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Predictors of HIV Sexual Risk Behavior among Men Who Have Sex with Men, Men Who Have Sex with Men and Women, and Transgender Women

Jane Rohde Bowers[1], **Catherine M. Branson**[2], **Jesse B. Fletcher**[3], and **Cathy J. Reback**[3,4]

[1]Office of AIDS Programs & Policy, Los Angeles County Department of Public Health, Los Angeles, California, USA

[2]School of Nursing, University of California at Los Angeles, Los Angeles, California, USA

[3]Friends Research Institute, Inc., Los Angeles, California, USA

[4]Integrated Substance Abuse Programs, Semel Institute for Neuroscience and Human Behavior, University of California at Los Angeles, Los Angeles, California, USA

Abstract

Men who have sex with men, men who have sex with men and women, and transgender women are at high risk for HIV infection. This study seeks to clarify which known HIV risk factors (partner type, sex location, serodiscordance, multiple sex partners, substance use during sex) contribute to engagement in high-risk (unprotected receptive anal) sex in each population. Data collected from June 2005 through June 2008 indicate all three populations display different HIV sexual risk profiles. The data suggest that HIV-prevention interventions should be individually tailored to address the specific needs of these three highly vulnerable and impacted populations.

Keywords

HIV/AIDS; sexual risk behaviors; men who have sex with men (MSM); bisexual men; gay men; transgender women

Introduction

HIV incidence has been steadily increasing among men who have sex with men (MSM) since the early 1990s (Hall, Song, & Rhodes, 2008) despite stabilizing or declining in other populations (Centers for Disease Control and Prevention [CDC], 2008). In the United States, of the estimated 828,000 male adults and adolescents living with HIV/AIDS, 64.3% were exposed through male-to-male sexual contact (CDC, 2008). MSM continue to be the population most affected by HIV in Los Angeles County, where it is estimated that 77% of persons living with HIV (non-AIDS) were exposed through unprotected male-to-male sexual contact and/or injection drug use with a male sexual partner (HIV Epidemiology Program, 2011). Sex with males and/or injection drug use represent known means of HIV transmission for MSM, men who have sex with men and women (MSM/W), and transgender women (TW).

Address correspondence to: Jane Rohde Bowers, MPH, Division of HIV and STD Programs, Los Angeles County Department of Public Health, 600 S. Commonwealth Avenue, 10th Floor, Los Angeles, CA 90005, USA, jrohde@ph.lacounty.gov.

Current HIV seroprevalence in Los Angeles County is estimated at 14.9% among MSM, at 12.3% among MSM/W, and at 21.0% among TW (HIV Epidemiology Program, 2009). Sexual acts differ in their risk for HIV transmission (Cohen, 2007), with unprotected receptive anal intercourse presenting the greatest likelihood of HIV transmission (Boiley et al., 2009; Varghese, Maher, Peterman, Branson, & Steketee, 2002). Although this places those MSM, MSM/W, and TW who practice unprotected receptive anal intercourse at increased risk of HIV infection, each population displays distinct behavioral profiles in terms of the factors that increase the likelihood of engaging in this HIV sexual risk behavior (Bowers, Branson, Fletcher, & Reback, 2011). For example, methamphetamine use is common among MSM, a factor that significantly increases their risk for HIV infection (Halkitis, Parsons, & Stirratt, 2001; Molitor, Traux, Ruiz, & Sun, 1998; Reback, Shoptaw, & Grella, 2008; Shoptaw & Reback, 2006). MSM who use methamphetamine concurrently with sex are more likely to have unprotected anal intercourse, placing them at higher risk for HIV infection (Colfax et al., 2005; Plankey et al., 2007).

MSM/W may be more than twice as likely to have sex while under the influence of substances when compared to MSM (Jeffries & Dodge, 2007). Additionally, MSM/W are less likely to have tested for HIV (Wheeler, Lauby, Liu, Van Syuytman, & Murrill, 2008) and twice as likely as MSM to report engaging in exchange sex (Knight et al., 2007). Furthermore, research has shown that gay-related stigma and homonegativity (Mayfield, 2001) among heterosexually identified and other nongay-identified MSM has been associated with increased risk behaviors and negative health consequences (Cochran & Mays, 2007; Harawa et al., 2008; Shoptaw et al., 2009; Wohl et al., 2002).

Compared with the other two populations, TW engage in higher rates of commercial sex activities (Bowers et al., 2011), have greater numbers of sex partners (Herbst et al., 2008; Nemoto, Luke, Mamo, Ching, & Patria, 1999; Operario & Nemoto, 2005), and are more likely to be the receptive partner during anal intercourse (Bowers et al., 2011; Clements-Nolle, Marx, Guzman, & Katz, 2001; Edwards, Fisher, & Reynolds, 2007; Reback, Lombardi, Simon, & Frye, 2005). Although these factors place TW engaging in such practices at disproportionate risk for HIV (HIV Epidemiology Program, 2009), previous studies have also noted that TW use condoms more consistently during anal intercourse than do MSM or MSM/W (Bowers et al., 2011; Chemnasiri et al., 2010; Reback et al., 2005).

Despite these differences, the three populations share some behavioral similarities that impact their risk for HIV infection. MSM, MSM/W and TW all vary their sexual risk behaviors by the level of intimacy they share with their partner. Previous studies have shown that unprotected anal intercourse is more frequent with primary partners compared with nonprimary partners for all three groups (Knight et al., 2007; Lightfoot, Song, Rotheram-Borus, & Newman, 2005; P. A. Wilson, Cook, McGaskey, Rowe, & Dennis, 2008) as unprotected sex with a primary partner may be considered an expression of love and intimacy (Carballo-Dieguez et al., 2011; Nemoto, Operario, Keatley & Villegas, 2004; Reback, Simon, Bernis & Gatson, 2001). Additionally, locations such as commercial sex venues (e.g., bathhouses, sex clubs) and public sex environments (e.g., parks, public restrooms) are common sites of sexual risk taking for MSM and MSM/W while TW primarily frequent public sex environments. One study among HIV-positive MSM showed nearly half of them frequented commercial sex venues (Parsons & Halkitis, 2002), and as much as 16% of commercial sex venue attendees are MSM/W (Reidy et al., 2009). Whereas MSM were more likely to attend commercial sex venues compared with MSM/W, MSM/W were more likely to have sex in public sex environments compared with MSM. TW report frequenting public sex environments largely when engaging in sex work (Hwahng & Nuttbrock, 2007).

HIV infection can only occur if the sexual partners are serodiscordant (i.e., at least one partner is HIV-positive and at least one partner is HIV negative). Although the process of serosorting (i.e., selecting prospective sexual partners based partially on their HIV status relative to one's own) is a known practice among MSM (Eaton et al., 2007), data suggest that as much as 57% to 63% of unprotected anal intercourse among MSM occurs with partners of unknown status (Whittington et al., 2002; Xia et al., 2006). Serosorting is less well documented among MSM/W and TW. Recent research with MSM/W has found that they are less likely to have tested for HIV and know their own status (Bowers et al., 2011) relative to the other two populations, making them less able to engage in the process of serosorting. However, McKay, Mutchler, and Gutierrez (2009) documented that some MSM/W who are aware of their HIV status practice serosorting by finding partners online (where HIV status is frequently stated on a potential sex partner's profile) as a way to avoid discussion of HIV status. Several studies with TW have found rates of unprotected receptive anal intercourse to be lowest with commercial partners and highest with main or primary partners (Garafalo, Deleon, Osmer, Doll & Harper, 2006; Nemoto et al., 2004; E. C. Wilson, Garafalo, Harris & Belzer, 2010), but these studies did not report the HIV status of the partner. E. C. Wilson and colleagues found higher rates of unprotected sex with main/primary partners and a higher likelihood of having discussed HIV status with these partners, which they concluded may be evidence that TW are practicing serosorting (Wilson et al., 2010). However, further research is needed to make determinations about the degree to which this practice occurs among TW.

This study seeks to clarify the differential predictors of HIV risk in MSM, MSM/W and TW individuals. Prior research has shown that partner type, sex location, serodiscordance, multiple sex partners, and substance use during sex all contribute to the sexual risk behaviors of one or more of these populations. To our knowledge, no prior studies have used multivariate inferential analyses to simultaneously control for and compare the effects of these factors on participant sexual risk across all three populations. These analyses accomplish this goal and allow for better specification of how each factor differentially contributes to the practice of high-risk (i.e., unprotected receptive anal) sex in each population.

Methods

Participants

Participants were self-reported MSM (n = 371), MSM/W (n = 286) and TW (n = 255) who attended a community-based, low-intensity, health education/risk reduction HIV-prevention program serving high-risk, substance-using MSM and MSM/W (Guys Understanding Your Situation [G.U.Y.S.]) or TW (TransAction) in the Hollywood/West Hollywood area of Los Angeles County. Eligibility criteria for the MSM and MSM/W participants included: (a) being male, (b) having had self-reported sex with a male in the previous 12 months, and (c) having any substance use in the previous 12 months. Eligibility criteria for the TW included self-identification as a transgender woman (regardless of her stage of gender transition; i.e., any woman who believed her male biological sex was in conflict with her gender identity as a woman was eligible to participate in the HIV-prevention program).

Procedure

Data collection occurred from June 1, 2005 through June 30, 2008. Recruitment into the G.U.Y.S. and TransAction programs was carried out by outreach workers trained to canvas areas known to be frequented by the target populations (such as sex clubs, bars, bathhouses, parks, coffee houses, specific street corners, inexpensive hotels). Enrollment occurred when an eligible individual attended at least one group or individual intervention onsite. All

program materials were approved by the funding agency. Program procedures and intervention designs have been reported elsewhere (Bowers et al., 2011).

Measures

Using a unique identifier to ensure anonymity, staff recorded participant responses on a paper behavioral risk assessment instrument that was subsequently scanned into an electronic database. The behavioral risk assessment was designed by the senior author (Reback, 2005), and records data on participants' sociodemographic characteristics (e.g., gender identity, sexual identity, age, race/ethnicity, HIV status, educational attainment, housing status), substance use in the previous 30 days (injection and non-injection drug use and safe needle use protocol), number and gender of sexual partners in the previous 30 days (main, casual, anonymous, exchange; and male, female, male-to-female preoperative transgender, female-to-male preoperative transgender), and details about the participants' three most recent sexual encounters within the previous 12 months (partner type, number of partners in the encounter, HIV status of partner[s], sexual activities during the encounter, substance use by participant and partner[s], location of sexual encounter). Serodiscordant sex was defined as sex with someone of unknown or different status, while the outcome variable is defined as unprotected receptive anal intercourse. All data were self-reported.

Statistical Analysis

Assessments were entered into electronic databases using scanning technology. Duplicate unique identifiers were eliminated, removing the possibility that the same participant was encountered multiple times by the outreach workers. Of the 1,304 assessments, 271 (20.8%) were determined to be duplicates of existing participants and were eliminated. Furthermore, of the 1,033 unique cases that remained, 121 (11.7%) were missing one or more of the variables used in this analyses (either due to a lack of recent sexual encounters, or due to refusal to answer), leaving a final total sample size of 912 participants. TW are omitted from analyses comparing substance use during sex in Table 2, as the stated eligibility requirement differences across populations may introduce bias into such analyses.

There are multiple units of analysis in this study. For all sociodemographic characteristics (Table 1), the individual (N = 912) is the sole unit of analysis. For all predictor prevalence rates (Table 2), the participants' recent sexual encounters (N = 2,316) are the sole unit of analysis. However, also embedded within Table 2 are clustered logistic and multinomial logistic regression results, where the unit of analysis is the recent sexual encounter nested within the participant. Similarly, for all data used in the clustered multivariate logistic regression analyses (Table 3), the unit of analysis is the recent sexual encounter nested within the participant (with each individual having up to three recent sexual encounters). Thus, although duplicate assessments were removed from the data before analysis, each participant can still appear in the logistic and multinomial logistic regression analyses up to three times, as each single assessment obtained information about their last three most recent sexual encounters. The dependent variables in the clustered regression analyses in Table 2 are the elements of the recent sexual encounter (e.g., partner type, sex location, group sex), as predicted by the participant's behavioral group (e.g., MSM) when controlling for participant's race/ethnicity. In all cases, MSM participants act as the reference category in the analyses. The units of analysis for the three clustered regressions in Table 3 are engagement in unprotected receptive anal intercourse for MSM, MSM/W, and TW participants, respectively.

Clustered multivariate logistic and multinomial logistic regressions using maximum likelihood estimations were run using Stata SE v. 10. Logistic regression is appropriate for analyses in which the dependent variable is dichotomous, such as participation in

unprotected receptive anal intercourse. Multinomial logistic regression is appropriate for analyses in which the dependent variable is a non-dichotomous, nominally measured variable, such as partner type (main, casual, anonymous exchange) or sex location (private, public, commercial sex venue). For all multinomial logistic regressions, the first listed category is used as the base outcome.

To overcome the autocorrelation arising from each participant having up to three entries in the data set, the cluster option was used to cluster each respondent's answers according to their unique identification number, which identified each set of responses common to a single respondent as belonging to a single "group." When estimating the regression matrices, effects are assumed to be independent between groups of the cluster variable, but not within groups. Means and standard deviations are provided in description of all continuous variables, while counts and their corresponding proportions are provided for categorical variables. All significance tests are two-tailed. Categories of race/ethnicity are included in all models as a statistical control to account for known differences in substance use and sexual behaviors that occur across racial categories. Lastly, due to the large number of potentially collinear predictors included for analyses in Table 3, the probability of committing a Type-II error due to variance estimate inflation is increased. Thus, though results are considered significant at $p \leq .05$, flags have also been included in Table 3 for results reaching a significance level of $p < .1$.

Results

Sociodemographic Characteristics

There were significant differences ($p < .001$) across all measured sociodemographic characteristics among the three target populations (see Table 1). MSM participants had the highest average age (36.1 years), whereas TW participants had the lowest average age (31.9 years). TW participants were predominantly Hispanic/Latina. MSM/W participants were more likely to be African American/Black (26.9% vs. 18.9% for MSM and 18.4% for TW). More than half of the MSM participants reported more than a high school education (53.5%), and only a fifth of TW participants (22.8%) had greater than a high school education. Although the HIV seroprevalence rate was high among all three target populations, MSM participants reported more than double the HIV infection rate of the MSM/W participants and more than 1.5 times the HIV infection rate of the TW participants (35.6% MSM vs. 16.4% MSM/W vs. 21.2% TW). TW had the lowest rate of unknown HIV status (5.1%), a rate that was less than half that of either the MSM (11.9%) or the MSM/W (13.6%).

Sexual Risk Factors

The prevalence of each sexual partner type, sex location, contextual factor, and substance used during sex for each target population is presented in Table 2. Relative risk ratios and adjusted odds ratios are shown where significant differences exist across populations when controlling for autocorrelative effects and participant race/ethnicity. The most common partner type for MSM/W was a casual partner (39.4%); results from the clustered multinomial logistic regression indicate they were approximately 1.7 times as likely as MSM to have a casual partner than to have a main partner ($p < .01$); MSM/W were more than twice as likely (relative risk ratio [RRR] = 2.28; $p < .01$) and TW were more than five times more likely (RRR = 5.12; $p < .001$) to report having sex with exchange partners than main partners when compared with MSM.

For all three populations, the most common sex location (i.e., where the sexual encounter took place) was a private venue (e.g., a home or apartment; the base outcome in the

regression analysis). Engagement in serodiscordant sex was high in all populations, though TW exhibited significantly higher likelihood of engaging in a sexual encounter with a partner of differing or unknown status when compared to MSM (adjusted odds ratio [AOR] = 1.51; $p < .05$). Regression analysis did not reveal significant differences in the prevalence of engaging in sex with multiple partners across the three populations; prevalence was low in all populations.

Substance use was common in all three populations, though rates of substance use were likely elevated in the MSM and MSM/W samples due to the recent substance use eligibility criterion. For this same reason, TW were excluded from statistical comparisons involving substance use. During sexual encounters, MSM most commonly used methamphetamine (41%), while MSM/W used methamphetamine and alcohol at approximately equal rates (32.6% and 35.4%, respectively). The seven separate logistic regression analyses revealed that during sex, MSM/W were more likely to use alcohol (AOR = 1.63; $p <.01$), cocaine (AOR = 3.19; $p \leq .01$), and crack (AOR = 1.99; $p \leq .01$). They were significantly less likely to use GHB (AOR = .27; $p < .05$) compared with MSM. No significant differences were found for methamphetamine, amyl nitrite, or heroin use during sex. TW reported less substance use during sex. They reported no use of amyl nitrite, heroin, or GHB and empirically lower rates of alcohol (11.7%), methamphetamine (18.8%), and crack (1.0%) use compared with either of the other target populations.

Predictors of Sexual Risk

Table 3 provides the results of three clustered multivariate logistic regressions. The outcome variable for all regressions was participation in unprotected receptive anal intercourse during a recent sexual encounter. Partner type was the most consistent predictor of high-risk sexual behaviors across the three target populations. In all populations, unprotected receptive anal intercourse was significantly more likely to occur with main partners (the reference category) than with any other partner type. In general, participants from all three populations were approximately one half to two thirds less likely to participate in high-risk sexual behaviors with their casual or anonymous partners as they were with their main partners. Participants were least likely to participate in high-risk sexual behaviors with their exchange partners. This comparative reduction in the odds of participating in high-risk sexual behaviors with exchange partners was most pronounced among MSM (AOR = .09; $p < .001$) and TW (AOR = .15; $p < .001$) participants.

When controlling for all other factors, sex location did not significantly influence the odds of high-risk sexual behaviors among participants from any population. However, the coefficient estimate for MSM was approaching significance, with MSM being less likely to participate in unprotected receptive anal intercourse while in a commercial sex venue such as a bathhouse or sex club (AOR = .59; $p = .06$) than in a private location. This trend toward significance prompted a subsequent post-hoc analysis in which “public sex environment” was included as the reference category. This additional analysis revealed MSM were half as likely to engage in unprotected receptive anal intercourse in a commercial sex venue than they were in a public sex environment (AOR = .48; SE = .16; $p = .026$). This empirical pattern was not evidenced among either the MSM/W or TW participants.

Partner serodiscordance did not influence participation in unprotected receptive anal intercourse in any population, though the coefficient estimate on TW was approaching significance. TW were approximately half as likely to engage in unprotected receptive anal intercourse with serodiscordant partners (AOR = .58; $p < .08$), a pattern not found among MSM or MSM/W participants. The presence of multiple sexual partners was associated with significant increases in the odds of high-risk sex for both the MSM (AOR = 3.6; $p < .001$)

and TW (AOR = 3.39; $p \leq .01$) participants, and was marginally associated with increases in sexual risk for MSM/W (AOR = 1.71; $p = .09$).

Lastly, substance use during sex increased the odds of unprotected receptive anal intercourse for both MSM and MSM/W participants, but not TW participants. For MSM participants, the use of methamphetamine, amyl nitrite, and crack all significantly increased the odds of participating in unprotected receptive anal intercourse. Marginal positive associations in this population were also observed for heroin and GHB. All substances increased these odds by a factor of at least 2. MSM/W participants showed a nearly 5-time increase in the odds of engaging in unprotected receptive anal intercourse when using amyl nitrites during sex (AOR = 4.62; $p < .05$). TW participants were not sampled according to their substance use patterns, and showed no significant effects for substance use; lack of amyl nitrite, heroin, or GHB use (Table 2) prevented the estimation of coefficient estimates for these substances among TW.

Discussion

The results presented here provide insight into how different factors predict HIV sexual risk among MSM, MSM/W, and TW. Each population has a unique behavioral profile, a finding that may ultimately help provide a more accurate understanding of the circumstances that lead individuals to engage in high-risk sexual behaviors. The conflation of these three populations into the overarching label “men who have sex with men” overlooks important behavioral differences that define the individual HIV risk profiles characterizing each group.

All three populations were more likely to engage in unprotected receptive anal intercourse with their main partners. This finding is consistent with the notion that unprotected sex is often equated with intimacy and may signify love and trust for a partner (Carballo-Dieguez et al., 2011; Nemoto, et al., 2004). Studies have shown that TW engage in higher rates of unprotected sex with their primary partners than non-primary partners (Reback et al., 2001), even if they are in a HIV-discordant relationship (Operario, Nemoto, Iwamoto, & Moore, 2011), perhaps to affirm their female gender identity (Bockting, Robinson, & Rosser, 1998). The findings from this study underscore a need for development of condom negotiation skills with primary partners across all three populations.

MSM participants were significantly less likely to engage in unprotected receptive anal intercourse if the sexual encounter took place in a commercial sex venue when compared with public sex environments. This effect occurred even when controlling for partner type, implying that this finding is not simply due to the kinds of partners most commonly found in these contexts. Commercial sex venues catering to MSM may be implementing practices that reduce sexual risk (Sowell, Lindsey, & Spicer, 1998), which may indicate the presence of successful structural HIV prevention efforts. A recent study reported that the majority of men visiting bathhouses used condoms during anal sex, indicating that bathhouses may be a place where burgeoning social norms have begun to facilitate condom use during anal sex (Woods et al., 2007). Public sex environments, as opposed to commercial sex venues, may be preferred by those who do not feel connected to a gay community, or who experience gay-related stigma or shame related to their same-sex sexual encounters. Participants in these environments are often reluctant to be approached or identified (Reback & Larkins, 2010) and sexual behaviors in this environment are usually conducted in secluded areas and are highly secretive (Somlai, Kalichman, & Bagnall, 2001). Future studies in this area could incorporate a measure of homonegativity or internalized homophobia to test this theory (Mayfield, 2001).

TW participants were less likely to engage in unprotected receptive anal intercourse if their partner had a different, or unknown, HIV status although the association fell short of statistical significance ($p = .08$). We take this marginal result as evidence that further research is warranted to determine if TW in this study may be engaged in serosorting, a sexual risk-reduction strategy in which safer-sex practices are chosen based on the serostatus of one's partner (Eaton et al., 2007; Xia et al., 2006). Given that MSM/W individuals have sex with both men and women, these individuals can act as a bridge to HIV transmission between gay and heterosexual communities (Prabhu, Owen, Folger, & McFarland, 2004; Siegel, Schrimshaw, Lekas & Parsons, 2008). The MSM/W in this study (a) were less likely to know their HIV status, and (b) did not change their HIV risk behaviors given the relative serostatus of their partner. These findings suggest that in addition to placing themselves at increased risk, they may be HIV-positive and unknowingly transmit the virus within and between populations. Interventions geared toward MSM/W may look to emphasize the importance of not only getting tested, but of disclosing one's HIV status to partners and modifying one's sexual risk behaviors accordingly.

When participants engaged in a sexual encounter with more than one partner, the odds for high-risk sex were significantly increased among MSM and TW, and marginally increased among MSM/W. The addition of another partner into a sexual encounter may cause the participants to abandon previous precautions due to increased erotic desire. Additionally, the social norms during sexual encounters with multiple partners differ from those with single partners, serving to discourage condom use even when participants are aware of the accompanying increase in risk (Sowell et al., 1998).

Substance use during sex was not equally common across all three populations, nor did substance use during sex have the same impact on high-risk sex across the three populations. Substance use during sex increased the odds of unprotected receptive anal intercourse among the MSM and MSM/W populations but not the TW population. Given the association between substance use and high-risk sexual behaviors, these findings demonstrate, once again, the utility of harm reduction intervention for out-of-treatment users as well as low-intensity brief interventions such as motivational interviewing (Miller & Rollnick, 2002) to help facilitate out-of-treatment users toward treatment through the transtheoretical model (Procaska & DiClemente, 1984). Previous research has shown that substance abuse treatment can function as HIV prevention, as high-risk sexual behaviors are immediately reduced as users enter treatment (Shoptaw & Reback, 2006, 2007).

In contrast, substance use during sex did not increase the odds of high-risk sex among the TW population. Though substance use in this population is associated with sex work, TW who used substances during sex were also more likely to report protective behaviors such as condom use (Reback et al., 2005). Thus, interventions designed to reach TW participants may look to focus more on the decoupling of substance use from sex work, rather than merely emphasizing the link between substance use and unprotected sex.

Limitations

The data collected were self-reported and as such are vulnerable to reporting bias and recall errors. The sample was limited to participants who enrolled in a community-based HIV-prevention program. Typically, individuals attending programs at local community-based organizations are disproportionately low income and in need of social services, and thus, these participants may not be representative of MSM, MSM/W, or TW from varying socioeconomic status or those from other regions. Additionally, substance use in the previous 12 months was an eligibility criterion for participation in the HIV-prevention program serving MSM and MSM/W. As a result, rates of substance use for the MSM and MSM/W participants may be higher than those in other samples of MSM and MSM/W,

which is why TW were omitted from direct comparison with MSM or MSM/W participants in regards to substance use. In light of these limitations, generalizability is limited.

Conclusions

Despite these limitations, findings strongly suggest the need to individually tailor HIV prevention interventions to address the specific needs of each of these distinct populations. For HIV-prevention interventions specifically targeting MSM, substance use screenings and educational sessions--particularly those that address the association between high-risk sex, sex with multiple partners, and substance use--should be included. Interventions also need to acknowledge the role of partner serostatus and incorporate techniques for disclosing HIV status and finding healthy ways to maintain intimacy in serodiscordant relationships. Due to high rates of unknown HIV status in the MSM/W population, efforts should be made to increase testing, reduce stigma, and increase education around the importance of knowing one's HIV status. Interventions for MSM and MSM/W also need to incorporate substance use screenings, tailoring the intervention for the specific substances common to each population to offer harm-reduction and substance abuse treatment options as necessary. Programs targeting TW can focus on adopting safe-sex practices with primary partners and can examine ways to foster intimacy with main partners that do not exclude condom use. There continues to be an urgent need for multilevel risk-reduction interventions with TW, particularly for those who exchange sex. Focusing on the psychosocial context of risk taking, such as issues of low self-esteem and intimacy in partnerships, is important to improve the effectiveness of interventions with this population.

These data have made it possible to describe the specific and unique factors contributing to high-risk behavior within each population. HIV continues to disproportionately impact all three of these high-risk groups, but evidence continues to mount that the specific means and circumstances by which members of these populations are exposed to HIV risk differ and that they cannot and should not be taken as being synonymous. To be optimally effective, HIV-prevention interventionists must be sensitive to the distinct behavioral profiles exhibited by each group and must design interventions to best meet the needs of these highly vulnerable populations.

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Table 1

Sociodemographic Characteristics of Target Populations (N = 912)

Characteristic		MSM (N = 371)	MSM/W (N = 286)	TW (N = 255)	
		Mean (SD)	Mean (SD)	Mean (SD)	p > F
Age		36.1 (9.3)	34.6 (9.4)	31.9 (9.9)	***
		N (%)	N (%)	N (%)	p >χ^2
Race/Ethnicity	*Caucasian/White*	181 (48.8)	145 (50.7)	33 (12.9)	
	African American/Black	70 (18.9)	77 (26.9)	47 (18.4)	***
	Hispanic/Latino	77 (20.8)	27 (9.4)	129 (50.6)	
	Other	43 (11.6)	37 (12.9)	46 (18)	
Education	*Less than high school*	68 (18.4)	80 (28)	116 (45.7)	
	High school or GED	104 (28.1)	101 (35.3)	80 (31.5)	***
	More than high school	198 (53.5)	105 (36.7)	58 (22.8)	
HIV Status	*Positive*	132 (35.6)	47 (16.4)	54 (21.2)	
	Negative	195 (52.6)	200 (69.9)	188 (73.7)	***
	Don't Know	44 (11.9)	39 (13.6)	13 (5.1)	
Housing	*Homeless/Marginally Housed*	268 (72.2)	258 (90.2)	148 (58)	***

*** p < .001

Table 2

Partner Type, Sex Location, Contextual Factors, and Substance Use During Recent Sexual Encounters by Population (N = 912; 2,316 Sexual Encounters)

		MSM N (%) RRR/AOR (SE)	MSM/W N (%) RRR/AOR (SE)	TW N (%) RRR/AOR (SE)
Partner Type [°]	*Main*	248 (25.8%)	152 (21%)	149 (23.5%)
		-	-	-
	Casual	264 (27.5%)	285 (39.4%)	113 (17.9%)
		-	1.72 (.33)**	.37 (.10)***
	Anonymous	361 (37.6%)	162 (22.4%)	72 (11.4%)
		-	*ns*	*ns*
	Exchange	87 (9.1%)	121 (16.7%)	299 (47.2%)
		-	2.28 (.60)**	5.12 (1.26)***
Sex Location [°]	*Private*	599 (62.4%)	511 (70.7%)	543 (85.8%)
		-	-	-
	Public Sex Environment	183 (19.1%)	171 (23.7%)	86 (13.6%)
		-	-	-
	Commercial Sex Venue	178 (18.5%)	41 (5.7%)	4 (.6%)
		-	.28 (.07)***	.03 (.01)***
Serodiscordance [γ]		579 (60.3%)	430 (59.5%)	459 (72.5%)
		-	*ns*	1.51 (.26)*
Group Sex [γ]		86 (9%)	62 (8.6%)	45 (7.1%)
		-	*ns*	*ns*
Substance Use During Sex	*Alcohol* [γ]	234 (24.4%)	256 (35.4%)	74 (11.7%)
		-	1.63 (.26)**	x
	Methamphetamine [γ]	394 (41%)	236 (32.6%)	119 (18.8%)
		-	*ns*	x
	Amyl Nitrite [γ]	36 (3.8%)	13 (1.8%)	0 (0%)
		-	*ns*	x
	Heroin [γ]	14 (1.5%)	18 (2.5%)	0 (0%)
		-	*ns*	x
	GHB [γ]	19 (2%)	4 (.6%)	0 (0%)
		-	.27 (.16)*	x
	Cocaine [γ]	10 (1.0%)	25 (3.5%)	6 (1.0%)
		-	3.19 (1.36)**	x
	Crack [γ]	63 (6.6%)	102 (14.1%)	6 (1.0%)
		-	1.99 (.50)**	x

MSM: n = 371; 960 Sexual Encounters
MSM/W: n = 286; 723 Sexual Encounters
TW: n = 255; 633 Sexual Encounters

° Clustered multinomial logistic regression; Relative Risk Ratios; statistical control: Race/Ethnicity

γ Clustered logistic regression; Adjusted Odds Ratios; statistical control: Race/Ethnicity

* $p \leq .05$;

** $p \leq .01$;

*** $p \leq .001$

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Table 3

Multivariate Logistic Regressions of Unprotected Receptive Anal Intercourse on Partner Type, Sex Location, Serodiscordance, Group Sex, and Substance Use During Sex (N = 912; 2,316 Sexual Encounters)

		MSM (N = 371)		MSM/W (N = 286)		TW (N = 255)	
		AOR	**95% CI**	**AOR**	**95% CI**	**AOR**	**95% CI**
Partner Type	*Main*	Ref Cat		Ref Cat		Ref Cat	
	Casual	0.29***	0.17-0.48	0.47**	0.29-0.76	0.33**	0.15-0.72
	Anonymous	0.30***	0.17-0.51	0.47**	0.27-0.84	0.38†	0.14-1.08
	Exchange	0.09***	0.03-0.25	0.42**	0.21-0.83	0.15***	0.07-0.31
Sex Location	*Private*	Ref Cat		Ref Cat		Ref Cat	
	Public	1.30	0.79-2.14	0.77	0.49-1.22	1.39	0.66-2.92
	Commercial Venue	0.63†	0.36-1.10	0.63	0.21-1.87	2.47	0.26-23.66
Serodiscordance		0.75	0.50-1.13	0.94	0.63-1.39	0.58†	0.32-1.06
Group Sex		3.6***	1.96-6.63	1.71†	0.92-3.20	3.39**	1.43-8.07
Substance Use During Sex	*Alcohol*	1.17	0.78-1.76	1.36	0.89-2.08	0.83	0.38-1.82
	Methamphetamine	2.55***	1.71-3.81	0.99	0.63-1.56	1.46	0.70-3.04
	Amyl Nitrate	2.38*	1.05-5.42	4.62*	1.08-19.71	~	~
	Heroin	3.21†	0.77-13.36	1.29	0.34-4.82	~	~
	GHB	2.60†	0.92-7.38	2.15	0.35-13.29	~	~
	Cocaine	0.67	0.10-4.52	1.29	0.49-3.36	1.07	0.07-17.46
	Crack	3.40***	1.60-7.21	0.70	0.36-1.34	1.57	0.15-16.89
	Model Fit Statistics	$p > \chi^2 = .000$	Pseudo $R^2 = .144$	$p > \chi^2 = .017$	Pseudo $R^2 = .054$	$p > \chi^2 = .000$	Pseudo $R^2 = .152$

† $p \leq .1$;

* $p \leq .05$;

** $p \leq .01$;

*** $p \leq .001$

~ Variable dropped due to absence of substance use in target population.

Statistical Control: Race/Ethnicity