OF PrEP, CATEGORIZED BY SEROSTATUS, TYPE OF PARTNER, AND THE PRESENCE/ABSENCE OF UAI

			Not at all		Less often		Same as now		More often		p	Value ^a
How often would you use condoms if (__) was on PrEP?			n	%	n	%	n	%	n	%		
Men in +/- relationships:												
(Yourself)	N=237		23	(9.7)	47	(19.8)	132	(55.7)	35	(14.8)		
UAIOUT?	No		17	(8.3)	40	(19.4)	118	(57.3)	31	(15.1)		NS
	Yes		6	(19.4)	7	(22.6)	14	(45.2)	4	(12.9)		
UAIPP?	No		2	(5.3)	8	(21.1)	24	(63.2)	4	(10.5)		NS
	Yes		21	(10.6)	39	(19.6)	108	(54.3)	31	(15.6)		
(Your primary partner)	N=236		20	(8.5)	27	(11.4)	147	(62.3)	42	(17.8)		
UAIOUT?	No		13	(6.3)	25	(12.2)	129	(62.9)	38	(18.5)		0.022
	Yes		7	(22.6)	2	(6.5)	18	(58.1)	4	(12.9)		
UAIPP?	No		0	(0)	7	(18.4)	24	(63.2)	7	(18.4)		NS
	Yes		20	(10.1)	20	(10.1)	123	(62.1)	35	(17.7)		
(The outside partner)	N=236		14	(5.9)	24	(10.2)	134	(56.8)	64	(27.1)		
UAIOUT?	No		8	(3.9)	20	(9.8)	119	(58.1)	58	(28.3)		0.008
	Yes		6	(19.4)	4	(12.9)	15	(48.4)	6	(19.4)		
UAIPP?	No		2	(5.3)	5	(13.2)	22	(57.9)	9	(23.7)		NS
	Yes		12	(6.1)	19	(9.6)	112	(56.6)	55	(27.8)		
HIV-negative men in +/- relationships:												
(Yourself)	N=50		4	(8)	7	(14)	29	(58)	10	(20)		
UAIOUT?	No		2	(5.3)	6	(15.8)	22	(57.9)	8	(21.1)		NS
	Yes		2	(16.7)	1	(8.3)	7	(58.3)	2	(16.7)		
UAIPP?	No		0	(0)	3	(15)	14	(70)	3	(15)		NS
	Yes		4	(13.3)	4	(13.3)	15	(50)	7	(23.3)		
HIV-positive men in +/- relationships:												
(Your primary partner)	N=49		6	(12.2)	3	(6.1)	36	(73.5)	4	(8.2)		
UAIOUT?	No		2	(5.9)	1	(2.9)	28	(82.4)	3	(8.8)		NS
	Yes		4	(26.7)	2	(13.3)	8	(53.3)	1	(6.7)		
UAIPP?	No		1	(5)	0	(0)	19	(95)	0	(0)		0.034
	Yes		5	(17.2)	3	(10.3)	17	(58.6)	4	(13.8)		

UAIOUT, Had UAI with an outside partner in the past 3 months? UAIPP, Had UAI with primary partner in the past 3 months?

^aStatistically significant p -values ($p < 0.05$) from Chi-square test of independence; NS, Statistically nonsignificant Chi-square test of independence.

positive partners reported that they would use condoms at the current rate if *they themselves* were taking PrEP. The majority of HIV-positive men with HIV-negative partners (74%) also reported they would use condoms at the current rate if *their HIV-negative partner* was taking PrEP. In the qualitative interviews, many reported that STI's were an ongoing concern. For example:

“We’d still use condoms, yeah, there’s a lot more stuff out there besides HIV” (Black, 24, HIV+).

Twenty percent of HIV-negative partners in a discordant couple reported they would use condoms less or not at all if *they themselves* were taking PrEP versus 18% of HIV-positive partners if *their HIV-negative partner* was taking PrEP. For example,

“I think that it would you know give us an option in terms if we wanted to not use a condom then that may be a possibility for us” (Black, 33, HIV-).

Among the men in serodiscordant relationships, a fifth of the HIV-negative men reported that they would use condoms more if *they themselves* were on PrEP and 8% of the HIV-positive men would increase their condom use if *their primary partner* was on PrEP.

Anticipated condom use while on PrEP, by sexual risk behavior

In Study 2, in analyzing men’s anticipated condom use while on PrEP by their sexual risk behavior, we found some statistically significant differences by whether they reported UAI with primary and outside partners (Table 3).

Men in concordant HIV-negative relationships. Among men in concordant negative relationships, sexual risk behavior with an outside partner was associated with the men’s anticipated condom use if the primary partner, or the outside partner were to be on PrEP—a greater percentage of those who reported UAI/OUT said they would stop using condoms if their primary partner or their outside partner was on PrEP, compared to those who did not report UAI/OUT. But a similar association was not noted in the case of the men themselves being on PrEP. Further, the presence or absence of UAI with primary partner was not associated with anticipated condom use in the cases of self, primary partner or outside partner being on PrEP.

Men in serodiscordant relationships. Among HIV-positive men in serodiscordant relationships who reported having UAI with their primary partner, there was a significant shift towards lesser- or no-use of condoms if their primary partner were to use PrEP. Among HIV-negative men in serodiscordant relationships, the presence of UAI with neither primary nor outside partners was associated with their anticipated condom use if they themselves were to use PrEP.

Anticipated condom use while on PrEP, by race

On the topic of race, akin to the findings pertaining to sexual risk behavior, HIV-negative men’s intentions to use condoms if they were themselves on PrEP, did not vary by their own or the couple-race or by whether their primary partner was seroconcordant or serodiscordant (Table 4). For

men in concordant negative relationships, race—both individual- and couple-level—was significantly related to anticipated condom use if their primary partner were to be on PrEP. For the same group however, if an outside partner were to be on PrEP, only couple-race showed a relationship to anticipated condom use, and not one’s own race.

Anticipated condom use while on PrEP, by age

Age was associated with anticipated condom use only for HIV-negative men in seroconcordant relationships for the case of the outside partner being on PrEP—those who reported that they would completely stop using condoms if the outside partner were on PrEP, were significantly older (mean: 48.1 years) than those who said they would use condoms ‘less often’ (mean: 36 years, $p=0.002$), ‘the same as now’ (mean: 34.8 years, $p=0.001$) and ‘more often’ (mean: 36.9 years, $p=0.006$). Relationship length was not significantly associated with intended condom use in any of the subgroups studied (data not shown).

Discussion

The present study investigated gay male couples’ views of PrEP as an HIV prevention strategy and whether they intended to change their use of condoms as a result of PrEP use. Overall, we found that in all the subgroups analyzed, the greatest number of men felt that PrEP was a good prevention strategy for themselves and their primary partners. The substantial proportion of couples positively endorsing PrEP as a good prevention strategy bodes well for the national priorities of reducing new HIV infections and HIV related health disparities among gay men.²⁹ HIV-negative couples and serodiscordant couples were similar in their overall endorsement of PrEP as a prevention strategy. However, HIV-positive partners in serodiscordant relationships were particularly accepting of the strategy for their HIV-negative partners. Having partner support for taking PrEP likely has important implications for overall acceptability and could potentially help with adherence by keeping regular pill taking routines,^{30–32} particularly if the HIV-positive partner also takes medications and the couple takes their medications together.²²

Despite this broad acceptance, many couples expressed ambivalence towards PrEP as a prevention strategy and a few felt that it was a bad prevention strategy. The relatively high number of men who reported ambivalence toward PrEP warrants further exploration. One possible explanation for ambivalence in the present study could be that the study was conducted before PrEP became widely available and before the initial CDC clinical practice guidelines were released in May, 2014.¹ Many men did not know about PrEP and may have been expressing initial skepticism to something with which they were unfamiliar.³³ Moreover, some gay men in relationships, particularly those with monogamous agreements, do not view themselves as being at risk for HIV,³⁴ and many do not trust a “magic bullet” type of drug when they have been successfully relying on condoms or other safe sex strategies for many years. These ambivalent couples may not perceive a clear benefit in taking PrEP, especially if they are in fact at low risk. It is important to factor in a couple’s sexual agreement type, current level of sexual risk, and whether there is partner support, when assessing the most effective

TABLE 4. STUDY 2: ANTICIPATED CONDOM USE IN THE PRESENCE OF PrEP, CATEGORIZED BY SEROSTATUS, TYPE OF PARTNER AND INDIVIDUAL- AND COUPLE-RACE

			Not at all		Less often		Same as now		More often		p Value ^a
How often would you use condoms if (__) was on PrEP?			n	%	n	%	n	%	n	%	
Men in +/- relationships:											
(Yourself)		N = 237	23	(9.7)	47	(19.8)	132	(55.7)	35	(14.8)	
Individual race	Black		7	(9.3)	17	(22.7)	35	(46.7)	16	(21.3)	NS
	White		16	(9.9)	30	(18.5)	97	(59.9)	19	(11.7)	
Couple race	Black		5	(10)	14	(28)	21	(42)	10	(20)	NS
	White		13	(9.5)	19	(13.9)	86	(62.8)	19	(13.9)	
	Black-white		5	(10)	14	(28)	25	(50)	6	(12)	
(Your primary partner)		N = 236	20	(8.5)	27	(11.4)	147	(62.3)	42	(17.8)	
Individual race	Black		5	(6.7)	14	(18.7)	37	(49.3)	19	(25.3)	0.008
	White		15	(9.3)	13	(8.1)	110	(68.3)	23	(14.3)	
Couple race	Black		4	(8)	13	(26)	21	(42)	12	(24)	0.004
	White		12	(8.8)	9	(6.6)	96	(70.1)	20	(14.6)	
	Black-white		4	(8.2)	5	(10.2)	30	(61.2)	10	(20.4)	
(The outside partner)		N = 236	14	(5.9)	24	(10.2)	134	(56.8)	64	(27.1)	
Individual race	Black		4	(5.3)	11	(14.7)	38	(50.7)	22	(29.3)	NS
	White		10	(6.2)	13	(8.1)	96	(59.6)	42	(26.1)	
Couple race	Black		4	(8)	10	(20)	20	(40)	16	(32)	0.032
	White		7	(5.1)	9	(6.6)	81	(59.1)	40	(29.2)	
	Black-white		3	(6.1)	5	(10.2)	33	(67.4)	8	(16.3)	
HIV-negative men in +/- relationships:											
(Yourself)		N = 50	4	(8)	7	(14)	29	(58)	10	(20)	
Individual race	Black		3	(16.7)	3	(16.7)	8	(44.4)	4	(22.2)	NS
	White		1	(3.1)	4	(12.5)	21	(65.6)	6	(18.8)	
Couple race	Black		2	(14.3)	3	(21.4)	6	(42.9)	3	(21.4)	NS
	White		0	(0)	4	(16.7)	17	(70.8)	3	(12.5)	
	Black-white		2	(16.7)	0	(0)	6	(50)	4	(33.3)	
HIV-positive men in +/- relationships:											
(Your primary partner)		N = 49	6	(12.2)	3	(6.1)	36	(73.5)	4	(8.2)	
Individual race	Black		2	(9.5)	2	(9.5)	14	(66.7)	3	(14.3)	NS
	White		4	(14.3)	1	(3.6)	22	(78.6)	1	(3.6)	
Couple race	Black		2	(14.3)	1	(7.1)	9	(64.3)	2	(14.3)	NS
	White		2	(8.3)	1	(4.2)	20	(83.3)	1	(4.2)	
	Black-white		2	(18.2)	1	(9.1)	7	(63.6)	1	(9.1)	

^aStatistically significant *p*-values (*p* < 0.05) from Chi-square test of independence; NS, Statistically non-significant Chi-square test of independence.

course of action regarding PrEP uptake. Consideration of PrEP use for all MSM, as suggested by the WHO,² should include these factors so as not to unnecessarily burden health systems with high costs and unnecessarily burden couples with fears of contagion.

The study also revealed that the majority of couples would not change their current condom use if they or their partner were taking PrEP. This was true for both concordant HIV-negative couples and discordant couples. However, some couples reported that they would stop using condoms or use them less with primary and outside partners if they were on PrEP or if their partner was on PrEP. Thus far, research has not addressed the dyadic nature of condom decision-making in the presence of PrEP to assess the influence partners have on each other. This is key to understanding the full potential of risk compensation. Risk compensation has been discussed in recent literature where results from large PrEP study trials suggest very little risk compensation,^{6,8,9} while studies investigating intentions to use condoms in the presence of PrEP suggest a high likelihood for reduced condom use.^{10,11} As PrEP is made more widely available, it will be important for

providers to assess risk for HIV and other STIs with both partners and encourage continued condom use as appropriate. The initial FDA approval for PrEP and the CDC guidelines for prescribing PrEP stipulate that it should be taken in conjunction with safer sex practices. In practice, thorough risk assessments and safer sex counseling may be difficult to achieve in busy medical practices. As PrEP continues to be scaled up, community-based prevention efforts will be needed to reinforce the importance of practicing safer sex in conjunction with taking PrEP.

Although some early studies suggested that those most willing to take PrEP were at highest risk, it remained a question as to whether in keeping with a higher risk profile, couples who engage in riskier behaviors would forgo condoms while using PrEP. This was not true in the present study where intentions to use condoms while taking PrEP did not vary significantly whether a couple had engaged in UAI or not. Most men, regardless of whether they engaged in UAI, felt that they would continue to use condoms at the current amount.

Relationship length was a factor for some couples (HIV-positive men in serodiscordant relationships) where longer

term couples seemed more ambivalent about PrEP than shorter term couples. Given that there is a tendency for some couples to forgo condoms after high levels of trust and intimacy in the relationship have formed, interest in PrEP is more likely driven by perceptions of risk, as well as, comfort from the added safety net that PrEP provides couples.

Differences in individual- and couple-level race were not associated with the acceptability of PrEP, which is counter to earlier studies reporting greater interest in PrEP among Black participants.^{15,16} However, individual- and couple-race was associated with anticipated condom use. Among men in seroconcordant HIV-negative relationships, trends suggest that compared to White couples and bi-racial couples, Black couples would use condoms less if their partner were taking PrEP. Couple and individual differences by race are critical to explore especially given the high incidence of HIV among Black MSM.³⁵ Earlier analysis from the qualitative sample (Study 1) suggested that condoms were the default behavior and used more consistently among Black couples compared to White couples and biracial couples.³⁶ Data from the present study suggest PrEP use and its promise of protection could substantially change how couples view condom use.

The findings should be interpreted and utilized in light of the limitations of this study. Consequently, caution is warranted in generalizing to the larger MSM community. In addition, HIV status was self-reported. The qualitative phase, which made up the smaller of the two samples, was conducted prior to PrEP being approved by the FDA, and before the CDC guidelines were released. Considering that many participants had not heard of PrEP before, our findings may underestimate men's knowledge of, and interest in taking PrEP. Intentions to use condoms while taking PrEP were compared based on sexual risk profiles (i.e., between men who reported condomless anal sex and those who did not). Future studies in couples should also compare condom-use intentions of partners who are taking PrEP with the intentions of those who are not. Finally, our study does not examine actual changes in condom use and asks hypothetical questions about what individuals anticipate doing if they themselves or their sexual partners were to start using PrEP. Still, this is one of the few studies to analyze both quantitative and qualitative data from both partners of seroconcordant and serodiscordant, Black, White, and bi-racial couples allowing us to examine and present attitudes towards PrEP use and intended condom use from a unique and important perspective.

Effective and safe HIV prevention strategies are still urgently needed both domestically and worldwide. PrEP is a promising option for those who are at high risk and who have access to it. Serodiscordant male couples have been identified as strong candidates for PrEP uptake, given the inherent risk of a serodiscordant sexual relationship. The present study found that the majority of serodiscordant couples view PrEP positively. HIV-positive partners are particularly enthusiastic given the on-going fear they endure of infecting their HIV-negative partner. HIV-negative couples are similar in their acceptability of PrEP and intentions for continued condom use. Future research examining actual versus intended sexual behavior associated with PrEP use is critical so that providers and other frontline professionals can support couples with the necessary behavioral skills that are needed for PrEP to be effective.

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Address correspondence to:
 Colleen C. Hoff, PhD
 Center for Research and Education
 on Gender and Sexuality
 San Francisco State University
 835 Market Street, Suite 523
 San Francisco, CA 94103
 E-mail: choff@sfsu.edu