

# Sexual Transmission Risk Behavior Reported Among Behaviorally Bisexual HIV-Positive Injection Drug-Using Men

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**Background:** Few research studies have examined the HIV transmission risk behaviors of HIV-positive injection drug users (IDUs) who are men who have sex with men and women (MSMW).

**Methods:** We compared unprotected vaginal or anal sex with an HIV-negative or unknown (UNK) status sexual partner of MSMW (n = 118) with men who have sex exclusively with women (MSW; n = 469) and men who have sex exclusively with men (MSM; n = 90) using baseline information from the Intervention for Seropositive Injectors—Research and Evaluation (INSPIRE) study, a 4-city randomized controlled trial.

**Results:** MSMW were twice as likely to report unprotected vaginal sex ( $P < 0.001$ ) and 3 times as likely to report unprotected anal sex with an HIV-negative/UNK status female partner ( $P < 0.001$ ) as MSW. MSMW did not differ in their report of unprotected insertive anal sex and were half as likely to report unprotected receptive anal sex with HIV-negative/UNK status men ( $P = 0.02$ ) as MSM. MSMW were 2 times as likely to report engaging in transactional sex (buying or selling sex in exchange for money, drugs, or housing) than MSM or MSW (81%, 43%, and 36%, respectively;  $P < 0.001$ ).

**Conclusions:** Further research is needed to understand the contexts of unprotected sex among HIV-positive injection drug-using MSMW.

Prevention programs should target the unique prevention needs of this population, particularly their risk with female partners.

**Key Words:** bisexual, HIV-positive, injection drug use, men who have sex with men and women, sexual risk

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Men who identify themselves as “bisexual” or are characterized as “behaviorally bisexual” have been historically targeted as a potential “bridge” between men with HIV/AIDS and their female partners.<sup>1–4</sup> Studies that have compared samples of men who have sex exclusively with men (MSM) with samples of men who have sex with men and women (MSMW) have found differences in partner type, with MSM more likely than MSMW to report a steady male partner<sup>5</sup> and MSMW reporting fewer male partners than MSM.<sup>6</sup> Doll and colleagues<sup>7</sup> found MSMW to have a lower prevalence of unprotected anal sex than MSM, and MSM have been shown to be more likely to be HIV-positive than MSMW.<sup>8</sup> One study among HIV-positive MSMW found that fewer than half had disclosed their same-gender sexual relationships to their female partners.<sup>9</sup> More recently, Hightow and colleagues<sup>10</sup> found that HIV-positive MSMW occupied central positions in linking multiple sexual networks of women and men and were likely to report >10 different sexual partners in the year before HIV diagnosis.

Two large long-term HIV seroincidence studies that compared the sexual risk behaviors of injection drugs users (IDUs) have reported a higher overall prevalence of sexual risk behavior among MSM-IDUs compared with men who have sex exclusively with women (MSW) IDUs.<sup>11,12</sup> Neither of these studies separately analyzed data of MSMW-IDUs from those of MSM-IDUs in their analyses. In a study of male sex work, injection drug use, and nongay-identified MSM, Rietmeijer and colleagues<sup>13</sup> found that sex work participation and injection drug use predicted lack of consistent condom use with female partners. In that study, none of the MSMW involved in transactional sex (as hustlers) and injection drug use reported consistent condom use with main female partners compared with 26% of the nonhustlers and 25% of the noninjecting MSMW.

Reflecting an effort to understand the psychosocial characteristics that are associated with high-risk sexual

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behavior among MSM, HIV behavioral research has examined internalized homophobia among MSM and found it to be linked to bisexuality and high-risk sexual behavior in several studies.<sup>14–16</sup> In a study comparing the sexual risk behaviors and psychosocial measures of “self-homophobia,” Stokes et al<sup>5</sup> found that bisexual men were more self-homophobic and saw other people as less accepting of same-gender behavior than MSM. Negative “coming out” experiences have been associated with difficulties in gaining social support, establishing community affiliations, and disclosing their HIV status to sexual partners in a qualitative study of HIV-positive gay and bisexual men.<sup>17</sup> In a sample of HIV-positive gay and bisexual men, Ibanez and colleagues<sup>18</sup> found MSM-IDUs to be more likely to have had sex with women; to identify as “barebackers”; and to report sexual abuse, anxiety, and hostility compared with MSM–non-IDUs.

Public health researchers commonly combine behaviorally homosexual and bisexual men into a single category. Examining the relation between sexual orientation and sexual behavior, Kral and colleagues<sup>19</sup> reported that bisexually identified MSM-IDUs were as likely as heterosexually identified MSM-IDUs to report sex with women and as likely as gay-identified MSM-IDUs to report anal intercourse, underscoring the complex relations between sexual orientation and sexual behavior among drug-using men. To our knowledge, no research studies have examined the transmission risk behaviors of HIV-positive MSMW-IDUs. Little is known about how the risk behaviors and prevention needs of HIV-positive MSMW-IDUs may differ from those of HIV-positive MSW or MSM.

In this analysis, we examined the sexual risk-taking behaviors, disclosure of HIV status, and transactional sex (buying or selling sex in exchange for money, drugs, or a place to stay) among HIV-positive MSMW-IDUs. We sought to test the hypothesis that separately analyzing MSMW’s reported behavior in comparison to that of MSW and MSM might elucidate the potentially different prevention needs of these groups of men and pave the way for further study. Because the sample consisted of drug-using men, we were also interested in exploring differences in drug use and administration among these 3 groups of men.

## METHODS

### Procedures and Participants

The data used in this study were from the baseline assessment from the Intervention for Seropositive Injectors—Research and Evaluation (INSPIRE) project, a behavioral intervention for HIV-positive IDUs aimed at decreasing sexual and drug risk behaviors and increasing utilization of health care and adherence to treatment regimens, which was conducted from August 2001 to March 2005. Participants were recruited through street-based recruitment and from medical care settings, methadone clinics, and AIDS service organizations between 2001 and 2003. Recruitment occurred in Baltimore, Miami, New York, and San Francisco. All research activities were approved in advance by institutional review boards at the collaborating sites and the Centers for Disease Control and Prevention (CDC). A complete description of the study design and methodology has been published previously.<sup>20</sup>

At telephone screening, eligibility criteria for the study included being 18 years or older, confirmed HIV-positive serostatus, self-reported injection drug use in the prior year, sex with an opposite-gender partner in the prior 3 months, and willingness to engage in group educational sessions and provide oral and blood specimens. INSPIRE participants who were biologically male (defined as having male genitalia intact) and reported vaginal or anal sex in the past 3 months ( $N = 677$ ) on the baseline interview were included in this analysis.

At the baseline, study participants completed an audio computer-assisted self-interview (A-CASI) about HIV risk behaviors, health care utilization, and HIV medication adherence and the correlates of those behaviors. Participants also provided an oral fluid sample for confirmatory HIV-antibody testing (OraSure; OraSure Technologies, Bethlehem, PA) and a blood specimen for CD4 cell and viral load measurement. HIV confirmation testing was performed at local laboratories and immunoassays at the CDC. Some participants who reported opposite-gender sexual behavior at screening did not report that behavior on the A-CASI baseline assessment instrument. There were 2 potential explanations for this discrepancy. First, the recall time period referenced in the telephone screening for sexual behavior did not overlap exactly with that of the baseline survey. Rather, these time periods varied in overlap according to the lag time between screening and baseline scheduling. Thus, it is possible that behaviors captured in the screening instrument did not match baseline data because those behaviors occurred before baseline recall periods for sexual behavior questions. Second, some participants may have misrepresented their sexual behavior during study screening, reporting to have had sex with women so as to gain eligibility access to the study. Because it was impossible for the study investigators to assess which of the 2 plausible explanations actually accounted for the 90 men who reported exclusively MSM behaviors at baseline, these men were retained in the study and included in the baseline data analyses.

### Participant Characteristics

Demographic characteristics examined include city of interview, age, gender, race/ethnicity, and sexual orientation. We assessed age by subtracting the date of interview from the date of birth. We assessed gender by asking “What is your sex or gender?” Responses included male and transgendered. Participants were then asked about their ethnic and racial background. Participants were asked if they considered themselves “Hispanic” or “Latino” and then asked to define their primary race. Race/ethnicity categories included black or African American, white, Hispanic or Latino, Asian, and other. Sexual orientation was recorded with the categories “straight, heterosexual”; “gay, homosexual”; “bisexual,” or “none of the above, unsure.”

We also asked about alcohol and drug use behaviors in the past 3 months. Behaviors of interest included any alcohol use, any noninjected drug use, types of noninjected drugs use (crack, cocaine, amphetamines, and any other noninjected drug), any injected drug use, frequency of injection, and types of drugs injected (heroin alone, cocaine/crack, heroin and cocaine together, and amphetamines alone).

## Classification by Gender of Sexual Partners

Participants were asked about their sexual behavior in the past 3 months. First, they were asked “In the past 3 months, how many people have you had sex with? By sex we mean oral sex, that is, giving or getting a blow job or going down on someone, vaginal sex, that is penis inside vagina, or anal sex, that is penis inside butt.” If participants reported sex in the past 3 months, they were asked to report the number of male, female, and transgendered sexual partners they had in the past 3 months. They were then asked separately about their 3 most recent sexual partners during the past 3 months. Questions about each partner included the following:

“How would you describe your relationship with (this partner)?”

“Has (this partner) told you that he or she is HIV-positive or HIV-negative? If (this partner) has not told you their HIV status, please select ‘unsure’.”

“In the past 3 months, how many times have you had vaginal sex with (this partner)? Thinking only of the (X) times in the past 3 months when you had vaginal sex with (this partner), how many of those times did you use a male or female condom?”

“In the past 3 months, how many times have you had anal sex with (this partner)? Thinking only of the (X) times in the past 3 months, when you had anal sex with (this partner), how many of those times did you use a male or female condom?”

If these 3 partners did not include a main partner (or primary partner), participants were asked about sexual behavior with their main partner if they had one. Participants who had additional sexual partners in the past 3 months were then asked about them as a group by gender and HIV serostatus.

We then categorized participants based on the gender of their sexual partners in the past 3 months on the baseline A-CASI assessment. Participants who reported only female sexual partners in the past 3 months were classified MSW. Participants who reported only male sexual partners in the past 3 months were classified as MSM. Participants who reported male and female sexual partners in the past 3 months were categorized as MSMW. Transgender partners were categorized as biologically male, based on self-reported preoperative status; none reported female-to-male (FTM) transgender sexual partners.

## Sexual Behavior

Using the previous questions, the primary outcome for this study (sexual risk behavior) was defined as any report of unprotected vaginal or anal sex with an HIV-negative or unknown (UNK) status partner in the past 3 months. To determine whether sexual risk behavior differed by gender or type of partner, we used information from the questions described previously to define sexual risk behavior with female partners and sexual risk behavior with male partners. We also defined sexual risk behavior with main and nonmain sexual partners by gender of partners.

In questions about individual sexual partners, consistent with past research,<sup>21,22</sup> participants were asked if they had told each of their sexual partners that they were HIV-positive. Based on the proportion of partners they had told, disclosure of

HIV status was categorized as “none,” “some,” or “all.” For each of their first 3 sexual partners and for their additional partners as a group, participants were asked if they had exchanged sex for money or drugs in the past 3 months. Any report of exchange of money or drugs with a sexual partner in the past 3 months was coded as “yes.”

## Statistical Analyses

We compared demographic characteristics, drug use, and sexual behavior of MSMW with that of MSM and MSW using  $\chi^2$  tests of homogeneity for categorical variables and the nonparametric Mann-Whitney *U* test to compare continuous variables because of the highly skewed distribution of these variables.

## RESULTS

### Participant Characteristics

Overall, there were 677 biologic male participants who reported vaginal or anal sex with a man or woman in the past 3 months. Of these, 67% (*n* = 467) reported sex only with women, 13% (*n* = 90) reported sex only with men, and 17% (*n* = 118) reported sex with women and men at the baseline interview (Table 1). These participants were evenly distributed in terms of their city of origin. Median age was 42 (interquartile range [IQR] = 38 to 47) years, most were African American (65%, *n* = 426) or Hispanic/Latino (20%, *n* = 129), and more than two thirds (69%, *n* = 462) identified as heterosexual.

When we examined participant characteristics by gender of sexual partners, we found that MSMW were more likely than MSW and MSM to be from Miami and San Francisco (*P* < 0.001). MSMW were younger than MSW (median age = 41 years for MSMW and 44 years for MSW; *P* < 0.001) but not MSM. For race/ethnicity, MSMW did not differ from MSM or MSW. Of the 677 biologic male participants in the sample, there were 31 male-to-female (MTF) transgendered individuals. Of these, 28 had sex only with men. Sexual orientation tended to reflect but did not perfectly match behavior patterns. Ninety-two percent (*n* = 426) of MSW self-identified as heterosexual, whereas only half (51%, *n* = 45) of those with only male sexual partners self-identified as homosexual or gay. Two-thirds (67%, *n* = 79) of MSMW self-identified as bisexual, and 21% (*n* = 25) self-identified as heterosexual.

### Alcohol and Drug Use

Next, we compared alcohol use and noninjected and injected drug use behaviors by gender of sexual partners (Table 2). MSMW were more likely to report any alcohol use and any noninjected drug use in the past 3 months compared with MSW (*P* = 0.006 and *P* < 0.001, respectively) and MSM (*P* = 0.04 and *P* = 0.02, respectively). MSMW were more likely than MSW to use noninjected stimulants, including crack (*P* < 0.001), powder cocaine (*P* = 0.004), and amphetamines (*P* < 0.001) as well as other noninjected drugs (*P* = 0.001). They were also more likely than MSM to use crack (*P* = 0.04) and cocaine (*P* < 0.001) but equally likely to use amphetamines and other noninjected drugs.

Eighty-six percent (*n* = 582) of all sexual behavior groups reported injecting any drug in the past 3 months. The

**TABLE 1.** Demographic Characteristics of HIV-Positive Male IDUs by Gender of Sexual Partners in the Past 3 Months: INSPIRE Study 2001 to 2005, Baseline Data

	Women Only (n = 469)	Men Only (n = 90)	Men and Women (n = 118)	Total (N = 677)
City				
Baltimore	148 (31.6%)	9 (10.0%)	10 (8.5%)	167 (24.7%)
Miami	117 (24.9%)	14 (15.6%)	45 (38.1%)	176 (26.0%)
New York	135 (28.8%)	11 (12.2%)	19 (16.1%)	165 (24.4%)
San Francisco	69 (14.7%)	56 (62.2%)	44 (37.3%)	169 (25.0%)
Age, years: median [IQR]	44 [39 to 49]	41 [36 to 45]	41 [37.5 to 44]	42 [38 to 47]
Gender				
Male	469 (100%)	62 (68.9%)	115 (97.5%)	646 (95.4%)
Transgender		28 (31.1%)	3 (2.5%)	31 (4.6%)
Ethnicity				
White	32 (7.0%)	9 (10.7%)	11 (9.6%)	52 (7.9%)
Black	312 (67.8%)	47 (56.0%)	67 (58.3%)	426 (64.6%)
Latino	85 (18.5%)	18 (21.4%)	26 (22.6%)	129 (19.6%)
Other	31 (6.7%)	10 (11.9%)	11 (9.6%)	52 (7.9%)
Sexual orientation self-identification				
Heterosexual	426 (91.6%)	11 (12.4%)	25 (21.2%)	462 (68.8%)
Homosexual	0 (0.0%)	45 (50.6%)	10 (8.5%)	55 (8.2%)
Bisexual	20 (4.3%)	22 (24.7%)	79 (66.9%)	121 (18.0%)
Other	19 (4.1%)	11 (12.4%)	4 (3.4%)	34 (5.1%)

number of times men injected drugs did not differ between MSMW and MSW but was higher among MSMW compared with MSM ( $P = 0.01$ ). The types of drugs injected differed by sexual behavior group. MSMW were similar to MSW in their use of injected heroin and cocaine/crack. MSMW were less likely than MSW to inject heroin and cocaine together ( $P = 0.02$ ) and were more likely than MSW to inject amphetamines ( $P < 0.001$ ). In contrast, MSMW were similar to MSM in their use of injected heroin alone and heroin and cocaine together but were more likely than MSM to report injecting cocaine/crack ( $P = 0.03$ ) and less likely to inject amphetamines ( $P = 0.05$ ).

### Sexual Behavior

Overall, 21% ( $n = 97$ ) of MSW, 26% ( $n = 23$ ) of MSM, and 47% ( $n = 53$ ) of MSMW reported unprotected vaginal or anal sex with an HIV-negative/UNK status sexual partner in the past 3 months, indicating that MSMW were twice as likely to report sexual HIV transmission risk compared with other men ( $P < 0.001$  and  $P = 0.003$  for MSMW compared with MSW and MSM, respectively; Table 3). MSMW had more sexual partners compared with MSW ( $P < 0.001$ ) and MSM ( $P < 0.001$ ) and more female sexual partners compared with MSW ( $P < 0.001$ ). MSMW did not differ from MSM in their number of male sexual partners. MSMW were significantly more likely than

**TABLE 2.** Alcohol- and Drug-Using Behaviors of HIV-Positive Male IDUs by Gender of Sexual Partners in the Past 3 Months: INSPIRE Study 2001 to 2005, Baseline Data

	Women Only (n = 469)	Men Only (n = 90)	Men and Women (n = 118)	Total (N = 677)
Alcohol use	359 (76.7%)	69 (77.5%)	104 (88.1%)	532 (78.8%)
Noninjected drug use	323 (68.9%)	69 (77.5%)	106 (89.8%)	498 (73.7%)
Noninjected drugs used				
Crack	185 (40.0%)	49 (54.4%)	81 (68.6%)	315 (47.0%)
Cocaine	186 (40.7%)	24 (27.3%)	65 (55.6%)	275 (41.5%)
Amphetamines	10 (2.2%)	25 (28.7%)	24 (20.5%)	59 (9.0%)
Other drugs	273 (58.2%)	58 (65.2%)	90 (76.3%)	421 (62.3%)
Injected drugs	405 (86.4%)	75 (83.3%)	102 (86.4%)	582 (86.0%)
Times injected: median [IQR]	13 [3 to 90]	9 [3 to 52]	26 [5 to 90]	12 [3 to 90]
Drugs injected				
Heroin	226 (48.2%)	35 (38.9%)	59 (50.0%)	320 (47.3%)
Cocaine/crack	128 (27.3%)	15 (16.7%)	35 (29.7%)	178 (26.3%)
Heroin and cocaine	223 (47.5%)	25 (27.8%)	42 (35.6%)	290 (42.8%)
Amphetamines	27 (5.8%)	30 (33.3%)	25 (21.2%)	82 (12.1%)

**TABLE 3.** Sexual Behavior of HIV-Positive Male IDUs by Gender of Sexual Partners in the Past 3 Months: INSPIRE Study 2001 to 2005, Baseline Data

	MSW (n = 469)	MSM (n = 90)	MSMW (n = 118)	Total (N = 677)
Unprotected sex with HIV-negative/UNK status	97 (21.1%)	23 (26.1%)	53 (46.9%)	173 (26.2%)
Disclosure of HIV status				
None	59 (12.6%)	14 (15.6%)	11 (9.4%)	84 (12.4%)
Some	44 (9.4%)	16 (17.8%)	40 (34.2%)	100 (14.8%)
All	365 (78.0%)	60 (66.7%)	66 (56.4%)	491 (72.7%)
Sex partners				
Total: median [IQR]	1 [1 to 3]	2 [1 to 3]	5 [3 to 9]	2 [1 to 4]
Female: median [IQR]	1 [1 to 3]		2 [1 to 4]	1 [1 to 3]
Male: median [IQR]		2 [1 to 3]	2 [1 to 3]	2 [1 to 3]
Relationship with sex partners				
Main	188 (40%)	21 (24%)	0 (0%)	210 (31%)
Nonmain	189 (40%)	44 (49%)	48 (41%)	281 (42%)
Both	91 (20%)	24 (27%)	70 (59%)	185 (27%)
Sex for exchange*	169 (36.0%)	37 (42.8%)	96 (81.4%)	302 (44.8%)

\*Includes sex exchange transactions as consumers and sellers.

MSW and MSM to report nonmain sexual partners ( $P < 0.001$  compared with MSW and MSM). MSMW were twice as likely as other men to report sex in exchange for money or drugs ( $P < 0.001$  compared with MSW and MSM). MSMW did not differ from other men in whether or not they disclosed to any sexual partner, but they were less likely than MSW to disclose their HIV-positive status to all their sexual partners ( $P < 0.001$ ).

### Unprotected Sexual Behavior

MSMW were twice as likely as MSW to report unprotected vaginal sex with an HIV-negative/UNK status female sexual partner ( $P < 0.001$ ; Table 4). MSMW were 3 times as likely as MSW to report unprotected anal sex with an HIV-negative/UNK status female sexual partner ( $P < 0.001$ ). Among MSMW, both types of sexual risk behavior tended to occur with nonmain female sexual partners. The proportion of participants reporting unprotected vaginal and anal sex with main sexual partners did not differ among MSMW and MSW ( $P = 0.44$  and  $P = 0.55$  for vaginal and anal sex, respectively). The proportion of MSMW who reported unprotected vaginal and/or anal sex with nonmain partners was significantly higher than among MSW ( $P < 0.001$  for vaginal and anal sexual risk behavior).

MSMW did not differ from MSM in their report of unprotected insertive anal sex overall or with main or nonmain sexual partners (see Table 4). MSMW were half as likely as MSM to report unprotected receptive anal sex overall ( $P = 0.02$ ) and with nonmain HIV-negative/UNK status men ( $P = 0.03$ ). As with women, sexual risk behavior was concentrated with nonmain sexual partners and did not differ with a main sexual partner.

### DISCUSSION

MSMW in this study were more likely to report sexual transmission risk behaviors with female partners compared with MSW. With male partners, MSMW were equally likely to

report unprotected insertive anal sex and half as likely to report unprotected receptive anal sex compared with MSM. MSMW in this study reported greater participation in sex work than MSW and MSM, and MSMW reported more overall sexual partners than MSM and MSW and more female sexual partners than MSW. In a sample comparing HIV-negative and HIV-positive MSM and MSMW, Doll and colleagues<sup>7</sup> reported that MSMW reported less unprotected anal sex with men than MSM. MSMW in our sample reported similar proportions of

**TABLE 4.** Unprotected Sexual Behavior of HIV-Positive Male IDUs With HIV-Negative/UNK Status Female and Male Sexual Partners in the Past 3 Months: INSPIRE Study 2001 to 2005, Baseline Data

	MSW (n = 469)	MSM (n = 90)	MSMW (n = 118)
Unprotected sex with HIV-negative/UNK HIV status women			
Vaginal sex			
Any*	92 (19.8%)		45 (39.8%)
Main	38 (8.1%)		7 (6.0%)
Nonmain*	63 (13.5%)		40 (35.7%)
Anal insertive sex			
Any*	18 (3.9%)		14 (12.3%)
Main	8 (1.7%)		3 (2.5%)
Nonmain*	13 (2.8%)		13 (11.0%)
Unprotected sex with HIV-negative/UNK status men			
Anal insertive sex			
Any		11 (12.2%)	17 (14.4%)
Main		1 (1.1%)	4 (3.4%)
Nonmain		11 (12.2%)	16 (13.6%)
Anal receptive sex			
Any†		22 (25.0%)	14 (12.3%)
Main		5 (5.6%)	4 (3.4%)
Nonmain†		20 (22.5%)	13 (11.4%)

\* $P < 0.001$ ; † $P < 0.05$ .

unprotected insertive anal sex with men compared with MSM and less unprotected receptive anal sex with men. MSMW in our sample reported significantly more unprotected anal sex with female partners than reported by MSW.

In addition, sexual risk behavior among HIV-positive MSMW-IDUs in our sample concentrated in nonmain sexual partnerships. Hightow and colleagues<sup>10</sup> recently reported that HIV-positive MSMW college students “appear to occupy a unique, central place in the sexual networks of HIV-infected students” and are more likely to report >10 sexual partners in the year before HIV diagnosis. Further research is needed to assess the sexual networks of HIV-positive MSMW-IDUs, particularly in regard to nonmain sexual partnerships. Bourgois<sup>23</sup> has outlined the potential benefits of qualitative ethnographic data to provide clarity to epidemiologic categorizations of risk behavior among IDUs. Our previous qualitative research on the sexual transmission risk behaviors of HIV-positive IDUs<sup>24</sup> has documented the uncertainty that many research participants express when asked to identify nonmain partnerships as “exchange” versus “casual” in public health interviews. Qualitative investigations into the complexity of the sexual interactions of HIV-positive MSMW-IDUs that occur in everyday social contexts could improve our epidemiologic understanding of sexual networks among this population.

Most (81%) MSMW in our sample reported involvement in the drug-sex economy as consumers, sellers, or both. It is difficult to interpret the exact relation between transactional sex and MSMW risk behavior in our sample. More research is needed comparing samples of MSMW-IDU sex workers with MSMW-IDU non-sex workers to determine how sexual risk behaviors are distributed within and across these groups. Involvement in the drug-sex economy may indicate an avenue for accessing sex with men for some MSMW, particularly in light of studies showing links between internalized homophobia and bisexuality among MSM<sup>14–16</sup> and qualitative data describing difficulties with HIV serostatus disclosure and sexual partnering among HIV-positive gay and bisexual men who experienced negative responses to revealing their sexual relationships with men.<sup>17</sup> Rietmeijer and colleagues<sup>13</sup> reported that sex work and injection drug use predated lack of condom use with female partners among their sample of MSMW sex workers, underscoring a potential link between sex work participation and high-risk sex with female partners of MSMW. Qualitative studies of HIV-positive male IDUs have revealed that gender stereotypes within the specific drug cultures define and limit HIV-positive IDU men from acting outside of gendered, scripted, and sometimes hypermasculine sex roles, which include limited communication about condom use with female partners.<sup>25,26</sup>

Although we did not see statistically significant differences in relation to race/ethnicity in this study, our sample was 85% men of color. The ways in which racial/ethnic groups respond to homosexuality within their cultural context plays a role in comfort with disclosure of male-to-male sexual activity<sup>27–29</sup> and HIV status,<sup>30</sup> and this has been forwarded as a partial explanation for why MSM of color have much higher HIV prevalence than white MSM.<sup>31–34</sup> Racial and ethnic differences in the sexual identity and behavior of MSMW<sup>35,36</sup>

also raise the issue of cultural influence and relevance in prevention research and practice.

In regard to alcohol and drug use, MSMW were more likely to report any alcohol and non-injection drug use in the previous 3 months than MSM or MSW. MSMW were more frequent users of stimulants than MSW and were more frequent users of crack and cocaine (but not amphetamines) than MSM. The relation between alcohol and stimulant use and high-risk sex has been well established in populations of MSM<sup>37–40</sup> and MSW-IDUs.<sup>41–43</sup> The contexts under which HIV-positive MSMW-IDUs use noninjection stimulants and alcohol during incidents of sexual risk taking merit further research. Frequency of injection and injection drugs of choice also differed between the 3 groups, with MSMW reporting more overall injection than MSM and more amphetamine injection than MSW. MSMW may be particularly relevant populations to understand in the context of the current amphetamine epidemic among MSM, with its well-established link to unprotected anal sex<sup>37,38</sup> and newly acquired HIV infection.<sup>44</sup>

### Limitations

This study has several limitations, which are likely to obscure true associations between the 3 groups of men. The average age of the sample and its recruitment in entirely urban locations limit generalizability to younger age cohorts of HIV-positive IDUs and rurally located HIV-positive IDUs. The lack of distinction between selling and purchasing sex in transactional sex data potentially obscures important differences between sex workers and sex work consumers and those who engage in both behaviors. Because this study focused on HIV-positive IDUs, the findings may have limited generalizability to other populations of male drug users.

We used convenience sampling to recruit heterosexually active IDUs into the study. Therefore, it is likely that we were not able to recruit the most hard-to-reach, and thus riskiest, IDUs. Also as a result of convenience sampling, it is likely that individuals in the study have fewer sexual partners, are less likely to have male and female sexual partners, and are less likely to engage in sexual risk behavior compared with the overall population of HIV-positive IDUs. In addition, a sizable proportion (~23%) of those who completed the screening interview did not return for the baseline interview. Individuals who returned for the baseline interview are also likely to have fewer sexual partners, are less likely to have both male and female sexual partners, and are less likely to engage in sexual risk behavior compared with those who did not return. Because the observed sample may be less likely to have both male and female sexual partners and less likely to engage in sexual risk behavior compared with the overall population of HIV-positive IDUs, we are less likely to observe true associations between the gender of sexual partners and sexual risk behavior in this study.

A-CASI data collection was used in this study to counteract reporting bias that may occur in interview-administered survey research. All items in this study were assessed using self-report. Self-reported data are subject to incorrect recall and social desirability bias. The presence of 90 male participants who reported exclusively MSM sexual behavior at baseline but not at the eligibility screening

underscores the potential limitation of self-report data. It is possible that the responses of these men are more inaccurate compared with those of other individuals in the sample. These potential differences have the potential to bias study results. We used a crude yes/no response for sexual risk behavior. It is likely that if we used a more nuanced definition of these variables, we would observe different or additional relations between aspects of the comparative sexual HIV transmission risk behaviors of MSMW, MSM, and MSW. Because the INSPIRE study was designed as randomized control trial with 12-month follow-up, it is possible to conduct future analyses of these data to explore additional relation measures and analyze the sexual behavior of MSMW in comparison to MSM and MSW longitudinally.

### Study Implications

Study results suggest future directions for research, data analysis, and prevention programming. In terms of directions for further research, in-depth qualitative studies could be initiated to explore the specific HIV risk environments and prevention needs of MSMW-IDUs, particularly diverse samples of MSMW of color. A clearer picture of the sexual lives and drug use environments of HIV-negative and HIV-positive MSMW is needed to provide further insight into prevention needs with male and female partners. Special attention should be paid to examining the social and cultural expectations related to the drug/sex economy, race/ethnicity, and gender norms in the sexual risk decision making of MSMW drug users.<sup>3,45</sup> Clinicians may be advised to assess whether their HIV-positive MSMW-IDU patients are participating in transactional sex as a key component to addressing HIV prevention needs.

The combining of the sexual behavior categories among men (ie, “gay and bisexual” or “heterosexual”) is still commonplace, despite the fact that “out” or acculturated gay men who partner only with other men may have different sexual cultures and prevention practices than behaviorally bisexual men who are assimilated into the gay culture as gay-identified men, bisexually identified men, closeted, or heterosexually identified MSMW. Data reported here indicate that it is advisable to separate MSMW, when statistical power allows, from MSW and MSM populations in epidemiologic surveillance and prevention intervention trial analysis to gain a clearer picture of the sexual behavior and intervention effects among high-risk groups of men. Continued “lumping” of the categories of gay and bisexual men may serve to cloud our understanding of behavioral differences between these groups. Additional purposive studies<sup>5,10</sup> that compare sexual behaviors among men are needed. Omitting questions about, or failing to examine post hoc, the sexual behavior with male partners among samples of MSW can perpetuate misunderstandings of the range of sexual behavior among men and indirectly reinforce homophobic norms within communities.

There is a critical need to understand the complex relation among sexual identity, sexual preference, and sexual behaviors in prevention programs targeting behaviorally bisexual HIV-positive male IDUs. A structural intervention that may hold promise is to separate gay and bisexual men in prevention programming, as is being explored in interventions

targeting “men on the down low.”<sup>46</sup> Promising intervention models that may be particularly relevant to MSMW men who use drugs are those exploring the relation between personal and community identity,<sup>47,48</sup> gender roles and differences in sexual relationships with women and men,<sup>46</sup> and transactional sex and sexual identity and what has been referred to ethnographically as “gay for pay” among drug users.<sup>13</sup> Prevention strategies are urgently needed that respond to the social and psychological complexities of HIV prevention among drug-using HIV-positive MSMW who report high-risk sex with female partners, particularly in regard to communication about sexual behavior and condom use.

In summary, HIV-positive MSMW-IDUs represent a high-risk population of sexually active HIV-positive men who are not well understood in terms of their sexual behavior, their contexts of sexual risk taking, and the relation between their drug use and sexual risk. Risky sex with HIV-negative/UNK status female partners is of particular concern among this population. Prevention programs should respond to the unique needs of HIV-positive MSMW-IDUs, particularly their prevention needs with female partners.

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