Psychosocial Characteristics and Sexual Behaviors of People in Care for HIV Infection: An Examination of Men Who Have Sex with Men, Heterosexual Men and Women

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Abstract

Few studies have examined the psychosocial factors associated with sexual transmission behaviors among HIV-positive men who have sex with men (MSM), heterosexual men (MSW) and women. We enrolled 1,050 sexually active HIV-positive patients at seven HIV clinics in six US cities as part of a clinic-based behavioral intervention. We describe the sexual transmission behaviors and examine demographic, clinical, psychosocial, and clinic prevention variables associated with unprotected anal or vaginal intercourse (UAVI). Twenty-three percent of MSM, 12.3% of MSW and 27.8% of women engaged in UAVI with partners perceived to be HIV-negative or of unknown serostatus. Among MSM and MSW, having multiple partners and lower self-efficacy were associated with increased odds of UAVI. Self-rating one's health status as excellent/very good was a risk factor for UAVI among MSM. Among women, binge drinking and stressful life events were associated with UAVI. These findings identify variables that warrant attention in targeted interventions.

Keywords

HIV; HIV prevention; Sexual behavior; STDs; STD prevention

Introduction

Approximately 56,000 people in the United States become infected with HIV infection each year [1]. Approximately 80% of these new infections stem from unsafe sexual behaviors, and approximately half of those new HIV infections stem from behaviors of persons who are aware that they are infected with HIV [2]. While many HIV-positive persons reduce or eliminate their risk behaviors after they are diagnosed, some continue to engage in unprotected sex and place others at risk for infection [3-5].

Previous studies examining the prevalence of unsafe sex among HIV-positive persons [3-5] have focused on the behaviors of men who have sex with men (MSM). Much less is known about the sexual behaviors of HIV-positive heterosexual men (MSW) and women. Further, most studies have not provided data on the highest transmission risk behaviors (e.g., unprotected insertive anal sex among HIV-positive MSM). The transmission risk is about five times higher when HIV-positive MSM engage in unprotected insertive, anal sex with partners at risk for infection, when compared to unprotected receptive anal sex [6]. Most epidemiologic and behavioral studies report prevalence rates of "unprotected anal sex" that combine insertive and receptive acts [7]. Also, most studies have focused on the prevalence of behavior (e.g., engaged in a behavior at least once in a specified time period) without considering the number of sexual partners placed at risk. It is possible that relatively few HIV-positive persons engage in very high transmission-risk behaviors, but those who do may engage in those behaviors with many partners. A more refined understanding of transmission risk necessitates data on specific behaviors and the number of sexual partners placed at risk.

Identifying the theoretically and empirically identified factors associated with sexual risk behavior among HIV-positive persons may inform the design of prevention programs or

interventions for those individuals. Social cognitive theory postulates that the degree of self-efficacy, or one's confidence to perform specific tasks, as determined by external social influences, influences health behaviors, such as practicing safer sex [8]. Prior studies have identified several psychosocial variables (e.g., low self-efficacy for practicing safer sex, low behavioral control over condom use, substance use, lack of communication with sex partners) that are correlated with unsafe sex among HIV-positive persons [9]. However, with a few exceptions [10-15], most studies have pooled data across sub-populations (MSM, MSW, Women) and, thus, the results of the statistical models used in those analyses must be interpreted cautiously. Among studies that have assessed differences in correlates of risky sexual practices across gender and/or sexual orientation, results have been mixed with some finding interaction effects while others have not. For example, Courtenay-Quirk and colleagues (2007) found differences in correlates of risky sexual behavior between HIV-positive MSM and HIV-positive heterosexual men and women. Several correlates were identified for MSM, including self-efficacy and substance use, but only having multiple partners among heterosexual men and no measured factors among women were associated with risky behavior. These authors concluded that more studies were needed to understand differences in intervention needs among these groups of HIV-positive persons. While Morin et al. [10] identified demographic correlates of unsafe sex that varied across MSM, MSW, and women including age, education level, and race, alcohol use was the only mutable factor found to differ and they did not test for statistical significance of interactions.

Prior studies point to the importance of examining correlates of risky sex by sub-population. Analyses that pool across groups (or do not include those groups in the analysis) may miss significant associations specific to a sub-population. And findings from pooled analyses may be incorrectly generalized to groups to whom the finding does not apply. Herein, using data collected in a baseline survey of HIV-positive persons in medical care, we provide a detailed examination of the sexual transmission risk behaviors of HIV-positive MSM (including men who report sex with men only, and those who report sex with both men and women) MSW, and women. Further, we examined an array of demographic, psychosocial, and clinical/health variables in each of these three sub-populations to identify unique and common factors associated with unsafe sex that may inform the design of targeted interventions for these persons.

Methods

Participant Selection and Recruitment

The baseline data were collected as part of an evaluation of a behavioral intervention (Positive STEPS) conducted at seven HIV clinics in six US cities (Denver, CO; Kansas City, MO; Nashville, TN; Brooklyn, NY; Chapel Hill, NC and 2 clinics in Atlanta, GA). Trained study recruiters attempted to approach all patients who presented at the clinic during recruitment periods of approximately 3 months during 2004. Patients were eligible for inclusion in the evaluation cohort if they were 18 years of age or older, planning to receive care at the clinic for at least 1 year, able to complete an interview in English, had known their HIV-positive serostatus for at least 6 months prior to recruitment, and had received care at the clinic at least once before the date of recruitment. Cohort candidates needed to be sexually active (any oral, anal or vaginal sex) or to have injected a non-prescription drug in the past 3 months. Approximately 200 patients were recruited at each of four clinics and 100–120 patients were recruited at each of three smaller clinics prior to implementing the intervention.

Baseline Data Collection

Data collection methods and tools were standardized across the sites to permit pooled analyses. Participants completed an interview using an Audio-Computer Assisted Self-Interview (ACASI). ACASI has been shown to minimize underreporting of unsafe behaviors [16, 17]. Participants were informed that none of the providers or other clinic staff would have access to their responses. Participants received a small monetary compensation after completing the baseline survey. Centrally trained research staff abstracted participants' medical records for data on HIV RNA, CD4 cell counts, and antiretroviral use in the 6 months prior to the baseline interview. All study procedures were approved by the Institutional Review Board (IRB) at each site. The project was exempted from IRB review at the Centers for Disease Control and Prevention.

Variables and Measures

Categorization of Participants by Sex Partner Gender—We classified each male participant as either MSM (including men who have sex with men only, and men who have sex with men and women) or MSW (men who have sex with women only) based on whether they had male and/or female sex partners in the past 3 months. Twenty-six men reported sex with both men and women. All women were included in one group. Nine transgender people were excluded from analyses because there were too few to be examined as a separate group.

Sexual Behaviors—Participants reported on their sexual behaviors in the past 3 months. Men were asked about insertive and receptive anal intercourse with male partners and vaginal and anal intercourse with female partners. Women were asked about vaginal and anal intercourse with male partners. Participants indicated (1) whether these activities occurred without using a condom, (2) the perceived serostatus of the partners (HIV-negative, HIV-positive, unknown), and (3) the number of partners per behavior.

Measurement of Potential Factors Associated with Risky Sexual Practices

Patient Demographic Characteristics—We assessed participants' demographic status (sex, race, ethnicity [Hispanic or not], age, education, employment status, annual income, and marital/committed relationship status). Participants were categorized as "employed" if they reported "regular full-time work," "regular part-time work," or being a "full-time student" or "full-time homemaker". Participants were categorized as "unemployed" if they reported "occasional or seasonal work," "not working," or being "retired".

Patient Clinical Factors—The ACASI asked patients how long ago they were diagnosed as HIV-positive. Participants indicated their self-perceived health (ranging from poor to excellent) using an item from the SF-36 Health Survey [18]. Based on the distribution of response, the variable was trichotomized as "excellent/very good," "good," or "fair/poor." From medical charts, we obtained the HIV RNA copy number and CD4 cell counts from laboratory results closest to the date of the baseline ACASI. Participants with HIV viral loads below 400 copies/ml were coded as having 'undetectable' levels; this cutoff was a minimal threshold available across all sites at the time of the baseline survey. We also abstracted from medical charts whether or not participants were on antiretroviral therapy (ART) during the prior 6 months.

Psychosocial Factors—The ACASI included questions about substance use in the past 3 months [19-21]. Both general use as well as use that may have occurred before sex were measured using previously developed items from the HIVNET EXPLORE instrument [22, 23]. General alcohol use was categorized as no use reported, some (but no binging which

was defined as 5 drinks/day), moderate (binging less frequently than weekly) or heavy (binging occurring at least once weekly). Participants were asked whether they used any non-prescribed substances in the past 3 months. Because few reported substance use other than crack and cocaine during that period, we categorized each participant as using or not using cocaine (powder or crack). We also assessed how often (on a 5-point scale) alcohol or drugs used in past 3 months made safer sex more difficult and whether they had ever exchanged sex for money, drugs, food, or shelter.

Participants were asked if they had ever been physically assaulted (yes/no) or had ever been sexually abused (yes/no). Participants were also asked whether they had experienced any of four stressful life events in the past 6 months: incarceration, eviction, major change in an important relationship, or fired from a job; adapted from the Holmes-Rahe Life Changes scale [24]. Participants were categorized as having none, one, or more than one stressful life event.

We measured participants' self-efficacy for practicing safer sex using a 9-item scale derived from a previously published instrument [25] and adapted for our population. Cronbach's alpha for this scale was 0.77 in our total sample. For purpose of analysis, summary scores of self-efficacy were trichotomized into tertiles (high, medium, low self-efficacy). The Center for Epidemiological Studies-Depression (CES-D) scale assessed psychological distress, with a score of 16 or higher indicating possible depression [26]. Cronbach's alpha for this scale was 0.91 in the total sample. CES-D was scored for all respondents who completed 18 or more of the 20 items.

Prevention Practices in the Clinical Setting—First, participants were asked whether their clinic had either written HIV prevention information (yes/no) or condoms (yes/no) available in the 6 months prior to the baseline ACASI. These two items were used to form a single variable reflecting whether the clinic had neither, one, or both prevention materials available. Second, participants used four 5-point Likert response scales ranging from "every clinic visit" to "never" to indicate how often their medical provider had counseled them on the following four prevention activities (safer sex, disclosure to sex partners, safer needle practices, and drug/alcohol use before sex) in the 6 months prior to the baseline assessment. We combined responses to these four items into a single prevention counseling index (potential range 4–20). The prevention index was retained as a continuous variable in analyses.

Statistical Analyses

Those who enrolled in the study were compared with those who declined participation on age, sex, and race/ethnicity. We characterized MSM, MSW, and women on demographic factors, clinical status, psychosocial variables, and their perception of prevention practices at the clinic. These three sub-samples were also characterized with regard to the prevalence of sexual behaviors with partners perceived to be HIV-positive, HIV-negative, and unknown serostatus and the number of partners.

To examine factors independently associated with occurrence of unprotected anal or vaginal intercourse (UAVI) with at-risk partners (i.e., those perceived by participants to be HIV-negative or of unknown serostatus), multivariable logistic regression models (SAS© 9.10) were conducted for the total sample and then separately for MSM, MSW, and women. The following variables were not included in any of the regression models due to multicollinearity with other variables (income, currently on ART, exchange sex, injection drug use, and alcohol or drug use made safer sex more difficult). The variable reflecting participants' perceptions of whether the clinic had prevention materials available was not included in the multivariable model for MSW due to lack of model convergence. Based on

an a priori conceptual model incorporating social cognitive theory and empirical studies of factors known to be associated with risky sexual behavior, all other variables were entered into the models without prior univariate screening to control for any small instances of confounding. All models were adjusted for study site. A Bonferroni adjustment of the alpha-level was applied when multiple comparisons to a referent category were made [27]. For example, when two comparisons to the referent were made, the alpha-level of .05 was divided by 2 generating a 97.5% confidence interval instead of the traditional 95% confidence interval.

We conducted additional analyses to assess for possible interaction effects involving the three sub-samples. That is, variables that were found to be significantly associated with risky sexual behavior in one or two sub-samples but not in another were formally tested in two-way interaction terms (3 sub-samples × variable). These interaction terms were tested simultaneously in the total sample model.

Results

Analytic Sample

A total of 2,451 patients were approached during the recruitment period, 2,087 (85%) agreed to be screened, and 1,282 (61%) of these were eligible for inclusion in the measurement cohort. Of the 805 who were screened and ineligible, 94% were neither sexually active nor injected a non-prescription drug in the previous 3 months. Among the 1,282 eligible patients, 1,109 (87%) agreed to participate and completed the ACASI survey. Those who agreed to participate did not differ from those who declined in terms of age, sex, or race/ethnicity (all $P > 0.05$). The analytic sample was 1,050 of the 1,109 who enrolled. We removed 27 patients who reported in the baseline ACASI survey that they had not engaged in anal, vaginal, or oral sex in the past 3 months [26 of these were eligible for the study due to intravenous drug use], 23 patients who did not provide sexual behavior information for any partner, and the 9 transgender individuals).

Sample Characteristics

In the total sample (Table 1), 496 (47%) were MSM, 227 (22%) were MSW, and 327 (31%) were women. Overall, 61% were African American and 31% were white; the other racial categories can be seen in Table 1. Approximately 77% of the MSW and 77% of the women were African American; 42% of the MSM were African American. In terms of clinical status, 34% of the total sample was diagnosed with HIV infection over 10 years ago; only 5% were diagnosed within the previous year. Overall, 80% had CD4 cell counts 200, 45% had HIV RNA copy numbers <400/ml, and 70% were on ART in the past 6 months.

Psychosocial Factors

Drug and alcohol use in the past 3 months was reported frequently. In the full analytic sample, moderate or heavy binge drinking was reported by 44%; use of crack or powder cocaine was reported by 15%. Forty-two percent had used drugs or alcohol before sex in the past 3 months; the percentage was highest among MSM (51%). Eight percent had ever exchanged sex for money, drugs, food, or shelter with the percentage being highest among MSM (11.4%). Forty-four percent of the full sample reported ever having been physically assaulted or sexually abused; the percentage was 45% among MSM, 30% among MSW, and 51% among women. Overall, 53% had experienced at least one stressful life event in the past 6 months and almost half (49%) met criteria for possible depression.

Perceptions of Prevention Materials and Activities at the Clinic

Over 80% of the MSM, MSW, and women perceived that their clinic provided *both* written prevention materials and condoms at their clinic. On the prevention counseling index (scaled from 4 to 20), patients had a relatively high mean score (17.2; similar values in each sub-sample), indicating that participants on average said that they received prevention counseling from their medical provider at "more than half of the visits."

Unprotected Anal and Vaginal Intercourse

Occurrence of UAVI with at-risk partners (referred to below as UAVI/AR) in the prior 3 months was reported among 23.0% of MSM, 12.3% of MSW, and 27.8% of women. The prevalence of specific sexual behaviors with different serostatus partners are presented in Table 2. In general, for each sub-sample, the prevalence of unprotected anal or vaginal intercourse was greater with HIV-positive partners than with HIV-negative or serostatus unknown partners. The one exception was among women; the prevalence of unprotected vaginal intercourse was the same with HIV-positive and HIV-negative male partners.

With respect to numbers of at-risk partners (Table 2), among MSM, 13.7% engaged in unprotected insertive anal intercourse with a total of 225 at-risk male or female partners in the prior 3 months. For MSW, 12.4% engaged in unprotected vaginal intercourse with 67 at-risk female partners and 2.6% engaged in unprotected anal intercourse with 37 at-risk female partners. For women, 26.6% engaged in unprotected vaginal intercourse with 117 at-risk male partners and 6.4% engaged in unprotected anal intercourse with 22 at-risk male partners.

Multivariable Analysis of Unprotected Anal or Vaginal Intercourse with At-Risk Partners

Factors associated with UAVI/AR in the prior 3 months are reported in Table 3 for the total sample and in Table 4 for the three sub-samples. Significant findings are given in bold. In the multivariable model for the full sample, the odds of UAVI/AR were lower among MSM and MSW than women, among participants with more than one (vs. no) stressful life event in the prior 6 months, and among participants who had more than one (vs. 1) sex partner in the prior 3 months. The odds of UAVI/AR were lower among participants who reported a medium or high (vs. low) level of perceived self-efficacy to practice safer sex.

Among MSM, those who rated their health as very good/excellent or good (versus fair/poor) and those who had more than one (vs. 1) sex partner had an increased odds of UAVI/AR. MSM who had high (vs. low) self-efficacy to practice safer sex and those who perceived that their clinic provided written prevention materials and condoms (vs. neither) had reduced odds of UAVI/AR.

Among MSW, those with high (vs. low) self-efficacy and those who experienced one or more (vs. 0) stressful life events in the past 6 months had reduced odds of UAVI/AR. MSW who reported that they had more than one (vs. 1) sex partner in the past 3 months had a substantially higher odds of UAVI/AR. Finally, the odds of UAVI/AR increased with the frequency of prevention counseling that was reported among MSW.

Among women, the odds of UAVI/AR were higher among those who reported recent binge drinking (vs. no drinking or no binge drinking), among women who reported more than one stressful life event (vs. none) in the past 6 months, and among women who were employed (vs. unemployed).

Of note, self-rated health status, unemployment, and stressful life events were found to have significant ($P < .05$) interactions with the sub-samples, indicating that the variable had a

significantly stronger association with UAVI/AR in one sub-sample than in another sub-sample as seen in Table 4.

Discussion

In this diverse sample of 1,050 sexually active people in care for HIV infection, a substantial proportion (nearly a fourth) engaged in unprotected sexual behavior that could transmit HIV to at-risk partners. This finding is consistent with prior research [4, 5, 28-31]. Our findings go beyond prior studies, however, in showing the large numbers of partners who were exposed to HIV in a relatively short period. Our findings confirm the need for sustained prevention with positives programs in the United States and those programs need to take the distinct behaviors of MSM, MSW, and women into consideration.

The sexual behavior patterns of the MSM and the MSW, but not women, showed signs of serosorting (i.e., the prevalence of unprotected anal or vaginal intercourse was highest with HIV-positive partners). In contrast, women engaged in UAVI with the same proportion of HIV-positive (19%) and HIV-negative partners (19%). Fewer women (10%) engaged in UAVI with unknown serostatus partners. The findings among the MSM are consistent with other studies showing that MSM diagnosed with HIV infection are more likely to practice safer sex with HIV-negative or unknown serostatus partners than HIV-positive partners [32-34], but the presence of serosorting among seropositive heterosexual men and the absence of serosorting among seropositive women are new findings. These findings suggest that whereas men may chose to practice safer sex based upon their perceptions of the partner's serostatus, women may face a more complicated situation. Women appear more likely to practice safer sex with partners of unknown status, perhaps because these partners are less familiar (i.e. casual partners versus main partners). Some of the women's HIV-negative partners (some of whom may be main partners) may not want to use a condom even when they know that the woman is infected [35]. These findings warrant further investigation to assess the decision-making processes of people living with HIV to practice safer sex with different partners and to understand how women's decisions are influenced by male partner's preferences.

For MSM, self-ratings of health status, but not CD4 cell counts or HIV RNA from medical charts, were strongly associated with UAVI with at-risk partners. MSMs' subjective appraisals of positive health status appear to be more important for understanding who practices unsafe sex with at-risk partners than objective indicators of HIV disease consistent with other studies [7]. MSM who had greater self-efficacy to practice safer sex and who perceived that their clinic provided more prevention materials were less likely to engage in UAVI with at-risk partners suggesting that MSM may benefit from HIV prevention materials, particularly those that enhance safer sex self-efficacy. Further, prevention messages emphasizing reduction in the number of sex partners might be beneficial.

Like MSM, MSW who had more than one partner had increased odds of UAVI with at-risk partners and those with greater self-efficacy to practice safer sex had reduced odds of that behavior. Confidence in one's ability to practice safer sex seems to play an important role for men and, accordingly, should be part of behavioral interventions for seropositive men. Two other findings among MSW were unexpected. First, having one recent stressful life event was associated with reduced odds of UAVI with at-risk partners. Incarceration in the past 6 months was one of the four stressful life events assessed and we speculate that imprisonment may partly explain the association between stressful events and reduced odds of UAVI with at-risk partners. Second, the odds of practicing UAVI with at-risk partners was higher when the frequency of provider-delivered prevention counseling increased It is

possible that heterosexual men who communicated to their providers about their risky behaviors received more counseling from their providers.

Women who were unemployed had a reduced odds of UAVI with at-risk partners. This finding is difficult to explain with the data at hand. Although the association was observed in a multivariate model, other unmeasured variables may account for it. For example, unemployed women may place themselves in fewer social situations that increase the possibility for unsafe sex, such as going to bars, clubs, or other events where they might have casual sex, all factors which we did not measure. Also, the employed group, which served as the referent in the analysis, included persons with regular full-time and regular part-time jobs as well as full-time homemakers and full-time students. We did not have enough women in our sample for a reliable analysis of these different sub-groups.

Interestingly, despite being an important factor in both MSM and MSW, self-efficacy for safer sex was not associated with UAVI with at-risk partners among women. Women may feel that they have less control over the use of condoms [36], particularly if they are unaware of female condoms. Furthermore, for women, the number of partners in the past 3 months was not associated with UAVI with at-risk partners as it was for both groups of men perhaps because fewer women had more than one partner compared with men. For women, stressful life events and binge drinking were associated with increased odds of UAVI with at-risk partners. Women appear to need interventions that address heavy alcohol consumption and coping strategies to help them with stressful life events [37-39].

Several variables were significant in one sub-sample but not in another, thus providing insight into factors that may need attention in group-targeted intervention programs. Only three variables, however, had significant interactions with the sub-samples, indicating that a significantly stronger association with UAVI with at-risk partners existed in one sub-sample than in another. Self-rated health status was significantly associated with risky sex among MSM but not MSW or women. Having more than one stressful life event in the past 6 months had a significant association among women but not men. Finally, unemployment was protective for women, although we could not fully explain this finding. These variables should be given close attention in future research and in population-specific interventions.

The limitations of this study must be kept in mind when interpreting the findings. First, as a cross-sectional analysis, causal inferences cannot be made about the observed associations. Second, participants' self-reports of behavior may contain a social desirability bias (e.g., underreporting of behavior that places partners at-risk for infection). However, this bias was minimized by using ACASI in a highly confidential manner [16]. Also, we did not examine the frequency of unprotected sex acts. Despite these limitations, the study has a number of strengths, particularly the large diverse sample from seven different HIV clinics in six cities throughout the United States made conducting separate analyses of MSM, MSW, and women possible.

Conclusions

In summary, our findings strongly indicate that there is a continuing need for prevention with positives programs. Of HIV-positive persons who are sexually active and in care, approximately 25% engaged in sexual behaviors that place others at risk for HIV infection. The problem is compounded by the fact that many of these persons have multiple at-risk partners, some of whom may become infected and unknowingly infect others. We identified several factors associated with unprotected sexual behaviors among HIV-positive MSM, MSW, and women. Some of the factors were common among sub-samples, and others were specific to a sub-sample. Our findings point to variables that may need attention in targeted

interventions. Additional research is needed to help inform the design of interventions for these groups of persons and for more individual-level approaches.

Acknowledgments

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Table 1

Participant characteristics, prevention in care study, 2004

	Total sample N = 1,050	MSM N = 496	MSW N = 227	Women N = 327
	N (%)	N (%)	N (%)	N (%)
Demographic characteristics				
Study site				
Chapel Hill, NC	186 (17.7)	60 (12.1)	64 (28.2)	62 (19.0)
Nashville, TN	193 (18.4)	120 (24.2)	32 (14.1)	41 (12.5)
Atlanta, GA	197 (18.8)	111 (22.4)	34 (15.0)	52 (15.9)
Denver, CO	183 (17.4)	147 (29.6)	15 (6.6)	21 (6.4)
Brooklyn, NY	193 (18.4)	20 (4.0)	56 (24.7)	117 (35.8)
Kansas City, MO	98 (9.3)	38 (7.7)	26 (11.4)	34 (10.4)
Race	N = 1,049 (%)			N = 326
Black/African American	636 (60.6)	208 (41.9)	176 (77.5)	252 (77.3)
White	327 (31.2)	241 (48.6)	38 (16.7)	48 (14.7)
Asian	2 (0.2)	1 (0.2)	0 (0)	1 (0.3)
American Indian/Alaskan Native	8 (0.8)	2 (0.4)	1 (0.4)	5 (1.5)
Native Hawaiian or Pacific Islander	1 (0.1)	0 (0)	0 (0)	1 (0.3)
Other[‡]	42 (4.0)	27 (5.4)	6 (2.6)	9 (2.8)
Multiple race	33 (3.2)	17 (3.4)	6 (2.6)	10 (3.1)
Age				
Mean	40.9	40.1	45.0	39.3
Median	40.8	40.3	44.5	39.1
Standard deviation	8.4	8.1	7.5	8.5
Education completed	N = 1,049 (%)			
High school or less	582 (55.5)	192 (38.8)	161 (70.9)	229 (70.0)
Some college or more	467 (44.5)	303 (61.2)	66 (29.1)	98 (30.0)
Employment status	N = 1,048	N = 495		N = 326
Regular full-time work	228 (21.8)	118 (23.8)	50 (22.0)	60 (18.4)
Regular part time work	106 (10.1)	57 (11.5)	19 (8.4)	30 (9.2)
Occasional or seasonal work	66 (6.3)	39 (7.9)	13 (5.7)	14 (4.3)
Not working	538 (51.3)	233 (47.1)	127 (56.0)	178 (54.6)
Full time student	25 (2.4)	12 (2.4)	3 (1.3)	10 (3.1)
Full time homemaker	37 (3.5)	4 (0.8)	4 (1.8)	29 (8.9)
Retired	48 (4.6)	32 (6.5)	11 (4.8)	5 (1.5)
Annual income	N = 896	N = 450	N = 188	N = 258
Less than $5,000	254 (28.4)	105 (23.3)	66 (35.1)	83 (32.2)
$5,000–$10,000	259 (28.9)	126 (28.0)	54 (28.7)	79 (30.6)
$10,001–$20,000	183 (20.4)	98 (21.8)	36 (19.2)	49 (19.0)
$20,001–$40,000	134 (15.0)	76 (16.9)	21 (11.2)	37 (14.3)
$40,001–$60,000	37 (4.1)	23 (5.1)	7 (3.7)	7 (2.7)
$60,001–$80,000	19 (2.1)	13 (2.9)	3 (1.6)	3 (1.2)

	Total sample N = 1,050	MSM N = 496	MSW N = 227	Women N = 327
	N (%)	N (%)	N (%)	N (%)
Over $80,000	10 (1.1)	9 (2.0)	1 (0.5)	0 (0)
Relationship status	N = 1,048 (%)	N = 494		
Married, committed, domestic partnership	397 (37.9)	169 (34.2)	91 (40.1)	137 (41.9)
Single	476 (45.4)	294 (59.5)	65 (28.6)	117 (35.8)
Divorced, widowed, separated	175 (16.7)	31 (6.3)	71 (31.3)	73 (22.3)
Clinical characteristics				
Duration of diagnosis				
Less than 1 year	49 (4.7)	28 (5.6)	9 (4.0)	12 (3.7)
1–2 years ago	123 (11.7)	53 (10.7)	31 (13.7)	39 (11.9)
3–4 years ago	139 (13.2)	62 (12.5)	36 (15.9)	41 (12.5)
5–7 years ago	205 (19.5)	84 (16.9)	52 (22.9)	69 (21.1)
8–10 years ago	180 (17.1)	83 (16.7)	29 (12.8)	68 (20.8)
Over 10 years ago	354 (33.7)	186 (37.5)	70 (30.8)	98 (30.0)
CD4 cell counts (from medical chart)	N = 989	N = 465	N = 209	N = 315
200	194 (19.6)	80 (17.2)	55 (26.3)	59 (18.7)
>200	795 (80.4)	385 (82.8)	154 (73.7)	256 (81.3)
HIV RNA copies (from medical charts)	N = 980	N = 462	N = 206	N = 312
<400 copies/ml	444 (45.3)	208 (45.0)	97 (47.1)	139 (44.6)
400–99,999 copies/ml	429 (43.8)	200 (43.3)	90 (43.7)	139 (44.6)
100,000 copies/ml	107 (10.9)	54 (11.7)	19 (9.2)	34 (10.9)
Currently on antiretroviral therapy	730 (69.5)	341 (68.8)	169 (74.4)	220 (67.3)
Self rated health status				
Poor	40 (3.8)	13 (2.6)	15 (6.6)	12 (3.7)
Fair	234 (22.3)	99 (20.0)	61 (26.9)	74 (22.6)
Good	400 (38.1)	189 (38.1)	86 (37.9)	125 (38.2)
Very good	258 (24.6)	137 (27.6)	40 (17.6)	81 (24.8)
Excellent	118 (11.2)	58 (11.7)	25 (11.0)	35 (10.7)
Psychosocial factors				
Alcohol use and binge drinking (>5 drinks/day) in past 3 months	N = 1,027	N = 488	N = 220	N = 319
No current drinking	405 (39.4)	139 (28.5)	98 (44.5)	168 (52.7)
Current drinking without binging	169 (16.5)	102 (20.9)	24 (10.9)	43 (13.5)
Current binge drinking < once a week	218 (21.2)	120 (24.6)	49 (22.3)	49 (15.4)
Current binge drinking at least once a week	235 (22.9)	127 (26.0)	49 (22.3)	59 (18.5)
How often did you use alcohol or drugs before having sex in the past 3 months?	N = 1,028	N = 487	N = 222	N = 319
Never	601 (58)	238 (49)	139 (63)	224 (70)
Less than half	181 (18)	99 (20)	37 (17)	45 (14)
Half of the time	97 (9)	47 (10)	21 (9)	29 (9)
Most of the time	82 (8)	58 (12)	11 (5)	13 (4)
Always	67 (7)	45 (9)	14 (6)	8 (3)

	Total sample *N* = 1,050	MSM *N* = 496	MSW *N* = 227	Women *N* = 327
	N (%)	*N* (%)	*N* (%)	*N* (%)
How often did using alcohol or drugs make having safer sex more difficult for you?	*N* = 1,019	*N* = 485	*N* = 219	*N* = 315
Never	779 (76)	345 (71)	164 (75)	270 (86)
Less than half	90 (9)	55 (11)	15 (7)	20 (6)
Half of the time	54 (5)	32 (7)	10 (5)	12 (4)
Most of the time	50 (5)	29 (6)	18 (8)	3 (1)
Always	46 (5)	24 (5)	12 (5)	10 (3)
Crack or cocaine use in past 3 months	N = 1,034	*N* = 491	*N* = 225	*N* = 318
Yes	155 (15.0)	83 (16.9)	40 (17.8)	32 (10.1)
Injected drug use in last 3 months	*N* = 1,031	*N* = 488	*N* = 225	*N* = 318
Yes	38 (3.7)	24 (4.9)	8 (3.6)	6 (1.9)
Trade sex for drugs, money, food or shelter	*N* = 1,017	*N* = 484	*N* = 221	*N* = 312
Ever	84 (8.3)	55 (11.4)	12 (5.4)	17 (5.4)
Ever experienced physical assault or sexual abuse	*N* = 1,047	*N* = 495	*N* = 227	*N* = 325
Ever	456 (43.6)	223 (45.0)	67 (29.5)	166 (51.1)
Stressful life events index				
0	496 (47.2)	211 (43)	108 (48)	177 (54)
1	382 (36.4)	180 (36)	84 (37)	118 (36)
>1	172 (16.4)	105 (21)	35 (15)	32 (10)
Self-efficacy for practicing safer sex				
High	354 (34)	150 (30)	84 (37)	120 (36.7)
Medium	345 (33)	167 (34)	81 (36)	97 (29.7)
Low	351 (33)	179 (36)	62 (27)	110 (33.6)
Depressive symptoms from CESD (total)	*N* = 1,047			*N* = 324
16	508 (49)	236 (48)	98 (43)	174 (54)
<16	539 (51)	260 (52)	129 (57)	150 (46)
Prevention activity in the clinical setting				
Prevention materials and condoms present				
None	58 (6)	27 (5)	9 (4)	22 (7)
One of two	139 (13)	64 (13)	31 (14)	44 (13)
Both	853 (81)	405 (82)	187 (82)	261 (80)
Prevention counseling index (maximum score = 20)	*N* = 1,043	*N* = 492	*N* = 225	*N* = 326
Mean	17.2	16.0	18.9	17.6
Median	16.0	15.0	19.0	17.0
Standard deviation	7.99	7.92	7.68	8.05

MSM men who only had male partners in past 3 months and men who had male and female partners in the past 3 months, *MSW* men who only had female partners in the past 3 months

[†]Of the 42 participants who responded "Other" on the race variable, 41 classified themselves as being of Hispanic ethnicity on a separate item. 25 participants in the Black/African American group, 27 in the white group, 4 in the American Indian/Alaskan Native group, 1 in the Native Hawaiian/Pacific Islander group, and 6 in the multiple race group reported that they were of Hispanic ethnicity. If the analysis was performed on less than the entire group due to missing data, the total number used in the analysis is indicated

Table 2

Prevalence of unprotected anal and vaginal intercourse in the past 3 months, prevention in care study, 2004

Sexual activity and serostatus of partner	MSM, N = 496[a] % Engaging in act, last 3 months	Total partners	MSW, N = 227[a] % Engaging in act, last 3 months	Total partners	Women, N = 327[a] % Engaging in act, last 3 months	Total partners
Unprotected insertive anal intercourse						
HIV-positive partners	26.3	(389)	4.4	(13)		
HIV-negative partners	8.3	(68)	1.8	(19)		
HIV-unknown serostatus partners	7.3	(157)	1.8	(18)		
HIV at-risk partners[b]	13.7	(225)	2.6	(37)		
Unprotected receptive anal intercourse						
HIV-positive partners	27.5	(298)			6.9	(24)
HIV-negative partners	10.9	(123)			4.1	(13)
HIV-unknown serostatus partners	10.1	(210)			2.8	(9)
HIV at-risk partners[b]	18.1	(333)			6.4	(22)
Unprotected vaginal intercourse						
HIV-positive partners	0.4	(6)	17.1	(43)	18.3	(62)
HIV-negative partners	1.0	(8)	8.3	(33)	18.6	(65)
HIV-unknown serostatus partners	1.0	(8)	5.4	(34)	8.6	(52)
HIV at-risk partners[b]	1.8	(16)	12.4	(67)	26.6	(117)
All UAVI						
HIV-positive partners	35.8	¶	18.1	¶	18.8	¶
HIV-negative partners	14.5	¶	7.9	¶	18.8	¶
HIV-unknown serostatus partners	12.7	¶	5.3	¶	9.5	¶
HIV at-risk partners[b]	23.0	¶	12.3	¶	27.8	¶

MSM/W men who only had male partners in past 3 months and men who had male and female partners in the past 3 months, *MSW* men who only had female partners in the past 3 months, *UAVI* unprotected anal or vaginal intercourse

[a] Denominator for all percentages listed below

[b] HIV at-risk partners are those perceived to be HIV-negative or of unknown HIV serostatus

¶ Numbers of sexual partners for "all UAVI" are not given because it is impossible to know whether insertive and receptive partners, for example, are the same person or different persons

Table 3

Findings from multiple regression analysis of factors associated with unprotected anal or vaginal intercourse (UAVI) with at-risk partners in total sample, prevention in care study, 2004

	Total sample Adjusted odds ratio (95% CI)
Sexual orientation based on participant's reported sex partners in last 3 months[a]	
MSM	**0.37 (0.21, 0.65)**
MSW	**0.35 (0.29, 0.65)**
Women	REF
Demographic factors	
Age (continuous)	0.99 (0.97, 1.01)
Race[a]	
Black/African American	0.95 (0.58, 1.57)
Others[*]	1.42 (0.76, 2.63)
White	REF
Education	
Some college or more	1.16 (0.81, 1.67)
HS degree of less	REF
Employment	
Unemployed (employed[**] as REF)	0.90 (0.63, 1.29)
Relationship status[a]	
Married/committed, domestic partnership	1.46 (0.93, 2.29)
Divorced/widowed/separated	1.14 (0.63, 2.06)
Single	REF
Clinical status	
Self-rated health status[a]	
Very good/excellent	1.67 (0.97, 2.90)
Good	1.38 (0.82, 2.32)
Fair/poor	REF
Duration of HIV diagnosis[a]	
<3 years	REF
3–10 years	1.30 (0.75, 2.26)
3–10 years	1.24 (0.68, 2.29)
Viral load (from medical chart)[a]	
<400	REF
400–99,999 copies/ml	0.95 (0.63, 1.44)
100,000 copies/ml	0.76 (0.41, 1.58)
CD4 (from medical chart)	
>200	REF
200	0.76 (0.47, 1.23)
Psychosocial factors	
Binge drinking (>5 drinks/day) in past 3 months	

	Total sample Adjusted odds ratio (95% CI)
Binge drinking	1.40 (0.98, 1.99)
No binge drinking or no alcohol use	REF
Crack use in past 3 months	
Yes (no as REF)	1.02 (0.64, 1.65)
Physical assault or sexual abuse (ever)	
Yes (no as REF)	1.12 (0.79, 1.59)
Stressful life events in past 6 months[a]	
0	REF
1	0.98 (0.63, 1.52)
>1	**1.80 (1.03, 3.14)**
Self-efficacy for safer sex[a]	
High	**0.43 (0.26, 0.70)**
Medium	**0.56 (0.35, 0.88)**
Low	REF
Depressive symptoms from CES-D	
16	1.21 (0.84, 1.75)
<16	REF
>1 sex partner in past 3 months	
Yes (had 1 as REF)	**2.38 (1.60, 3.56)**
Clinic prevention activities	
Perception that clinic has condoms, written materials or both available[a]	REF
Had neither	0.98 (0.41, 2.37)
Had 1	0.58 (0.27, 1.29)
Had both	
Perceived prevention counseling index (potential range 4–20)	1.01 (0.99, 1.04)

The analysis controlled for study site. There were no statistically significant associations between study site and unprotected anal or vaginal intercourse (UAVI) with at-risk partners

HIV at-risk partners are those perceived to be HIV-negative or of unknown serostatus

MSM men who only had male partners in past 3 months and men who had male and female partners in the past 3 months, *MSW* men who only had female partners in the past 3 months

[*] The "Other" category for the race variable in this analysis includes Asian, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, multiple race, or other

[**] The employed category included participants who reported "regular full-time work," "regular part-time work," being a "full-time student" or "full-time homemaker"

[a] A Bonferroni adjustment of the alpha-level was applied when multiple comparisons to a referent category were made. For example, when two comparisons to the referent were made, the alpha-level of .05 was divided by 2 generating a 97.5% confidence interval instead of the traditional 95% CI

Bold font signifies statistically significant findings ($P < .05$)

Table 4

Findings from multiple regression analyses of factors associated with unprotected anal or vaginal intercourse (UAVI) with at-risk partners by sub-sample, prevention in care study, 2004

	MSM Adjusted odds ratio (95% CI)	MSW Adjusted odds ratio (95% CI)	Women Adjusted odds ratio (95% CI)
Demographic factors			
Age (continuous)	0.99 (0.96, 1.03)	0.96 (0.88, 1.05)	0.99 (0.95, 1.02)
Race[a]			
Black/African American	1.07 (0.53, 2.16)	0.31 (0.05, 1.92)	1.05 (0.36, 3.07)
Others[*]	0.86 (0.36, 2.06)	0.11 (0.01, 2.27)	2.57 (0.71, 9.32)
White	REF	REF	REF
Education			
Some college or more	1.15 (0.66, 2.00)	1.87 (0.48, 7.29)	0.95 (0.50, 1.80)
HS degree of less	REF	REF	REF
Employment			
Unemployed[‡] (employed[**] as REF)	1.31 (0.74, 2.33)	1.79 (0.39, 8.26)	**0.53 (0.29, 0.98)**
Relationship status[a]			
Married/committed, domestic partnership	1.53 (0.79, 2.97)	2.53 (0.36, 17.63)	1.74 (0.77, 3.94)
Divorced/widowed/separated	0.74 (0.20, 2.71)	1.60 (0.28, 9.12)	1.67 (0.67, 4.17)
Single	REF	REF	REF
Clinical status			
Self-rated health status[a]			
Very good/excellent[‡]	**3.46 (1.39, 8.62)**	1.79 (0.24, 13.20)	1.23 (0.49, 3.10)
Good[‡]	**2.72 (1.14, 6.52)**	3.07 (0.50, 18.98)	1.02 (0.43, 2.42)
Fair/poor	REF	REF	REF
Duration of HIV diagnosis[a]			
<3 years	REF	REF	REF
3–10 years	2.32 (0.96, 5.60)	0.73 (0.13, 3.98)	0.77 (0.30, 1.96)
Over 10 years	1.38 (0.52, 3.69)	1.43 (0.20, 10.36)	1.09 (0.37, 3.17)
Viral load (from medical chart)[a]			
<400	REF	REF	REF
400–99,999 copies/ml	0.69 (0.36, 1.32)	1.04 (0.23, 4.75)	1.22 (0.60, 2.46)
CD4 (from medical chart)			
>200	REF	REF	REF
200	0.81 (0.38, 1.72)	1.57 (0.37, 6.58)	0.50 (0.22, 1.18)
Psychosocial factors			
Binge drinking (>5 drinks/day) in past 3 months			
Binge drinking	1.07 (0.63, 1.83)	0.86 (0.24, 3.12)	**2.16 (1.15, 4.07)**
No binge drinking or no alcohol use	REF	REF	REF
Crack use in past 3 months			
Yes (no as REF)	1.22 (0.63, 2.37)	2.09 (0.48, 9.05)	0.83 (0.28, 2.43)

	MSM Adjusted odds ratio (95% CI)	MSW Adjusted odds ratio (95% CI)	Women Adjusted odds ratio (95% CI)
Physical assault or sexual abuse (ever)			
Yes (no as REF)	1.26 (0.74, 2.15)	0.85 (0.23, 3.07)	0.97 (0.53, 1.79)
Stressful life events in past 6 months[a]			
0[‡]	REF	REF	REF
1[‡]	1.65 (0.83, 3.28)	**0.14 (0.02, 0.95)**	0.81 (0.39, 1.69)
>1[‡]	2.08 (0.92, 4.70)	0.12 (0.01, 1.01)	**3.35 (1.08, 10.40)**
Self-efficacy for safer sex[a]			
High	**0.40 (0.18, 0.88)**	**0.04 (0.00, 0.31)**	0.61 (0.28, 1.33)
Medium	0.57 (0.29, 1.12)	**0.18 (0.03, 0.99)**	0.44 (0.19, 1.06)
Low	REF	REF	REF
Depressive symptoms from CES-D			
16	1.40 (0.79, 2.46)	2.38 (0.67, 8.43)	1.19 (0.62, 2.26)
<16	REF	REF	REF
>1 sex partner in past 3 months			
Yes (had 1 as REF)	**2.84 (1.61, 5.02)**	**6.39 (1.64, 24.95)**	1.35 (0.54, 3.38)
Clinic prevention activities			
Perception that clinic has condoms, written materials or both available[a]			
Had neither	REF	–	REF
Had 1	0.64 (0.18, 2.31)	–	0.70 (0.16, 3.09)
Had both	**0.30 (0.09, 0.98)**	–	0.52 (0.14, 1.89)
Perceived prevention counseling index (potential range 4–20)	1.02 (0.98, 1.06)	**1.13 (1.04, 1.24)**	0.99 (0.95, 1.03)

The analysis controlled for study site. There were no statistically significant associations between study site and unprotected anal or vaginal intercourse (UAVI) with at-risk partners

HIV at-risk partners are those perceived to be HIV-negative or of unknown serostatus

MSM men who only had male partners in past 3 months and men who had male and female partners in the past 3 months, *MSW* men who only had female partners in the past 3 months

[*] The "Other" category for the race variable in this analysis includes Asian, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, multiple race, or other

[**] The employed category included participants who reported "regular full-time work," "regular part-time work," being a "full-time student" or "full-time homemaker"

[‡] The variable had a significant (*P* < .05) interaction with sub-sample

[a] A Bonferroni adjustment of the alpha-level was applied when multiple comparisons to a referent category were made. For example, when two comparisons to the referent were made, the alpha-level of .05 was divided by 2 generating a 97.5% confidence interval instead of the traditional 95% CI

Bold font signifies statistically significant findings (*P* < .05)