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Factors Associated with Regular HIV Testing among a Sample of US MSM with HIV-negative Main Partners

Jason W. Mitchell, MPH, PhD¹ and Keith J. Horvath, MS, PhD²

¹University of Michigan School of Nursing, Risk Reduction and Health Promotion Programs, Ann Arbor, MI

²Medical College of Wisconsin, Center for AIDS Intervention Research, Milwaukee, WI

Abstract

HIV transmission is common within MSM couples; despite recommendations that MSM who engage in risky sexual behaviors get tested biannually/annually, little is known about the testing patterns of MSM while in a current primary relationship. This study compared demographic and relationship characteristics of groups of MSM with different testing patterns while in their primary relationships, and assessed which factors were associated with regular or irregular testing. 275 HIV-negative male couples/550 MSM were recruited online to complete a survey in 2011. Since the start of their relationship, 21% of MSM tested for HIV every 3, 4, or 6 months; 29% tested once a year; 30% tested only when they felt at-risk for HIV; and 20% never tested for HIV. Bivariate analyses indicated men who had never been tested while in their relationship were younger, less educated, had greater trust in their partner, and were less likely to be in a couple that had one or both men having had sex with someone else. In the multivariate analyses, testing at regular intervals was associated with higher education, having a sexual agreement, being in a couple that had one or both men having had sex with someone else, and having lower faith in trust toward the main partner. Findings suggest that many MSM's testing behaviors while in their primary relationship do not align with their risk profile. Trust appears to be a barrier to regular HIV testing, which may be addressed by encouraging MSM to negotiate clear sexual agreements with their primary partner.

Keywords

HIV testing patterns; Regular HIV testing intervals; HIV-negative partnered MSM; Relationship characteristics

INTRODUCTION

Studies show that between one-third and two-thirds of HIV infections among men who have sex with men (MSM) in the United States (US) are transmitted within same-sex primary

Correspondence should be addressed to: Jason W. Mitchell, MPH, PhD, University of Michigan School of Nursing, Risk Reduction and Health Promotion Programs, 400 N. Ingalls, Office 3343, Ann Arbor, MI 48109, Fax: 734.647.0351, Office: 734.647.0349, jwmitch@med.umich.edu.

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relationships.^{1, 2} Nearly three-quarters (74%) and one-third (31%) of MSM in one study reported engaging in unprotected anal intercourse (UAI) with their main and outside partner, respectively.³ Unprotected anal intercourse, the sexual activity associated with highest likelihood of HIV transmission, may be particularly high in primary relationships because of high perceptions of trust in the other partner and overconfidence that both partners share a clearly negotiated sexual agreement. Given high rates of HIV among US MSM,⁴ the Centers for Disease Control and Prevention (CDC) recommends annual HIV testing for men who have same-sex partners, with more regular testing (every 3 to 6 months) for those with identifiable risk factors (e.g., having multiple or anonymous sex partners).⁵

These recommendations have not been adopted by many MSM, as a national survey of MSM residing in 21 cities showed that 61% received an HIV test in the past year and only 44% of high-risk MSM reported an HIV test in the past six months.⁶ In this study, men received an HIV test, and of those who tested seropositive, less than half (45%) reported receiving an HIV test in the previous year. Other studies confirm that uptake of HIV testing among US MSM remains low.^{7, 8} HIV testing rates among MSM couples is similarly low. In a study of 142 HIV-negative MSM couples living in the Northwest US, the majority of men (75%, N=212) had not been tested for HIV in the prior 3 months even though most (90%) practiced UAI within their relationship.⁹ In the same study, men who reported a recent HIV test were three times more likely to report UAI with a casual MSM partner outside their primary relationship than men who did not have a recent HIV test. A follow-up study showed that men from this sample who tested for HIV in the prior 3 months were significantly more likely to have had UAI both within and outside their primary relationship in the univariate analysis ($OR=5.39$), although this effect did not remain significant in the multivariate analysis.¹⁰

The testing literature, including the studies described above with partnered MSM, primarily consists of studies that examine testing behavior as a single, discreet event (i.e., whether someone was tested in the past year). A recent study found that testing for HIV in the past year was associated with being Black, visiting a healthcare provider in the past year, and having ever disclosed same-sex attractions or same-sex sexual activity to a healthcare provider.¹¹ Nearly two-thirds (63%) of men in this study who had not tested for HIV in the past year reported not doing so because they believed they were at low risk for infection.

Studies of factors associated with regular interval HIV testing behaviors among MSM are less common. In one study of interval testing, 538 HIV-negative Hispanic MSM in South Florida were interviewed about the frequency of their testing behaviors.¹² Results showed that men who tested 3 or more times in their lifetime were older, were more highly educated, had a primary care provider, had been diagnosed or believed they were infected with a sexually transmitted infection, had more than one sexual partner in the past three months, and had oral sex and unprotected insertive anal sex in the past three months than men who had tested for HIV less than three times in their lifetime; in addition, men who tested two or more times a year were more likely than men who tested less often per year to be younger, have lower HIV risk perceptions, engage in oral sex, and report consistent condom use for insertive anal intercourse. A second study of interval testing among MSM in Seattle, WA showed that a shorter interval between HIV tests was associated with younger age, having

only male sexual partners, and having ten or more male sexual partners in the past year.¹³ The finding that MSM reporting high numbers of recent sexual partners seek repeat tests for HIV and other STIs is supported by studies of MSM in other Western countries.¹⁴ These studies provided crucial information about factors associated with regular testing among MSM, but were not exclusive to MSM in primary relationships.

In the current study, we collected dyadic data from 275 HIV concordant negative MSM couples to examine factors associated with men's history of interval HIV testing since they have been in their current primary relationship. The aims of this study were to: 1) compare men's demographic and relationship characteristics by their history of HIV testing since the start of their current primary relationship; and 2) determine which demographic and relationship factors are associated with the regularity of men's testing history.

METHODS

Participants and Recruitment

Recruitment for this study sample was conducted through *Facebook* banner advertising. Banner advertisements were shown to individuals who had their own personal home pages. During a ten-week recruitment period during 2011, advertisements targeted partnered individuals based on demographics that they reported on their *Facebook* profile. Specifically, our study advertisements targeted *Facebook* members who described themselves as male, 18 years of age and older, living anywhere in the US, interested in men, and had a current relationship status as either being in a relationship, engaged, or married. All *Facebook* users whose profiles met this initial eligibility criteria had an equal chance of being shown one of three banner advertisements. The advertisements briefly described the purpose of the study and included a picture of a male same-sex couple.

A total of 7,994 *Facebook* users clicked on at least one of the advertisements and were then directed to the study webpage where information about the study and a brief eligibility survey could be accessed. Among those who visited our study webpage, 4,056 (51%) potential participants answered our eligibility questions; 722 MSM (18%), representing both men of 361 MSM couples, qualified, enrolled, and completed the original study questionnaire. A total of 275 concordantly negative MSM couples are included in this analysis. Men who were in a HIV-discordant or concordantly positive relationship were excluded from the present study because we were most interested in factors associated with men's history of interval HIV testing while they are in their current concordantly HIV-negative primary relationship. Men must have met the following eligibility criteria: be 18 years of age or older; live in the U.S.; be in a sexual relationship with another male and have had either oral and/or anal sex with this partner within the previous three months. After consenting to participate, men had immediate access to the 30–40 minute confidential survey.

A partner referral system was embedded in the survey to enable data collection from both men in the couple. Specifically, participants were required to input their own and their main partner's email address. An email was sent to the participant's partner that contained a link to enroll in the study. Both partners must have met the inclusion criteria described earlier.

Email addresses were used to link survey responses between partners, and post-hoc analyses of response consistency (e.g., relationship duration) was used to verify the couples' relationship. Every fifth couple that completed the survey received two modest incentives via email (e.g., \$20 electronic gift card for each partner). The BLINDED Institutional Review Board approved the study protocol.

Online survey

The online survey service provider Survey Gizmo hosted our study webpage, electronic consent form, and confidential, online survey through the use of a secure access portal. Though we collected each participant's email addresses, no other personal identifying information was collected. Email addresses were deleted following data collection.

Measures

Outcome Variable—To assess testing history during the primary relationship, men were prompted and asked to describe their HIV testing history since the relationship started. Specifically, participants were prompted with “Please select which option that best describes your HIV testing history since the relationship started”, and provided with the following options to select: “I have not been tested for HIV since the relationship started”, “On average, I would get tested about once a year”, “On average, I would get tested about every 6 months”, “On average, I would get tested about every 3 to 4 months” or “I would only get tested if I felt I was at risk”. Men who reported testing every 3, 4, or 6 months were collapsed into a single category for the purpose of this study.

Independent Variables—Participants' characteristics, including sociodemographics, are shown in Table 2. Men were asked to self-report their perceived HIV status, their primary partner's perceived HIV status, engagement of UAI within the relationship (e.g., with main partners), whether they had sex with any casual MSM partners within the previous three months, and of these men, whether they had UAI with a casual MSM partner.

Relationship characteristics assessed included relationship duration, cohabitation duration, and whether men and their main partner concurred about having a sexual agreement in their relationship (i.e., an explicit mutual understanding between the two partners about what sexual behaviors are allowed to occur and with whom).

Several validated scales were used to assess additional characteristics of men's relationships, including their levels of trust¹⁵, relationship commitment^{16, 17}, communication patterns¹⁸, and investment in a sexual agreement.¹⁹ Details about these scales - including a description of each subscale, the number of items, and reliability coefficients - are provided in Table 1.

Data analysis

The present study uses data from an original study about MSM couples' behaviors and relationship characteristics that collected dyadic data from 361 male couples (N = 722 MSM). To accomplish our study aims, this secondary analysis excludes all but men who self-identified as HIV-negative (N = 550) and having a HIV-negative concordant relationship (N = 275 seronegative male couples). Data from the 550 HIV-negative

partnered men were analyzed using Stata Version 12 (StataCorp, College Station, TX). Data were adjusted accordingly for missing values²⁰, and several variables were transformed for descriptive purposes. UAI with primary and casual partners in the past three months was transformed into binary variables (yes/no). In addition, a participant's report about having a sexual agreement was compared to his partner's report of the same item to create a dummy variable reflecting whether both men concurred about having a sexual agreement in their relationship or not. This same procedure was used to construct a dummy couple-level variable to indicate whether one or both men within the couple (vs. neither partner) reported having sex with a casual MSM partner outside of their relationship.

Descriptive statistics included means, standard deviations, rates, and percentages. Bivariate analyses were conducted to assess whether differences existed between the four types of men's self-reported HIV testing histories. One-way analysis of variance with bonferroni correction was used to assess differences between the four groups of men's self-reported HIV testing histories for continuous variables. For categorical and dichotomous measures, tests of association using Fisher's exact and Pearson's Chi-square were calculated.

Characteristics from the bivariate analyses that were identified as statistically significant (i.e., P – value < 0.05) between the four types of men's HIV testing histories were included in a multivariate multinomial regression model. For this model, the referent category was men who self-reported never have been tested for HIV while in their current relationship. A backward elimination strategy was used to remove variables that remained non-significant until all variables remained significant, including the overall final model (i.e., P – value < 0.05). However, age, race/ethnicity, education level, relationship duration, UAI with the main partner, and UAI with a casual MSM partner were included as potential confounders for the multivariate multinomial regression model. Stata provides an option to calculate the Relative Risk Ratio (or RRR) from the multinomial log-odds coefficient. The RRR is interpreted as the change in the outcome relative to the referent group (in this case, men who self-reported never have been tested while in their current relationship) for each unit change in the predictor variable given all other variables in the model are held constant.²¹ The RRR often is interpreted similarly to an odds ratio when conducting multinomial logistic regression analyses. We report the RRR, 95% confidence interval, and statistical significance for the factors in the final multivariate multinomial regression model.

RESULTS

Table 2 shows the demographic, sexual risk behavior, and relationship characteristics for the total sample of self-reported HIV-negative partnered men and by HIV testing group. In general, men were mostly white, employed, gay-identified, and lived in an urban environment. Of the 550 MSM, 21% (n=118) self-reported they test for HIV every 3, 4, or 6 months; 29% (n=158) test for HIV on a yearly basis; 30% (n=163) test only when they felt at-risk for HIV; and 20% (n=111) never tested for HIV while in their current relationship.

Compared to the other testing groups, men who never tested for HIV while in their current relationship tended to be younger ($F(3, 546) = 10.16, p < 0.000$) and have a shorter relationship duration ($F(3, 546) = 12.32, p < 0.000$). A lower proportion of men who had

never been tested for HIV in their current relationship had a bachelor's degree or higher (33%; $\chi^2(3) = 17.87, p < 0.000$), a sexual agreement present in their relationship (48%; $\chi^2(3) = 10.01, p < 0.05$), or were in a couple that had one or both men having had sex with a casual MSM partner (12%; $\chi^2(3) = 27.47, p < 0.000$) compared to men in the other three testing histories. Moreover, men who had never been tested for HIV while in their current relationship reported having higher levels of relationship commitment ($F(3, 526) = 3.05, p < 0.05$), faith for trust toward their main partner ($F(3, 524) = 3.48, p < 0.05$), and satisfaction and value toward investment of their sexual agreement ($F(3, 376) = 2.63, p = 0.05$; $F(3, 373) = 2.85, p < 0.05$, respectively); however men in this group perceived that fewer quality of alternatives existed than being in their current relationship ($F(3, 524) = 4.36, p < 0.01$).

Table 3 shows results from the multivariate multinomial regression model. As noted earlier, the reference group for every comparison was men who have never been tested for HIV while in their current relationship.

Never testers vs. 3, 4, or 6-month HIV testers

Compared to the never tester group, men who tested for HIV every 3, 4, or 6 months were more likely to be a racial or ethnic minority ($RRR = 0.44 [0.22, 0.91], p < 0.05$), report that they or their primary partner have had sex with a casual MSM partner in the prior 3 months ($RRR = 5.35 [1.97, 14.52], p < 0.01$), and concur with their main partner about having a sexual agreement in their relationship ($RRR = 2.04 [1.00, 4.14], p < 0.05$). However, men who tested for HIV every 3, 4 or 6 months were less likely to report having higher levels of faith for trust toward their main partner ($RRR = 0.67 [0.50, 0.91], p < 0.01$).

Never testers vs. annual HIV testers

Compared to the never tested group, men who tested for HIV on a yearly basis were significantly more likely to have a Bachelor's degree or higher ($RRR = 2.07 [1.19, 3.60], p < 0.05$) and to report that they or their partner had engaged in sex with a casual MSM partner in the prior 3 months ($RRR = 4.43 [1.73, 11.35], p < 0.01$).

Never testers vs. felt at-risk testers

Finally, men who tested for HIV only when they felt at-risk were significantly more likely than the never tested group to have a Bachelor's degree or higher ($RRR = 2.26 [1.27, 4.03], p < 0.01$) and to report that they or their partner have had sex with a casual MSM partner in the prior 3 months ($RRR = 2.86 [1.07, 7.68], p < 0.05$), but were significantly less likely to report having high levels of faith for trust toward their main partner ($RRR = 0.76 [0.57, 1.00], p < 0.05$).

DISCUSSION

Testing for HIV is a critical component to prevention and treatment efforts. Prior research studies with MSM and gay male couples have generally described HIV testing behaviors as discreet events, either within the past three or twelve months. The findings from our study provide greater information on the frequency of interval testing among self-reported HIV-negative MSM in primary seroconcordant relationships, as well as on which demographic

and relationship factors are associated with men with different testing histories. The four primary findings of this study are described below.

Our findings suggest that being in a couple that had one or both men having had sex with a casual MSM partner was associated with testing for HIV yearly or every 3, 4, or 6 months. Men within these couples may be aware of the heightened risk for acquiring HIV or other STIs through having multiple sexual partners. Although UAI with primary or casual partners was not significantly associated with more regular HIV testing, men may be concerned of the effect of their sexual behavior with casual MSM partners has on their primary relationship, as well as the potential to harm their main partner. These results suggest that targeting couples who have one or both men having sex with casual MSM partners to test regularly may be achieved by appealing to the potential impact (e.g., HIV/STI transmission, relationship dissolution) that their outside sexual activities have on their main partner and/or relationship.

Men who concurred with their main partner about having a sexual agreement were twice as likely to test for HIV every 3, 4, or 6 months compared to those who have never been tested for HIV while in their current relationship. One recent study with gay male couples found that a primary reason that men establish a sexual agreement with their main partners is to minimize their risk for HIV and other STIs.²² It is possible that some of these men may have agreed to integrate regular HIV testing (e.g., to occur at certain intervals) as a part of their sexual agreement with their main partner. Future research should further explore the possibility of encouraging partners to include regular HIV testing as an important part of their sexual agreement.

An important finding was that men who had more faith in trust, defined as feelings of confidence in the relationship and the responsiveness and caring expected from the partner in the face of an uncertain future¹⁶, were more likely to never have been tested for HIV while being in their current relationship. Men who have higher levels of faith in trusting their main partner may rely on their partner to prompt them to get tested, or believe that testing for HIV at regular intervals is unnecessary when they are in a primary relationship. Prior research with MSM has described trust as a barrier to condom use.^{23–27} In a similar manner, trust may interfere with HIV testing behaviors because partners who have high levels of trust toward one another may view testing as a possible violation of that trust. Additional research is warranted to further explore how concepts of trust affect partnered men's and gay male couples' HIV testing behaviors, including their interval or history to test for HIV while in a primary relationship.

Education level and being a racial or ethnic minority were also associated with HIV testing history in this sample of men. Compared to men who never tested for HIV, men who obtained a Bachelor's degree or higher were approximately twice as likely to test for HIV on a yearly basis or only when they felt at-risk for acquiring HIV. These educated men may rationalize their level of risk to justify how often they should get tested for HIV. In contrast to the perception that MSM who have higher levels of education test often for HIV, our findings suggest this notion is not necessarily true. One way to ensure that all partnered men are testing for HIV at intervals that match their risk profile is to encourage practitioners who

provide sexual health services to ask gay men and other MSM about the characteristics and sexual behaviors of their current primary relationships. Practitioners could then recommend and suggest appropriate testing intervals that match their patients' sexual behaviors and needs. The finding that men who identified as racial or ethnic minorities had greater odds of testing for HIV every three, four, or six months compared to White participants is consistent with at least one prior study of testing behavior among MSM.¹¹ Men of color may be more aware of their heightened risk for HIV infection, and therefore test regularly than their White counterparts. Alternatively, because men were recruited via *Facebook*, men of color in this sample may have had relatively high socioeconomic status that may have influenced their frequent testing behaviors.

Limitations

Several limitations of the current study are noted. First, the use of a cross-sectional study design with a convenience sample MSM in the U.S. does not allow for casual inference and these results cannot be generalized to all Internet-using HIV-negative partnered MSM who live in the United States or those who do not use *Facebook*. Second, although we did not collect identifying information, biases of participation, social desirability, and recall may have influenced the men to inaccurately self-reported information about their HIV status, sexual behaviors, and HIV testing history. Third, a number of possible factors associated with testing frequency were not assessed, including participant's knowledge of HIV transmission related behaviors, their perceived risk for acquiring HIV, and their health-seeking behaviors. Additional potential relationship characteristics, such as definitions of monogamy within the relationship or intimate partner violence, could have affected their history for testing for HIV while in their current relationship. Further, men's testing behaviors before their current relationship was not assessed, which may have resulted in a small percentage of men who have been in their primary relationship for a short time being categorized as never testing despite having tested regularly for HIV prior to their current relationship. In addition, the present study only included men who were in a concordantly negative relationship (i.e., HIV-negative MSM couple). As such, their testing behaviors may have differed from HIV-negative MSM who were in a HIV-discordant relationship. Future studies may benefit from the inclusion of these limitations and factors to assess factors associated with frequent HIV testing among MSM couples and to make more direct comparisons with existing literature.

Despite these limitations, this study advances understanding of HIV-negative partnered men's HIV testing histories in the context of their primary relationships. The CDC's current HIV testing recommendations for gay, bisexual, and other MSM may not be specific enough for certain subpopulations of MSM, including those who are currently in a same-sex relationship. For example, men who engage in UAI within their relationship and have sex outside of their relationship could benefit by getting tested for HIV and other STIs more often than the current recommendation of annually, especially when condoms are not always used for anal sex with casual partners.

To date, few studies have examined MSM's HIV testing histories even though the prevalence of UAI remains high both within and outside of primary relationships. Greater

focus on MSM's testing behaviors is timely given the low testing rates reported within this population. Finally, interventions are urgently needed that not only encourage and assist at-risk HIV-negative partnered MSM to test for HIV, but to also develop and sustain an interval testing plan that accurately reflects the dynamics of their individual risk and relationship profile.

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Table 1

Measures used to assess relationship characteristics of commitment, trust, communication patterns, and investment in a sexual agreement

Measure with subscales	Description	Items	α
Investment model ^a		22	0.90
Commitment level	Long-term orientation toward the partnership, intention to remain in a relationship, and psychological attachment to a partner	7	0.84
Satisfaction level	In a comparative fashion, assesses the negative and positive outcomes of the relationship	5	0.91
Investment size	Existence of concrete or tangible resources in the relationship that would be lost or greatly reduced if the relationship ends	5	0.74
Quality of alternatives	Perception that being single or an attractive alternative partner existed outside of the main relationship, and that this alternative would provide superior outcomes when compared to the current relationship	5	0.80
Trust scale ^b		17	0.89
Predictability	Consistency and stability of a partner's specific behaviors based on past experience	5	0.72
Dependability	Dispositional qualities of the partner which warrant confidence in the face of risk and potential hurt	5	0.69
Faith	Feelings of confidence in the relationship and the responsiveness and caring expected from the partner in the face of an uncertain future	7	0.90
Communication Patterns scale ^c		11	
Mutual constructive	Extent that men discuss and resolve problems with their main partner through the expression of emotions and understanding of viewpoints	3	0.83
Mutual avoidance and withholding	Whether men avoid, withdraw after, and withhold discussion with their main partner	8	0.85
Sexual Agreement Investment scale ^d		13	0.96
Commitment	Commitment to the sexual agreement	4	0.93
Satisfaction	Satisfaction with the sexual agreement	3	0.85
Value	Value of the sexual agreement	6	0.94

Notes.

^aResponse scale was a 7-point Likert: "Do not agree" to "Agree completely"

^bResponse scale was a 7-point Likert: "Strongly disagree" to "Strongly agree"

^cResponse scale was a 9-point Likert: "Very unlikely" to "Very likely"

^dResponse scale was a 5-point Likert: "Not at all" to "Extremely"

Table 2

Comparison of 550 HIV-negative partnered men's characteristics by HIV testing history while in their current relationship

	Tests for HIV every 3, 4, or 6 months	Tests for HIV on a yearly basis	Tests for HIV only when felt at-risk	Never been tested for HIV ^a
Sample size	N = 118	N = 158	N = 163	N = 111
Characteristic	% (N)	% (N)	% (N)	% (N)
Sexual orientation				
Gay	98% (116)	99% (156)	98% (159)	97% (108)
Bisexual	2% (2)	1% (2)	2% (4)	3% (3)
Race				
White	74% (87)	81% (128)	85% (138)	84% (93)
Black	6% (7)	3% (5)	2% (4)	1% (1)
Latino	7% (8)	8% (12)	6% (10)	5% (5)
Other including mixed	14% (16)	8% (13)	7% (11)	11% (12)
Bachelor's degree or higher ^{***}	47% (56)	56% (89)	56% (92)	33% (37)
Employed full or part-time	77% (91)	83% (131)	83% (136)	80% (89)
Lives in urban environment	90% (106)	92% (146)	87% (141)	83% (92)
Relationship duration ^{***}				
3 – 6 months ^b	16% (19)	8% (12)	6% (9)	18% (20)
6 months – 2 years	36% (43)	28% (45)	25% (40)	41% (46)
2 – 5 years	25% (29)	27% (42)	29% (48)	28% (31)
5 – 10 years	13% (15)	17% (27)	23% (37)	8% (9)
More than 10 years	10% (12)	20% (32)	18% (29)	5% (5)
Sexual agreement present in relationship (both men concur) [*]	67% (79)	63% (99)	57% (93)	48% (53)
One or both men in the couple had sex with a casual MSM partner in prior 3 months ^{***}	41% (48)	37% (58)	29% (47)	12% (13)
Unprotected anal intercourse (UAI)				
With main partner	86% (101)	83% (131)	79% (129)	86% (95)
With casual MSM partner	16% (19)	15% (23)	13% (21)	6% (7)
With both main partner and casual MSM partner	14% (16)	13% (21)	12% (20)	5% (5)
HIV interval testing history while in current relationship	N=118	N=158	N=163	N=111
Tested every 3 to 4 months	26% (31)			
Tested every 6 months	74% (87)			
Tested every 12 months		100% (158)		
Tested only if felt at-risk			100% (163)	
Never been tested				100% (111)
Characteristic [range]	M (SD)	M (SD)	M (SD)	M (SD)

	Tests for HIV every 3, 4, or 6 months	Tests for HIV on a yearly basis	Tests for HIV only when felt at- risk	Never been tested for HIV ^a
Sample size	N = 118	N = 158	N = 163	N = 111
Characteristic	% (N)	% (N)	% (N)	% (N)
Age [18 – 59 years]***	29.8 (8.8)	34.1 (11.1)	32.4 (10.1)	27.9 (8.2)
Relationship duration [3 – 219 months]***	44.7 (52.7)	68.2 (64.5)	70.9 (71.6)	32.9 (38.5)
Investment model [0 – 6]				
Commitment level*	5.24 (1.0)	5.48 (0.8)	5.44 (0.8)	5.56 (0.7)
Quality of alternatives (to relationship) **	3.47 (1.6)	3.69 (1.2)	3.75 (1.2)	4.10 (1.3)
Relationship satisfaction	4.85 (1.2)	5.04 (1.0)	4.85 (1.1)	5.09 (0.9)
Investment size	4.57 (1.1)	4.87 (0.9)	4.78 (1.0)	4.68 (1.0)
Trust scale [1 – 7]				
Predictability of partners' behavior/actions **	4.99 (1.4)	5.48 (1.1)	5.40 (1.2)	5.40 (1.1)
Dependability to rely on partner*	5.40 (1.3)	5.74 (0.9)	5.62 (1.1)	5.74 (0.9)
Faith that partner will do no harm*	5.84 (1.1)	6.16 (1.0)	5.95 (1.0)	6.20 (0.8)
Sexual agreement investment scale [0 – 4] ^c				
Commitment	3.58 (0.6)	3.51 (0.6)	3.54 (0.6)	3.72 (0.5)
Satisfaction*	3.34 (0.7)	3.23 (0.8)	3.13 (0.8)	3.44 (0.6)
Value*	3.55 (0.6)	3.46 (0.7)	3.37 (0.7)	3.63 (0.5)
Communication patterns [1 – 9]				
Mutual constructive	7.25 (1.6)	7.26 (1.6)	7.17 (1.6)	7.36 (1.5)
Mutual avoidance and withholding	3.50 (1.8)	3.25 (1.5)	3.61 (1.7)	3.24 (1.7)

Notes

^a Never been tested for HIV included men who reported having never been tested for HIV since they've been in their current relationship.

^b The 19 men who had been in their current relationship for 3–6 months and indicated getting testing for HIV at every 3, 4 or 6 months, were generally evenly distributed to represent relationship durations of 3 months, 4 months, 5 months, and 6 months.

^c Not all men indicated having a sexual agreement in their relationship. Data reflects scores reported by 392 men.

* $P < 0.05$,

** $P < 0.01$,

*** $P < 0.001$

Table 3

Characteristic differences of HIV-negative partnered men's HIV testing history: Comparing those who have never been tested to those who test at different intervals while in their current relationship

Ref: Never been tested for HIV	Tests for HIV every 3, 4, or 6 months	Tests for HIV on a yearly basis	Tests for HIV only when felt at-risk
Demographic characteristic	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
Race: White (vs. others)	0.44 (0.22, 0.91) *	0.51 (0.26, 1.03)	0.79 (0.40, 1.55)
Bachelor's degree or higher	1.72 (0.91, 3.23)	2.07 (1.19, 3.60) *	2.26 (1.27, 4.03) **
Relationship characteristic			
One or both men in the couple had sex with a casual MSM partner in prior 3 months	5.35 (1.97, 14.52) **	4.43 (1.73, 11.35) **	2.86 (1.07, 7.68) *
Sexual agreement present in relationship (both men concur)	2.04 (1.00, 4.14) *	1.24 (0.66, 2.33)	1.20 (0.66, 2.16)
Trust: Faith	0.67 (0.50, 0.91) **	0.94 (0.70, 1.26)	0.76 (0.57, 1.00) *

Notes.

Multivariate multinomial regression model controlled for age, race/ethnicity, education level, relationship duration, UAI with main partner, and UAI with a casual MSM partner as potential confounders.

* $P < 0.05$,

** $P < 0.01$,

*** $P < 0.001$