

Georgia State University  
**ScholarWorks @ Georgia State University**

---

Public Health Theses

School of Public Health

---

Summer 8-9-2016

# Characteristics and Risk Behaviors of Men Who Have Sex with Men and Women Compared to Men Who Have Sex with Men – 20 U.S. Cities, 2011 and 2014

Shaun Shadaker

Follow this and additional works at: [https://scholarworks.gsu.edu/iph\\_theses](https://scholarworks.gsu.edu/iph_theses)

---

## Recommended Citation

Shadaker, Shaun, "Characteristics and Risk Behaviors of Men Who Have Sex with Men and Women Compared to Men Who Have Sex with Men – 20 U.S. Cities, 2011 and 2014." Thesis, Georgia State University, 2016.  
[https://scholarworks.gsu.edu/iph\\_theses/476](https://scholarworks.gsu.edu/iph_theses/476)

This Thesis is brought to you for free and open access by the School of Public Health at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Public Health Theses by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact [scholarworks@gsu.edu](mailto:scholarworks@gsu.edu).

## ABSTRACT

### CHARACTERISTICS AND RISK BEHAVIORS OF MEN WHO HAVE SEX WITH MEN AND WOMEN COMPARED TO MEN WHO HAVE SEX WITH MEN – 20 U.S. CITIES, 2011 AND 2014

By

SHAUN D. SHADAKER

May 5, 2016

Background: Men who have sex with men (MSM) are heterogeneous with respect to sexual behavior. We examined differences in sexual risk behaviors and HIV protective behaviors between men who have sex with men and women (MSMW) and men who have sex with men only (MSMO). Among MSMW, we also examined associations between partner gender and disclosure of same-sex attraction with sexual risk behaviors.

Methods: Data for this analysis were from MSM who participated in National HIV Behavioral Surveillance (NHBS) in 2011 and 2014. Prevalence differences comparing MSMW and MSMO were calculated for demographics and behaviors. Adjusted prevalence ratios comparing MSMW to MSMO were calculated for the outcomes condomless sex, exchange sex, testing for HIV, and disclosure of same-sex behavior.

Results: MSMW were less likely than MSMO to have condomless sex with male partners (aPR 0.77; 95%CI 0.73-0.80), to have been diagnosed with another STD (aPR 0.83; 95%CI 0.73-0.95), and to disclose their same-sex behavior to healthcare providers (aPR 0.72; 95%CI 0.69-0.76). However, MSMW were more likely than MSMO to engage in exchange sex (aPR 2.43; 95%CI 2.17-2.72) and to have ever injected drugs (aPR 2.00; 95%CI 1.76-2.28)

Conclusions: MSMW have distinctive sexual risk behaviors and could benefit from tailored interventions to reduce the prevalence of HIV in this population.

CHARACTERISTICS AND RISK BEHAVIORS OF MEN WHO HAVE SEX WITH MEN  
AND WOMEN COMPARED TO MEN WHO HAVE SEX WITH MEN – 20 U.S. CITIES,  
2011 AND 2014

by

SHAUN D. SHADAKER

B.S., GEORGIA STATE UNIVERSITY

A Thesis Submitted to the Graduate Faculty  
of Georgia State University in Partial Fulfillment  
of the  
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA

30303

APPROVAL PAGE

CHARACTERISTICS AND RISK BEHAVIORS OF MEN WHO HAVE SEX WITH  
MEN AND WOMEN – 20 U.S. CITIES

by

SHAUN D. SHADAKER

Approved:

Matthew J. Magee, Ph.D, MPH

Committee Chair

Richard Rothenberg, M.D., MPH

Committee Member

Brooke Hoots, Ph.D, MsPH

Committee Member

May 5, 2016

Date

## Acknowledgments

First and foremost I would like to thank my family for their love and support. I have been blessed with the best family I could ask for, and I thank them for always encouraging me to be my best, and for all their understanding along the way.

I would also like to acknowledge my thesis chair, Dr. Matthew Magee. I can't thank him enough for his patience, guidance, and wisdom, and for always challenging me to make this thesis better. Through this experience and in the classroom, I have learned so much from him and I am very grateful.

I also offer my gratitude to the NHBS team at the CDC. Thanks to Dr. Brooke Hoots, who served as my supervisor and ally at the CDC and worked with me throughout this process. Thank you for lending your expertise to refine this study and for allowing me to use this great source of data.

Thanks also to Dr. Richard Rothenberg for serving as my second committee member at Georgia State. Your time and input were appreciated.

Finally, I would like to thank my friend and former employer, Trey Inman. I made my way through two degrees while working for Trey as he accommodated my ever-changing schedule, while always offering encouragement and support. I cannot thank him enough.

## Author's Statement Page

In presenting this thesis as a partial fulfillment of the requirements for an advanced degree from Georgia State University, I agree that the Library of the University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote from, to copy from, or to publish this thesis may be granted by the author or, in his/her absence, by the professor under whose direction it was written, or in his/her absence, by the Associate Dean, School of Public Health. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this dissertation which involves potential financial gain will not be allowed without written permission of the author.

Shaun D. Shadaker

Signature of Author

## TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	ii
LIST OF TABLES .....	vi
CHAPTER I .....	1
INTRODUCTION .....	1
1.1 Background .....	1
1.2 Gap and Purpose of Study.....	3
CHAPTER II.....	4
REVIEW OF THE LITERATURE .....	4
2.1 Condom Use.....	4
2.2 Drug Use .....	5
2.3 Exchange Sex.....	6
2.4 Disclosure of Same Sex Behavior.....	6
2.5 HIV Testing .....	7
2.6 The Role of Race/Ethnicity .....	8
2.7 The Bridge of Susceptibility.....	9
2.8 Summary of Literature Review .....	10
CHAPTER III .....	11
MANUSCRIPT .....	11
Introduction .....	11
Methods .....	13
Results .....	16
Discussion .....	20
Conclusion.....	23
THESIS REFERENCES.....	36

## List of Tables

Table 4.1 Demographic Characteristics Stratified by Sexual Partners .....	28
Table 4.2 Risk Behaviors by Sexual Partner .....	29
Table 4.3 Adjusted Prevalence Ratios for Main Outcome Variables .....	30
Table 4.4 Demographics & Risk Behaviors by Disclosure of Same-Sex Behavior, MSMW .....	31
Table 4.5 Risk Behaviors with Last Partner among MSMW .....	32



## List of Figures

Figure 1.1 Race-Stratified Prevalence of Condomless Anal Sex with Male Partners, Past 12 Months .....	33
Figure 2.1 Race-Stratified Prevalence of Ever Injecting Drugs .....	33
Figure 3.1 Race-Stratified Prevalence of Exchange Sex, Past 12 Months .....	34
Figure 4.1 Race-Stratified Prevalence of Diagnosis of Other STDs, Past 12 Months.....	34
Figure 5.1 Race-Stratified Prevalence of HIV Testing, Past 12 Months .....	35
Figure 6.1 Race-Stratified Prevalence of Disclosure to Healthcare Providers .....	35

## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Background**

Human immunodeficiency virus (HIV) is a worldwide public health concern. The virus attacks the immune system by destroying cells that fight infections (CDC, 2015). Left untreated, HIV can progress to acquired immunodeficiency syndrome (AIDS), which leaves the body susceptible to other debilitating infections that can lead to death. Since first coming to the attention of health practitioners in the United States in 1981, the number of people living with the disease has greatly increased. According to the Centers for Disease Control and Prevention (CDC), there were nearly 37 million people in the world living with HIV in 2015. That number includes at least 1.2 million cases of HIV in the United States. This large prevalence of people living with HIV is certainly concerning, but also reflects the progress of public health and medical professionals around the world. More people are living with HIV today in part because the disease is not the death sentence that it once was. Advancements in treatments have not only made HIV more controllable, but also help to prevent new cases. Despite this progress, however, there is still no cure for HIV to date, and until there is we must do everything possible to reduce the number of new infections. In order to have the greatest impact, it is necessary to reach those most at risk of contracting HIV with interventions to curb the epidemic.

Not all people in the United States are equally affected by HIV. The risk of acquiring the disease varies between different age groups, races, income levels, and geographic locations, among other factors. Since the beginning of the epidemic, however, gay, bisexual, and other men who have sex with men have been the group most affected by HIV in the United States. In fact, the very early stages of the epidemic saw the disease informally dubbed “the gay plague” and very briefly, but more formally, Gay Related Immune Deficiency, or GRID (Clews, 2014). Despite the fact that these labels were quickly discredited

among medical professionals, the stigmas resulting from them have not entirely abated. Today it is recognized that one's sexual orientation is not a sole determining factor in whether or not he or she will contract HIV, but the imbalance of people getting the disease remains. In fact, the CDC has estimated that men who have sex with men accounted for 78% of new cases of HIV in the United States in 2010. This is especially disconcerting given that these men have been estimated to account for as little as 2.9% of the U.S. population (Purcell, 2012).

Because of the drastic HIV-related health disparities seen among this population, many public health campaigns and interventions have been implemented in an attempt to ease their burden of disease. It is important to note, however, the distinctions among members of this population. Grouping everyone together under the umbrella of "men who have sex with men" misses the opportunity to reach more specific populations, such as bisexual men, who may have different behavioral patterns (Hubach, et al., 2014). Existing studies have shown that men who have sex with both men and women (hereafter referred to as MSMW) may engage in riskier sexual behaviors than men who have sex with men only (hereafter referred to as MSMO). It has been suggested that MSMW may differ from MSMO when it comes to frequencies of condom use, number of sexual partners and exchanging drugs or money for sex. (Flores et al., 2009). These are all factors that increase one's risk of contracting HIV. Additionally, differences have been noted between the two groups in terms of testing for HIV (Jeffries, 2010) and disclosing their same sex behavior (Schrimshaw et al., 2013). While not contributing directly to one's own acquisition of HIV, testing and disclosure are both important for reducing the spread of the disease to other parties, including the female partners of MSMW who would otherwise be at much lower risk. Better understanding of all these risk factors and how they differ among MSMW will help to guide future interventions to reduce the burden of HIV in this population and others.

## **1.2 Gap and Purpose of Study**

Although there are many studies that reported HIV-related risk factors of men who have sex with men, the majority do not distinguish between MSMO and MSMW. There are relatively few studies that do focus on behaviorally bisexual men, and the results across these studies are inconsistent. Additionally, studies to date generally had small sample sizes and/or focused on only one race or geographic region. This study utilized cross-sectional data from 20 cities across the United States to gain a clearer picture of the HIV risk factors exhibited by a diverse group of MSMW.

The objectives of this study were to:

1. Compare MSMW to MSMO to determine differences in sexual risk and HIV prevention behaviors.
2. Determine the associations between 1) partner gender and 2) disclosure of same sex behavior with sexual behaviors among MSMW.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

#### **2.1 Condom Use**

Correct and consistent use of condoms is essential for stemming the HIV/AIDS epidemic. Though the efficacy of condoms in preventing HIV is difficult to determine due to the inherent need to observe private behaviors, (CDC, 2013) the World Health Organization (WHO) estimates they are more than 80% effective in preventing HIV, while providing additional protection from unwanted pregnancies and a myriad of other sexually transmitted infections. Despite this, condom use among men who have sex with men remains low, with as few as 16% reporting consistent use (Smith et al., 2013). Less is known about condom use behaviors among MSMW, however. Although several studies have examined condom use among this population, they have resulted in conflicting conclusions.

As described by Jeffries and Dodge (2007), a slew of studies conducted throughout the 1990s reported high rates of condomless sex among MSMW (Doll et al., 1992; Peterson et al., 1992; McKirnan et al., 1995; Stokes et al., 1996). However, in their own cross-sectional study of 4,928 men between 15 and 44 years old, Jeffries and Dodge found no significant difference in condom use between MSMW and MSMO or heterosexual men. In fact, they observed that MSMW used condoms more frequently with their female partners than did heterosexual men, or MSMO with their male partners. This difference in condom use based upon the gender of MSMW's sexual partners has been documented in other studies as well. However, the directionality of the difference is not universal, as other studies found that condom use was more frequent with male partners of MSMW than with females (Gorbach et al., 2009; Weatherburn et al., 1998). Hubach et al. (2014) enumerated explanations for these differences in their qualitative analysis of 77 bisexual men in Indianapolis. They described that MSMW were more concerned about HIV with their male partners, but males were less insistent on condom use during sex

than their female partners. With females, however, the primary driver of condom use was concern over pregnancy, with the main barrier being loss of sensation.

Despite conflicting data in past studies, there is some consensus that MSMW engage in less receptive anal intercourse (RAI), and consequently less unprotected receptive anal intercourse (URAI) than MSMO (Flores et al., 2009; Jeffries, 2014; Maulsby et al., 2013; Zule et al., 2009; Dodge et al., 2010). As this behavior is recognized as the most risky for HIV transmission, the lower rates of URAI among MSMW helps to explain the reduced prevalence of HIV in this population when compared to exclusively homosexual men (Jeffries, 2014; Zule, 2009). Regardless, more must be done to increase the use of condoms for MSMW. In order to devise effective interventions to promote this behavior, more clarity is needed to effectively describe the differences in condom use among MSMW and MSMO.

## **2.2 Drug Use**

Intravenous drug use is a risk factor for HIV all unto its own, as the virus can be transmitted through blood from shared needles (CDC, 2015). However, the inherent dangers of mixing sex with drugs are also widely recognized. According to the CDC, when used prior to or during sex, drugs and alcohol can cause lowered inhibitions, leading to riskier sexual behavior and reduced condom use. While in theory this may seem self-evident, studies have been less than conclusive. Leigh, Ames & Stacy (2008) found that amphetamine use led to decreased condom use, supporting other findings (Mansergh et al., 2006) but in their study alcohol, cocaine and marijuana did not have a significant effect. Another study found that alcohol use prior to sex was associated with reduced condom use, but only among females and with casual partners (Scott-Sheldon et al., 2009). This gender difference would only complicate matters when studying MSMW, who have been shown to be more likely than other men to use drugs or alcohol during sex (Friedman et al., 2014). However, the disparities in drug use are not found just among MSMW, but with their sexual partners as well. MSMW's female partners have been shown to

engage in significantly more substance use than partners of MSMO and heterosexual men, and to be more likely to trade sex for money or drugs than other women (Jeffries, 2014).

### **2.3 Exchange Sex**

Exchanging money or drugs for sex has been shown in past studies to contribute to the risk of HIV infection in both heterosexual and homosexual populations (Jenness et al., 2011). Studies have found that MSMW were significantly more likely to exchange sex for money or drugs (Friedman et al., 2014; Jeffries, 2014; Maulsby et al., 2013), with another finding that MSMW in Los Angeles were nearly twice as likely to receive drugs or money for sex as their heterosexual or strictly homosexual counterparts (Gorbach et al., 2009). This transactional aspect of sex has its own set of risks that extend beyond lowered inhibitions. Sex workers are not only more likely to have sex while under the influence, but they also have high numbers of sexual partners and a higher prevalence of HIV and other STDs (Reisner et al., 2008). The combination of all these risks presents a serious health concern for the sex worker as well as his or her sexual partners.

### **2.4 Disclosure of Same Sex Behavior**

Disclosure of one's same sex attraction or behavior is a complex issue. For nearly all gay and bisexual men there is a process in which they begin to confide their feelings to the people in their lives, whether it be friends, family, or others. For many, those are difficult conversations to have. Fears of rejection or discrimination based on one's sexual orientation still persist in the community, and those concerns can have a negative effect on both the physical and mental health of these men (Schrimshaw et al., 2013). Homophobia and stress from concealing sexual orientation have been associated with risky sexual behaviors such as condomless intercourse (Jeffries et al., 2013; McGarrity & Huebner, 2013).

Additionally, those that are not open with their sexuality can miss the opportunity to engage with other members of the community, which can be important for HIV prevention. Social networks have been shown to have an effect on transmission of HIV and other STDs (Latkin et al., 2011). McGarrity & Huebner (2013) described that those who disclose their sexuality experience better mental and physical health, less drug use and lower stress levels. Closeted men may also be less informed about HIV risks, and less likely to discuss these issues with their healthcare providers (Lapinski, Braz & Maloney, 2010). Because MSMW may be less likely to disclose their sexuality to healthcare workers, they may therefore be less likely to receive proper care and recommended HIV testing.

## **2.5 HIV Testing**

The CDC began recommending in 2006 that those at high risk of HIV get tested at least annually, and have suggested that sexually active MSMO and MSMW get tested every three to six months (CDC, 2006; Joseph et al., 2014). This is because frequent testing is essential for getting HIV positive individuals in treatment at the earliest possible stage of the disease, but also to prevent transmission by those unaware they have contracted the disease. Despite these benefits and recommendations, up to 20% of people in the United States living with HIV are not aware of their infection (CDC, 2011). A CDC report found that in 2011 only 67% of men who have sex with men who were either HIV-negative or unaware of their status had been tested in the preceding year (CDC, 2013). That same report highlighted the need for frequent testing, as it found that men who were unaware of their positive status were more than twice as likely to have had condomless discordant sex at last sex as men who were knowingly HIV positive (33% vs. 13%). While 67% of men getting tested is not sufficient, it likely exceeds the number of MSMW, as they have been suggested to test less frequently than MSMO (Jeffries, 2010). Jeffries points out in his analysis that many of the studies involving HIV testing for MSMW have been conducted



in countries other than the United States. Because of the implied differences in cultures and healthcare coverage, this highlights the need for additional studies within the United States to describe the testing behaviors of this population.

## **2.6 The Role of Race/Ethnicity**

While the articles on testing are frequently focused on foreign populations, a large percentage of the U.S. articles on MSMW are focused on the African American community. Much of the reason for this is that black men who have sex with men have as much as 5 times the risk of contracting HIV as their white counterparts (Sullivan et al., 2014). However, the reasons for these health disparities are not entirely clear. Black men who have sex with men have been shown to engage in less risky sexual behaviors, including less unprotected sex, fewer sexual partners, and less drug use than white men (Millett et al., 2006; Millett et al., 2007; Peterson & Jones, 2009; Magnus et al., 2010). African American men do, however, experience levels of discrimination that most Caucasians do not. Racial discrimination can have an effect on healthcare utilization and testing for HIV which may affect the men's health (Irvin et al., 2014). Black MSMO and MSMW also face homophobia in addition to racial injustices, which is associated with riskier sexual behavior (Jeffries et al., 2013) and less disclosure of their same sex behavior (Fields et al., 2015). Much attention has been paid to this community regarding HIV risk from men who conceal their sexuality, despite the fact that this behavior is exhibited by men of all racial groups (Lapinsky et al., 2010). Indeed, Ford et al. (2007) reported on the caution that must be taken when addressing this issue in research. The judgement placed on these men is unwarranted based on current research (Bond et al., 2009) and care must be taken to not attach additional burdens to an already marginalized community. However, African American men are more likely to be MSMW than other racial groups (Flores et al., 2009; Montgomery et al., 2003) so it is important to understand the behaviors of this population for their own benefit.

## **2.7 The Bridge of Susceptibility**

Much of the discussion over HIV risk behaviors among the MSMW population in the literature has been concerned with a bridge of susceptibility to lower-risk populations (Jeffries, 2014). In theory, same-sex behavior among these men place them at higher risk for HIV, which then puts their female sexual partners at greater risk. There is, however, no consensus on the validity of this argument (Greene et al., 2012). For it to be a significant driver of HIV incidence among females requires disproportionate rates of multiple risk factors at once, including condomless sex, high HIV prevalence, and a lack of testing for HIV. Additionally, many fear that a lack of disclosure among MSMW will increase the risk of HIV for their female partners (Greene et al., 2012; Bond et al., 2009; Gorbach et al., 2009; Siegel et al., 2008). Dodge, Jeffries & Sandfort (2008) found in their qualitative study that most men report that disclosure is more difficult with female partners, and at the same time reported less perceived risk when having sex with females, which inhibited condom use. A combination of these factors could put some women at increased risk of HIV, but more research is needed to conclude the impact this may have on the future of the epidemic.

## **2.8 Summary of Literature Review**

Takeaways from the review of past studies include:

- Condom use is essential for prevention of HIV and presents additional problems for MSMW, who have different behaviors based on the gender of their sexual partner.
- Drug use may be more prevalent among MSMW, which could lead to risky sexual behavior, and exchange of drugs or money for sex presents many additional risks.

- Disclosure of homosexual behavior is a complex issue. Those who are open with their sexuality generally have better health outcomes and are more likely to receive appropriate medical treatment.
- Frequently testing for HIV is vital to ensure those who are HIV positive receive the care they need as soon as possible, and to prevent the spread of disease by those unaware of their infection.
- The risk of HIV among heterosexual women that is attributable to MSMW is unclear. Blame placed on these men is unwarranted and more research is needed to determine the effect of the so-called bridge of susceptibility.

## **CHAPTER III**

### **MANUSCRIPT**

#### **Introduction**

Men who have sex with men (MSM) continue to be disproportionately burdened by HIV in the United States.<sup>1</sup> According to the US Centers for Disease Control and Prevention (CDC), MSM accounted for 55% of estimated HIV diagnoses in the United States in 2013 despite representing only 2% of the population.<sup>2</sup> Reductions in HIV-related stigma and ongoing improvements in treatment options for persons living with HIV may lead to behavioral disinhibition that put MSM at increased risk of HIV.<sup>3</sup>

Men who have sex with men, however, are heterogeneous with respect to sexual risk behaviors. Targeting more specific populations of MSM, such as men who have sex with both men and women, will likely improve HIV prevention effectiveness.<sup>4</sup> Previous studies reported that compared to men who have sex with men only (MSMO), men who have sex with men and women (MSMW) may have less frequent condom use,<sup>5-9</sup> use more drugs during sex,<sup>10,11</sup> and have a greater likelihood of exchanging drugs or money for sex.<sup>10-12</sup> Additionally, MSMW may be less likely to engage in protective behaviors such as testing for HIV.<sup>13</sup> Frequent HIV testing is essential for early diagnosis of infection which improves HIV prognosis. Additionally, diagnosis reduces transmission among those who are infected through both altered sexual behaviors and reduced viral load from antiretroviral therapies.<sup>14</sup> Disclosure of same sex behavior to friends and healthcare providers may be associated with reduced sexual risk behaviors due to reduced stress, improved mental and physical health, and access to social networks that encourage safer sexual behaviors.<sup>15</sup> Unfortunately, many studies have found that MSMW are less likely to disclose their sexuality to friends and healthcare providers than other men.<sup>16-19</sup>

Clarifying sexual risk behaviors exhibited by MSMW as opposed to MSMO can lead to more effective HIV prevention interventions to reduce the burden of disease in these communities. This

analysis compared MSMW to MSMO to determine differences in sexual risk and HIV prevention behaviors. Secondly, among MSMW, we determined the associations between 1) partner gender and 2) disclosure of same sex behavior with sexual behaviors among MSMW.

## **Methods**

### *Setting and Study Design*

We conducted a cross-sectional analysis using data from National HIV Behavioral Surveillance (NHBS), an ongoing surveillance system that surveys populations at high risk of contracting HIV in 20 U.S. cities with high AIDS burden. Details of the NHBS operations and sampling procedures have been described elsewhere.<sup>20</sup> The current analysis used data from MSM recruited for interviews through venue-based, time-space sampling in 2011 and 2014. Data for the two survey years were combined for this analysis.

Eligible study participants were men  $\geq 18$  years old, who were born male and identified as male at the time of the survey, and who self-reported ever having oral or anal sex with a man. Additionally, participants were required to live in the participating survey location, and be able to complete the survey in either English or Spanish. Those who had previously participated in the current cycle were excluded. All participants gave informed consent prior to beginning the survey. MSM with complete and valid interview data who were currently sexually active, defined as having  $\geq 1$  male partner in the past 12 months, were included in analysis. Validity was assessed by the interviewer's confidence in the respondent's answers; interviewers received in-person training on administering the questionnaire and interviews they marked invalid were excluded from analysis.

### *Definitions*

MSMO were defined as those participants who reported only male sexual partners in the 12 months preceding the survey. MSMW were defined as participants with at least one male and at least one female partner in the past 12 months.

Sexual risk and protective behavioral data were self-reported during the interview, including condomless sex, exchange sex, HIV testing and disclosure of same-sex behavior. Participants who stated they had had sex with at least one male partner over the past 12 months without using a condom were defined as having condomless male sex, and likewise with their female partners. Main sexual partners were self-reported by the participants as someone with whom they felt committed and would call their boy/girlfriend, significant other, or spouse. A casual partner was defined as a sexual partner with whom there was no commitment or who was not well known.

Multiple questions on the survey pertained to disclosure of sexual behavior. Initially, both gay-identified and non-gay-identified participants were asked if they had ever disclosed their same sex attraction or behavior to anyone. Those who answered no to this question were defined as non-disclosing to all parties. Participants answering that they had disclosed their sexuality to someone were then asked in turn if they had told gay-identified friends, non-gay-identified friends, family, and healthcare providers, and were defined as disclosing to any party to which they self-reported disclosure.

Exchange sex was defined as the exchange of drugs or money for sex. For the purpose of this analysis, no distinction was made between those who gave compensation and those who received it. Participants who reported giving or receiving drugs or money in exchange for sexual intercourse with their male and/or female partners were defined as having engaged in exchange sex, whether it was with their main or casual partners.

Concurrent partnerships were determined by the participants' answers pertaining to their last sexual partners, male and female. If the participant stated that he had sex with other people while in a

sexual relationship with that most recent partner or if he believed that partner “probably did” or “definitely did” have sex with others while in their relationship, it was defined as a concurrent relationship. Conversely, if the respondent did not report concurrent sex and believed his partner probably or definitely did not have sex with another person while in their relationship it was defined as non-concurrent. One night stands were categorized separately.

Binge drinking was defined as having five or more alcoholic drinks in a single setting. Ever injecting drugs was defined as injecting any drug that was not prescribed.

Participants were questioned about previous diagnosis of sexually transmitted diseases (STDs). Specifically, participants were asked if they had been told by a doctor or healthcare provider in the previous 12 months that they had gonorrhea, chlamydia, syphilis, or any other STD other than HIV. If the participant answered ‘yes’ to one or more of those questions, he was defined as having another STD in the previous 12 months.

### *Statistical Analysis*

To assess the bivariate association between MSMW vs MSMO behavior and participant demographic and behavioral characteristics, we calculated prevalence differences with 95% confidence intervals (CI) and used chi-square statistical tests. To compare prevalence of main risk behaviors of interest (condomless anal sex with male partners, ever injecting drugs, exchange sex, diagnoses of other STDs, HIV testing, and disclosure to healthcare provider) between MSMW and MSMO, adjusted prevalence ratios and 95% confidence intervals were calculated using log-linked Poisson regression models with generalized estimating equations. All models were clustered on recruitment event and used an independent correlation matrix. Race was considered as an effect measure modifier. If the p-value for the likelihood ratio test between the model with an interaction term between race and MSMO/MSMW and the model without an interaction term was less than 0.20, prevalence ratios were presented stratified

by race (black MSMW, black MSMO, white MSMW, white MSMO, Hispanic/Latino MSMW, and Hispanic/Latino MSMO). Covariates associated with the outcomes in bivariate analyses with p-values less than 0.10 were considered as confounders in the multivariable models and backwards elimination was used to reduce models until only significant covariates remained, with a p-value less than 0.05. All statistical analyses were performed using SAS version 9.3. Statistical significance was defined by a two-tailed p-value < 0.05.

### *Ethical Approval*

The current study was determined exempt by the Institutional Review Board (IRB) of Georgia State University. NHBS activities were approved by local institutional review boards (IRBs) in each participating city. NHBS activities were determined to be research in which the Centers for Disease Control and Prevention (CDC) were not directly engaged and did not require review by the CDC IRB.

## **Results**

### *Study Sample and Demographics*

A total of 18,896 men were included in the analysis--9,253 (49.0%) from the 2011 survey, and 9,633 (51.0%) from the 2014 survey. Nine participants had missing values pertaining to their sexual behavior with women, and were excluded from the analysis, leaving a final sample size of 18,887. Overall, a majority of participants were white and identified as homosexual with a median age of 32 (Table 1). In total, 11.6% (n=2,199) were classified as MSMW and 88.4% (n=16,688) were classified as MSMO. Compared to MSMO, MSMW were younger (median age 31 vs 32 for MSMO), and were more likely to be black (40.3% vs. 25.5%), have an annual household income below \$20,000 USD (46.7 vs. 29.3%), and to reside in the southern United States (48.8 vs. 41.1%) ( $P<0.01$  for all comparisons). MSMW were less likely than MSMO to self-report being HIV positive (8.3 vs. 15.9%) ( $P<0.01$ ).

### *Sexual Risk Behaviors*



Overall, participants reported a median of 4 (interquartile range [IQR] 2-9) sex partners in the past 12 months, 61.1% reported condomless anal sex with male partners in the past 12 months, and 11.4% reported exchanging sex in the past 12 months (Table 2). Additionally, 60.3% of the sample had been tested for HIV in the past 12 months, and 11.9% had another STD diagnosed in the past 12 months. Compared to MSMO, during the past 12 months MSMW had more total sex partners (median 3 [IQR 2-8] vs. 6 [IQR 4-11]), more total casual sex partners (median 5 [IQR 2-10] vs. 3 [IQR 1-7]), and more total condomless sex partners (median 2 [IQR 1-4] vs. 1 [IQR 0-2]) ( $P<0.01$  for all comparisons). When comparing only male partners, however, MSMW had fewer casual (median 2 [IQR 1-5] vs. 3 [IQR 1-7]) and condomless partners (median 0 [IQR 0-2] vs. 1 [IQR 0-2]) over the past 12 months than MSMO ( $P<0.01$ ). Disclosure of sexuality to healthcare providers was less prevalent among black MSMW than whites or Hispanics/Latinos (46.8 vs. 50.7 vs. 51.4%) and exchange sex was more prevalent among black MSMW than white or Hispanic/Latino MSMW (38.6 vs. 29.4 vs. 24.3%), with all  $P<0.01$ . Prevalence of ever injecting drugs was highest among white MSMW compared to black and Hispanic/Latino MSMW (26.9 vs. 6.8 vs. 8.7% respectively,  $P<0.01$ ). Prevalence of condomless sex with female partners in the past 12 months was higher among whites than black MSMW (65.7 vs. 60.1%;  $P<0.05$ ), though there was no significant difference in prevalence of condomless sex with male partners between white and black MSMW (47.2 vs. 46.5%;  $P=0.80$ ).

#### *Adjusted Prevalence Ratios*

In adjusted models (Table 3), MSMW compared to MSMO were more likely to exchange sex in the past 12 months (adjusted prevalence ratio [aPR] 2.43 95%CI 2.23-2.65), and more likely to have ever injected drugs (aPR 2.00 95%CI 1.76-2.28) but MSMW were less likely to report condomless anal sex (aPR 0.77 95%CI 0.73-0.80), and less likely to have been diagnosed with another STD in the past 12 months (aPR 0.83 95%CI 0.73-0.95). We did not detect a significant association between MSMW and

HIV testing in the previous 12 months (aPR 0.99 95%CI 0.96-1.01). Stratifying by race illuminated differences in drug use, whereas the prevalence ratio for MSMW vs. MSMO for black participants (aPR 1.27 95%CI 0.96-1.68) was significantly less than that of white (aPR 2.33 95%CI 1.99-2.73) or Hispanic/Latino (aPR 2.39 95%CI 1.75-3.26) participants.

#### *Risks among Non-Disclosing Men (MSMW)*

MSMW who did not disclose their same sex behavior to straight friends or family were older than those who did (median age 34 vs. 29) and more likely to be black (48.0 vs. 36.9%). In the past 12 months, MSMW who do not disclose their same sex behavior were less likely to have had condomless male anal sex (36.5 vs. 54.5%), or condomless sex with both a male and a female (34.1 vs. 48.0%) (Table 4). However, condomless vaginal sex was more prevalent among non-disclosing men (73.6 vs. 56.1%). Additionally, men who do not disclose their sexuality were less likely to have been tested for HIV in the past 12 months (53.6 vs. 72.9%). P-values for all disclosure comparisons were <0.01.

#### *Risk Behaviors with Last Partner (MSMW)*

MSMW were more likely to have a casual partnership (72.8 vs 67.7%;  $P<0.01$ ) and to engage in exchange sex (14.2 vs. 8.5;  $P<0.01$ ) with their last male sex partner than with their last female sex partner (Table 5). Condomless sex (50.4 vs. 32.9%;  $P<0.01$ ) and alcohol use during sex (51.8 vs. 46.0%;  $P<0.01$ ) were more prevalent with last female partners than last male partners. Condomless sex with female partners was also found to be more prevalent among white MSMW than black MSMW (80% vs 71%;  $P<0.01$ ). Reporting concurrent partners was more prevalent with last female sex partners than last male sex partners (69.1 vs 22.3%;  $P<0.01$ ). Further analysis of risk behaviors among those who reported concurrent partners with their last partner found that MSMW who reported concurrent partners with their last female partners engaged in condomless sex with that last partner more frequently than those who did not report concurrent partners with their last female partner (52.2 vs. 42.0%;  $P<0.01$ ). Condomless sex

was less prevalent among MSMW who reported concurrent partners with their last male partners than among those who did not report concurrent partners with their last male partners (38.6 vs. 31.9%;  $P < 0.05$ ).

## **Discussion**

We found that men who have sex with men are heterogeneous with respect to HIV risk behaviors. Specifically, more than 10% of men who have sex with men also reported sex with women. Importantly, we reported that MSMW were less likely to have condomless anal sex with a male partner but more likely to exchange sex for money or drugs. Disclosure of same-sex behavior was less prevalent among MSMW than MSMO, and associated with positive outcomes such as increased HIV testing and less exchange sex and condomless sex with male partners. These results support previous studies finding that a greater proportion of MSMW are younger<sup>21</sup> and black<sup>21,22</sup> with less income and education.<sup>12,23</sup>

Our study strengthens previous arguments that MSMW engage in less condomless sex with their male partners than MSMO.<sup>21-24</sup> There was less consensus in the literature over risk behaviors when accounting for female partners.<sup>23,25</sup> A national cross-sectional study<sup>25</sup> of 3,703 men found that MSMW did not use condoms less frequently with their male and female partners than MSMO or heterosexual men. Conversely our results indicated that when sexual partners of both genders are taken into account, MSMW have more total sex partners, casual sex partners, and condomless sex partners than MSMO. Also, we found that MSMW are less likely to use condoms with their female partners than with males. This is an important distinction when developing interventions that address HIV risks among this population that is often grouped with other MSM. Focusing solely on their same sex behavior overlooks risk factors exhibited with their female partners.

The high prevalence of exchange sex among MSMW has been found in other studies.<sup>10-12</sup> MSMW were more than twice as likely as MSMO to have exchanged money or drugs for sex in the past 12 months. Future interventions focused on the MSMW community are needed.

Evidence has been presented in previous studies that MSMW have higher rates of sexually transmitted diseases other than HIV compared to MSMO.<sup>11</sup> Our results conflicted with this, as MSMO in our sample had a slightly higher prevalence of diagnosed STDs over the past 12 months. Other risk factors including binge drinking, injection drug use, and being under the influence of drugs at last intercourse were significantly more prevalent among MSMW than MSMO. This supports extant literature documenting a higher prevalence of substance abuse in this population.<sup>12,22,26</sup>

Our study found that testing for HIV within the past 12 months did not differ significantly between MSMO and MSMW. There is a paucity of studies conducted in the United States on this relationship, though one found that MSMW test less often than MSMO and are less likely to ever test.<sup>13</sup> Those conducted in Canada<sup>28</sup> and abroad<sup>28,29</sup> have also found HIV testing to be less prevalent among MSMW. Our study provides evidence that a greater percentage of this population may have begun to test for HIV, perhaps taking advantage of the growing number of options for discrete and confidential HIV testing throughout the country.<sup>30</sup>

There were notable findings in this study with respect to race among the exposure groups. Despite a focus in the literature on black/African American MSMW concerning their impact on HIV risk in other populations,<sup>32-35</sup> there was virtually no distinction between the MSMW racial groups with respect to condomless sex with male partners. Additionally, condomless sex with a female in the past 12 months was observed more among white MSMW than black MSMW. However, black MSMW were less likely to disclose their same sex behavior than other MSMW, and more likely to exchange sex for money or drugs. These behaviors seemed to be more specific to race than sexual behavior, as race-stratified

adjusted prevalence ratios did not significantly differ. Attention has been devoted to disclosure among the black community, which is a complex issue and affected by a myriad of social, religious, and cultural factors.<sup>35</sup> More research is needed to clarify the prevalence of exchange sex in this community, however, which was heightened despite the fact that injection drug use among black MSMW was only approximately a quarter that of their white counterparts.

This study elucidates the correlation between disclosure of same-sex behaviors and positive health outcomes observed in other studies.<sup>36</sup> MSMW who disclosed their sexuality were more likely to have tested for HIV in the past 12 months, and less likely to exchange drugs or money for sex. Though non-disclosure has often been touted as a large component of the bridge of susceptibility to women,<sup>32-35</sup> the majority of the non-disclosing men in this study had only slept with men in the year preceding the interview. Those that had slept with women did have a higher prevalence of condomless vaginal sex, which is a cause of concern. However, MSMW who did not disclose their sexuality were less likely to report condomless sex with both a male and a female partner in the past 12 months than those who are out to friends or family. Non-disclosing MSMW who reported this behavior represented only 1% of our sample of MSM, who comprise only 2% of the U.S. population. The implication of risk from these men, then, appears to be minimal. Instead, a focus should be placed on interventions to increase acceptance of same-sex or bisexual identification so these men are more comfortable disclosing their sexuality, as the correlated health benefits are evident.

The role concurrency plays in the transmission of STDs and HIV has been debated for decades<sup>37</sup> and there is still no consensus on the matter.<sup>38-40</sup> However, the extremely high prevalence (69%) of concurrent relationships among this population of MSMW with their female partners cannot be ignored. The relationship between concurrency and bisexual behavior has been described previously<sup>41</sup> but the total prevalence found among MSMW in this study exceeds that existing data (46% vs. 32%). This would

greatly increase the odds of exposure of a new HIV infection to multiple sexual partners during the acute stage of heightened infectiousness.<sup>42</sup> This increased risk would indeed be a cause of concern about a bridge of susceptibility to the female partners of MSMW, especially given our finding that MSMW used condoms less frequently with their concurrent female partners than with reportedly monogamous female partners. More research is needed to determine the drivers of this behavior, and the impact it may have on the health of all parties involved.

Our study has several limitations. First, venue-based sampling, though a trusted method of accessing hard-to-reach populations, is not entirely random and therefore may limit the generalizability of the results. The venues selected for sampling required a majority of those in attendance to be MSM. Those who absolutely conceal their same-sex behavior may be less likely to frequent the selected venues and therefore may not have been reached by the study. Misclassification is also a concern. The exposure categories were based on self-reported behavior over the year preceding the interview, so a participant could have been classified as MSMO for having only male partners in that period, despite having female sex partners 13 or more months prior to being surveyed. This could lead to underestimation of MSMW in our study. Also, self-reporting of risk factors over the past 12 months allows for potential recall bias. Substance abuse among the MSMW in our sample in conjunction with sexual activity could lead to disproportionate underreporting of condomless sex or sex partners among the exposure group. Further distortion could result from the face-to-face nature of the interview. MSMW were less likely than MSMO to disclose their same sex behavior to friends and healthcare providers, and therefore may have been less forthcoming in the interview when discussing risk behaviors with male partners.

Despite these limitations, the sample size and scope of this study was the largest of those discovered in our review of the literature, and therefore is a considerable strength. Many previous studies on this population focused on relatively smaller samples from a particular race, demographic, or

geographic location. With nearly 19,000 racially diverse total participants in 20 cities across the United States, this is among the largest analyses on the subject.

## **Conclusion**

Many meaningful distinctions were observed when comparing MSMW to MSMO in this analysis, including in virtually every demographic and sexual risk behavior we examined. Condomless sex with male partners and diagnoses of other STDs were less prevalent among MSMW when compared to MSMO, but they had a greater likelihood of engaging in exchange sex, or injecting drugs. Tailored interventions are needed to reduce exchange sex among MSMW, especially in the black community. Because our study found disclosure of sexuality was associated with less risky sexual behavior, we suggest that disclosure of same-sex behavior to others, including healthcare providers, should be encouraged through campaigns to reduce discrimination and promote self-acceptance. This study presents further evidence that MSMW are a distinct sub-population of MSM requiring their own focus in research and interventions to reduce HIV-related health disparities in this frequently marginalized population.

## REFERENCES

1. Mansergh G, Herbst J, Mimiaga M, Holman J. Preference for condoms, antiretroviral preexposure prophylaxis, or both methods to reduce risk for HIV acquisition among uninfected US Black and Latino MSM. *JAIDS* 2015;70(4):153-155.
2. Centers for Disease Control and Prevention. HIV surveillance report (2014); Vol. 26. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2014. Available at <http://www.cdc.gov/hiv/library/reports/surveillance/index.html>
3. Eaton LA, Kalichman SC. Risk compensation in HIV prevention: implications for vaccines, microbicides, and other biomedical HIV prevention technologies. *Curr HIV/AIDS Rep* 2007;4:165-172.
4. Hubach R, Dodge B, Goncalves G, Malebranche D, Reece M, Van Der Pol B, Martinez O, Schnarrs P, Nix R, Fortenberry D. Gender matters: condom use and nonuse among behaviorally bisexual men. *Arch Sex Behav* 2014;43:707-717.
5. Bingham TA, Harawa NT, Williams JK. Gender role conflict among African American men who have sex with men and women: associations with mental health and sexual risk and disclosure behaviors. *Am J Public Health* 2013;103(1):127-133.
6. Doll LS, Petersen LR, White CR, Johnson ES, Ward JW, The Blood Donor Study Group. Homosexually and non-homosexually identified men who have sex with men: a behavioral comparison. *J Sex Res* 1992;29(1):1-14.
7. McKirnan DJ, Stokes JP, Doll LS, Burzette RG. (1995). Bisexually active men: social characteristics and sexual behavior. *J Sex Res* 1995;32(1):65-76.
8. Peterson JL, Coates TJ, Catania JA, Middleton L, Hilliard B, Hearst N. High-risk sexual behavior and condom use among gay and bisexual African-American men. *Am J Public Health*



1992;52(11):1490-1494.

9. Stokes JP, McKirnan DJ, Doll LS, Burzette RG. Female partners of bisexual men: what they don't know might hurt them. *Psychol Women Q* 1996;20(2):267-284.
10. Friedman MR, Kurtz SP, Buttram ME, Wei C, Silvestre AJ, Stall R. HIV risk among substance-using men who have sex with men and women (MSMW): findings from South Florida. *AIDS Behav* 2014;18:111-119.
11. Jeffries W. Beyond the bisexual bridge: Sexual health among U.S. men who have sex with men and women. *Am J Prev Med*, 2014;47(3):320-329.
12. Maulsby C, Sifakis F, German D, Flynn CP, Holtgrave D. HIV risk among men who have sex with men only (MSMO) and men who have sex with men and women (MSMW) in Baltimore. *J Homosex* 2013;60(1):51-68.
13. Jeffries W. HIV testing among bisexual men in the United States. *AIDS Educ Prev* 2010;22(4):356-370.
14. Centers for Disease Control and Prevention. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR. Morb Mortal Wkly Rep* 2006; 55(RR14):1-17.
15. Dodge B, Jeffries WL, Sandfort TGM. Beyond the down low: sexual risk, protection, and disclosure among at-risk black men who have sex with both men and women (MSMW). *Arch Sex Behav* 2008;37:683-696.
16. Schrimshaw EW, Siegel K, Downing MJ, Parsons JT. Disclosure and concealment of sexual orientation and the mental health of non-gay-identified, behaviorally bisexual men. *J Consult Clin Psychol* 2013;81(1):141-153.
17. Balsam KF, Mohr JJ. Adaptation to sexual orientation stigma: a comparison of bisexual and

- lesbian/gay adults. *J Couns Psychol* 2007;54:306-319.
18. McGarrity LA, Huebner DM. Is being out about sexual orientation uniformly healthy? The moderating role of socioeconomic status in a prospective study of gay and bisexual men. *Ann Behav Med* 2014;47:28-38.
  19. Jeffries WL, Marks G, Lauby J, Murrill CS, Millett GA. Homophobia is associated with sexual behavior that increases risk of acquiring and transmitting HIV infection among black men who have sex with men. *AIDS Behav* 2013;17:1442-1453.
  20. Centers for Disease Control and Prevention. HIV risk, prevention, and testing behaviors among men who have sex with men—National HIV Behavioral Surveillance System, 21 U.S. cities, United States, 2008. *MMWR. Morb Mortal Wkly Rep* 2011;60(14),1–34.
  21. Sullivan PS, Peterson J, Rosenberg ES, Kelley CF, Cooper H, Vaughan A, Salazar LF, Frew P, Wingood G, DiClemente R, del Rio C, Mulligan M, Sanchez TH. Understanding racial HIV/STI disparities in black and white men who have sex with men: a multilevel approach. *PLoS ONE* 2014;9(3):1-11.
  22. Flores SA, Bakeman R, Millett GA, Peterson JL. HIV risk among bisexually and homosexually active racially diverse young men. *Sex Transm Dis* 2009;36(5):325-329.
  23. Gorbach PM, Murphy R, Weiss RE, Hucks-Ortiz C, Shoptaw S. Bridging sexual boundaries: men who have sex with men and women in a street-based sample in Los Angeles. *J Urban Health* 2009;86(1):S63-S76.
  24. Dodge B, Schnarrs PW, Reece M, Martinez O, Goncalves G, Malebranche D, Van Der Pol B, Nix R, Fortenberry JD. Sexual behaviors and experiences among behaviorally bisexual men in the Midwestern United States. *Arch Sex Behav* 2013;42:247-256.
  25. Jeffries WL, Dodge B. Male bisexuality and condom use at last sexual encounter: results from a

- national survey. *J Sex Res* 2007;44(3):278-289.
26. Thiede H, Valleroy LA, MacKellar DA, Celentano DD, Ford WL, Hagan H, Koblin BA, LaLota M, McFarland W, Shehan DA, Torian LV. Regional patterns and correlates of substance use among young men who have sex with men in 7 US urban areas. *Am J Public Health* 2003;93(11):1915-1921.
  27. Myers T, Godin G, Lamber J, Calzavara L, Locker D. Sexual risk and HIV-testing behaviour by gay and bisexual men in Canada. *AIDS Care* 1996;8(3):297-310.
  28. Lyons A, Pitts M, Grierson J, Smith A, McNally S, Couch M. Sexual behavior and HIV testing among bisexual men: a nationwide comparison of Australian bisexual-identifying and gay-identifying men. *AIDS Behav* 2012;16(7):1934-1943.
  29. Lachowsky NJ, Saxton PJ, Dickson NP, Hughes AJ, Summerlee AJ, Dewey CE. Factors associated with recent HIV testing among younger gay and bisexual men in New Zealand, 2006-2011. *BMC Public Health* 2014;14:294-304.
  30. Centers for Disease Control and Prevention. Results of the expanded HIV testing initiative—25 jurisdictions, United States, 2007–2010. *MMWR Morb Mortal Wkly Rep*. 2011;60(24):805–810.
  31. Zule WA, Bobashev GV, Wechsberg WM, Costenbader EC, Coomes CM. Behaviorally bisexual men and their risk behaviors with men and women. *J Urban Health* 2009;86(1):S48-S62.
  32. Siegel K, Schrimshaw EW, Lekas HM, Parsons JT. Sexual behaviors of non-gay identified non-disclosing men who have sex with men and women. *Arch Sex Behav* 2008;37:720-735.
  33. Bond L, Wheeler DP, Millett GA, LaPollo AB, Carson LF, Liao A. Black men who have sex with men and the association of down-low identity with HIV risk behavior. *Am J Public Health* 2009;99(S1):S92-S95.
  34. Satcher AJ, Durant T, Hu X, Dean HD. AIDS cases among women who report sex with a bisexual

- man, 2000-2004 – United States. *Women Health* 2007;46(2-3):23-40.
35. Fields EL, Bogart LM, Smith KC, Malebranche DJ, Ellen J, Schuster MA. “I always felt I had to prove my manhood”: homosexuality, masculinity, gender role strain, and HIV risk among young black men who have sex with men. *Am J Public Health* 2015;105(1):122-131.
  36. Lapinski MK, Braz ME, Maloney EK. The down low, social stigma, and risky sexual behaviors: Insights from African-American men who have sex with men. *J Homosex* 2010;57:610-633.
  37. Mah TL, Halperin DT. Concurrent sexual partnerships and the HIV epidemic in Africa: evidence to move forward. *AIDS Behav* 2010;14:11-16.
  38. Epstein H. The mathematics of concurrent partnerships and HIV: a commentary on Lurie and Rosenthal, 2009. *AIDS Behav* 2010;14:29-30.
  39. Morris M, Kurth AE, Hamilton DT, Moody JWS. Concurrent partnerships and HIV prevalence disparities by race: linking science and public health practice. *Am J Public Health* 2008;99:1023-1031.
  40. Lurie MN, Rosenthal S. Concurrent partnerships as a driver of the HIV epidemic in sub-saharan Africa? The evidence is limited. *AIDS Behav* 2009;14:17-24.
  41. Levin EM, Koopman JS, Aral SO, Holmes KK, Foxman B. Characteristics of men who have sex with men and women and women who have sex with women and men: results from the 2003 Seattle sex survey. *Sex Transm Dis* 2009;36(9):1111-1119.
  42. Sawers L, Stillwaggon E. Concurrent sexual partnerships do not explain the HIV epidemics in Africa: a systematic review of the evidence. *J Int AIDS Soc* 2010;13(34): doi:10.1186/1758-2652-13-34.

**Table 1. Demographic Characteristics Stratified by Sexual Partners**

	<b>Total</b> 18,887 (100)	<b>Men Who Have Sex with Men Only</b> 16,668 (88.36)	<b>Men Who Have Sex with Men and Women</b> 2,199 (11.64)	<b>Prevalence Difference</b>
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>% (95% CI)</b>
<b>Age in Years</b>				
Median (IQR)	32 (25, 43)	32 (25, 43)	31 (24, 41)	--*
<b>Race/Ethnicity</b>				
White	7,332 (38.82)	6,726 (40.30)	606 (27.56)	-12.75 (-14.76, -10.74)*
Black or African American	5,135 (27.19)	4,248 (25.46)	887 (40.34)	14.88 (12.73, 17.04)*
Hispanic/Latino	4,930 (26.10)	4,399 (26.36)	531 (24.15)	-2.21 (-4.12, -0.30)*
Other	1,415 (7.49)	1,251 (7.50)	164 (7.46)	-0.04 (-1.21, 1.13)
<b>Sexual Identity</b>				
Homosexual	15,407 (81.83)	15,017 (90.22)	390 (17.85)	-72.38 (-74.04, -70.71)*
Bisexual	3,195 (16.97)	1,551 (9.32)	1,644 (75.24)	65.92 (64.06, 67.78)*
Heterosexual	227 (1.21)	76 (0.46)	151 (6.91)	6.45 (5.39, 7.52)*
<b>Education Level</b>				
Less than grade 12	920 (4.87)	617 (3.70)	303 (13.79)	10.09 (8.62, 11.56)*
High school	4,292 (22.72)	3,593 (21.53)	699 (31.80)	10.27 (8.23, 12.31)*
Some college, technical college	6,233 (33.00)	5,534 (33.16)	699 (31.80)	-1.36 (-3.44, 0.71)
Bachelor's or post grad studies	4,912 (26.01)	6,943 (41.61)	497 (22.61)	-19.00 (-20.90, -17.09)*
<b>Annual Household Income</b>				
0 to \$19,999	5,821 (31.28)	4,816 (29.27)	1,005 (46.66)	17.39 (15.17, 19.61)*
\$20,000 to \$39,999	4,561 (24.51)	4,062 (24.68)	499 (23.17)	-1.52 (-3.42, 0.38)
\$40,000 - \$74,999	4,535 (24.37)	4,160 (25.28)	375 (17.41)	-7.87 (-9.60, -6.13)*
\$75,000 or more	3,693 (19.84)	3,418 (20.77)	275 (12.77)	-8.00 (-9.54, -6.46)*
<b>Region</b>				
Northeast	4,120 (21.81)	3,642 (21.82)	478 (21.74)	-0.09 (-1.92, 1.75)
South and Territories	7,935 (42.01)	6,863 (41.13)	1,072 (48.75)	7.62 (5.41, 9.84)*
Midwest	1,991 (10.54)	1,734 (10.39)	257 (11.69)	1.30 (-0.12, 2.72)
West	4,841 (25.63)	4,449 (26.66)	392 (17.83)	-8.83 (-10.57, -7.10)*
<b>Current Health Insurance</b>				
Yes	14,029 (74.28)	12,672 (75.93)	1,357 (61.71)	-14.10 (-16.23, -11.97)*
<b>Self-reported HIV status</b>				
Positive	2,827 (15.01)	2,645 (15.89)	182 (8.32)	-7.46 (-8.92, -6.01)*
<b>Out to anyone (gay- or bi-identified respondents only)</b>				
Yes	17,672 (95.01)	16,024 (96.72)	1,648 (81.06)	-15.65 (-17.38, -13.93)*
<b>Out to healthcare provider</b>				
Yes	14,294 (75.85)	13,194 (79.24)	1,100 (50.09)	-29.15 (-31.33, -26.97)*
IQR: Interquartile Range				
* p-value < .05				

**Table 2. Risk Behaviors by Sexual Partner**

	<b>Total 18,887 (100)</b>	<b>Men Who Have Sex with Men Only 16,668 (88.36)</b>	<b>Men Who Have Sex with Men and Women 2,199 (11.64)</b>	<b>Prevalence Difference</b>
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>% (95% CI)</b>
Total number of sex partners, past 12 months				
Median (IQR)	4 (2, 9)	3 (2, 8)	6 (4, 11)	--*
Number of male sex partners, past 12 months				
Median (IQR)	3 (2, 8)	3 (2, 8)	3 (2, 6)	--*
Total number of casual sex partners, past 12 months				
Median (IQR)	3 (1, 7)	3 (1, 7)	5 (2, 10)	--*
Number of male casual sex partners, past 12 months				
Median (IQR)	3 (1, 7)	3 (1, 7)	2 (1, 5)	--*
Condomless anal sex with male partners, past 12 months				
Yes	11,516 (61.07)	10,450 (62.71)	1,066 (48.63)	-14.07 (-16.29, -11.86)*
Number of condomless sex partners, past 12 months				
Median (IQR)	1 (0, 2)	1 (0, 2)	2 (1, 4)	--*
Number of condomless male sex partners, past 12 months				
Median (IQR)	1 (0, 2)	1 (0, 2)	0 (0, 2)	--*
Exchange sex, past 12 months				
Yes	2,160 (11.44)	1,466 (8.78)	694 (31.56)	22.89 (20.89, 24.89)*
Tested for HIV, past 12 months				
Yes	11,339 (60.27)	9,979 (60.02)	1,360 (62.13)	2.05 (0.11, 4.21)
No	5,028 (26.72)	4,342 (26.12)	686 (31.34)	5.18 (3.13, 7.22)*
Not tested in past year, because HIV+	2,447 (13.01)	2,304 (13.86)	143 (6.53)	-7.30 (-8.46, -6.15)*
Diagnosed with other STD, past 12 months				
Yes	2,250 (11.91)	2,015 (12.07)	235 (10.69)	-1.39 (-2.77, 0.01)
Binge drinking, past 30 days				
Yes	9,668 (51.33)	8,438 (50.69)	1,230 (56.14)	5.44 (3.23, 7.66)*
Ever injected drugs				
Yes	1,300 (6.89)	999 (5.99)	301 (13.70)	7.71 (6.23, 9.19)*
Drug or alcohol use with last male partner				
Alcohol	5,379 (28.49)	4,778 (28.64)	601 (27.34)	-1.30 (-3.29, 0.68)
Drugs	962 (5.10)	801 (4.80)	161 (7.32)	2.52 (1.39, 3.66)*
Both drugs and alcohol	1,789 (9.48)	1,379 (8.27)	410 (18.65)	10.38 (8.70, 12.06)*
Neither	10,751 (56.94)	9,725 (58.29)	1,026 (46.68)	-11.62 (-13.83, -9.40)*
Numbers may not add to totals due to missing values IQR: Interquartile Range * p-value < .01				

**Table 3. Adjusted Prevalence Ratios for Main Outcome Variables**

	Unadjusted Prevalence Ratio (95% CI)	Adjusted Prevalence Ratio (95% CI)	Race-Stratified Adjusted Prevalence Ratios (95% CI)		
			Black	White	Hispanic/Latino
<b>Condomless anal sex with male sex partners, past 12 months</b>	n = 18,857	n = 18,576	n = 18,504		
MSM-O	Ref	Ref <sup>a</sup>	Ref <sup>a</sup>	Ref <sup>a</sup>	Ref <sup>a</sup>
MSMW	0.78 (0.74, 0.81)	0.77 (0.73, 0.80)	0.84 (0.78, 0.91)	0.69 (0.63, 0.75)	0.76 (0.70, 0.83)
<b>Exchange sex, past 12 months</b>	n = 18,850	n = 18,569	n = 18,497		
MSM-O	Ref	Ref <sup>b</sup>	Ref <sup>b</sup>	Ref <sup>b</sup>	Ref <sup>b</sup>
MSMW	3.60 (3.32, 3.91)	2.43 (2.23, 2.65)	2.10 (1.86, 2.37)	2.43 (2.06, 2.86)	2.64 (2.17, 3.22)
<b>Diagnosed with other STD, past 12 months</b>	n = 18,887	n = 18,610	n = 18,538		
MSM-O	Ref	Ref <sup>c</sup>	Ref <sup>c</sup>	Ref <sup>c</sup>	Ref <sup>c</sup>
MSMW	0.89 (0.78, 1.01)	0.83 (0.73, 0.95)	0.86 (0.70, 1.06)	0.73 (0.56, 0.94)	0.93 (0.72, 1.19)
<b>Ever injected drugs</b>	n = 18,880	n = 18,603	n = 18,531		
MSM-O	Ref	Ref <sup>d</sup>	Ref <sup>d</sup>	Ref <sup>d</sup>	Ref <sup>d</sup>
MSMW	2.29 (2.01, 2.61)	2.00 (1.76, 2.28)	1.27 (0.96, 1.68)	2.33 (1.99, 2.73)	2.39 (1.75, 3.26)
<b>Tested for HIV, past 12 months</b>	n = 16,367	n = 16,108	n = 16,044		
MSM-O	Ref	Ref <sup>d</sup>	Ref <sup>d</sup>	Ref <sup>d</sup>	Ref <sup>d</sup>
MSMW	0.95 (0.92, 0.99)	0.99 (0.95, 1.02)	1.03 (0.98, 1.08)	0.94 (0.89, 1.01)	0.94 (0.88, 1.01)
<b>Out to Healthcare Provider</b>	n = 18,846	n = 18,496	n = 18,425		
MSM-O	Ref	Ref <sup>e</sup>	Ref <sup>e</sup>	Ref <sup>e</sup>	Ref <sup>e</sup>
MSMW	0.63 (0.60, 0.66)	0.72 (0.69, 0.76)	0.69 (0.64, 0.75)	0.66 (0.60, 0.72)	0.81 (0.74, 0.90)

a : Adjusted for age, income, ever injected drugs  
 b : Adjusted for age, education, income, ever injected drugs  
 c : Adjusted for age, income  
 d : Adjusted for age, education, income  
 e : Adjusted for education, income, sexual identity, current health insurance

**Table 4. Demographics and Risk Behaviors by Disclosure of Same-Sex Behavior among MSMW**

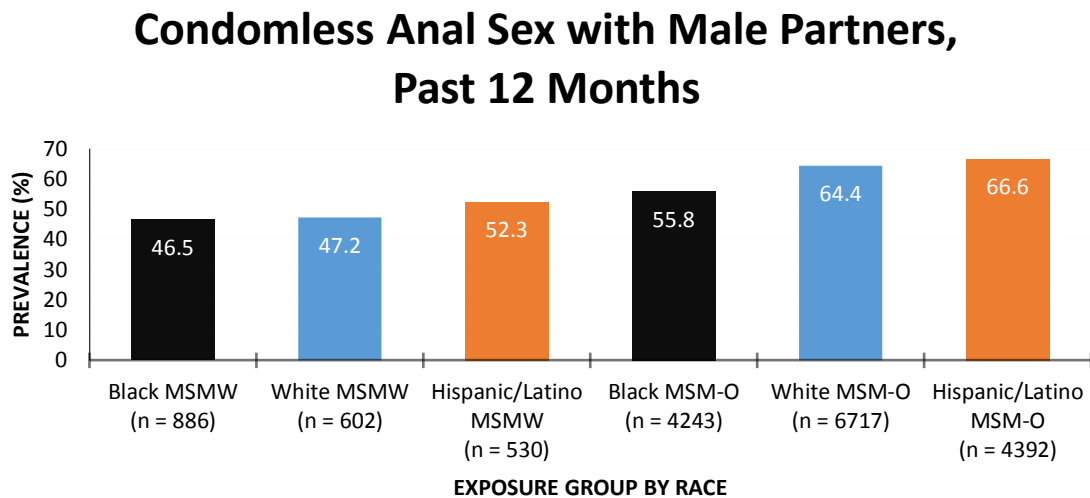
	<b>Total</b> 2,199 (100)	<b>Disclose to</b> <b>Straight Friends</b> <b>or Family</b> 1,485 (67.56)	<b>Do Not Disclose to</b> <b>Straight Friends</b> <b>or Family</b> 713 (32.44)	<b>Prevalence Difference</b>
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>% (95% CI)</b>
<b>Age in Years</b>				
Median (IQR)	31 (24, 41)	29 (24, 39)	34 (26, 45)	-- <sup>a</sup>
<b>Race/Ethnicity</b>				
White	606 (27.71)	433 (29.32)	173 (24.37)	-4.89 (-8.80, -0.99)*
Black or African American	886 (40.51)	545 (36.90)	341 (48.03)	11.13 (6.72, 15.54)*
Hispanic/Latino	531 (24.28)	369 (24.98)	162 (22.82)	-2.13 (-5.91, 1.65)
Other	164 (7.50)	130 (8.80)	34 (4.79)	-3.99 (-6.11, -1.86)*
<b>Sexual Identity</b>				
Homosexual	390 (17.86)	344 (23.32)	46 (6.49)	-16.71 (-19.52, -13.91)*
Bisexual	1,643 (75.23)	1,093 (74.10)	550 (77.57)	3.54 (-0.28, 7.35)
Heterosexual	151 (6.91)	38 (2.58)	113 (15.94)	13.29 (10.49, 16.09)*
<b>Condomless vaginal sex, past 12 months</b>				
Yes	1,353 (7.17)	829 (56.13)	524 (73.60)	17.47 (13.36, 21.58)*
<b>Condomless male anal sex, past 12 months</b>				
Yes	1,066 (48.65)	807 (54.49)	259 (36.48)	-18.01 (-22.37, -13.66)*
<b>Condomless sex with male and female, past 12 months</b>				
Yes	956 (43.49)	713 (48.01)	243 (34.08)	17.47 (13.36, 21.58)*
<b>Exchange sex, past 12 months</b>				
Yes	694 (31.70)	364 (24.61))	330 (46.48)	21.87 (17.59, 26.14)*
<b>Tested for HIV, past 12 months</b>				
Yes	1,360 (66.50)	996 (72.91)	364 (53.61)	-19.31 (-23.74, -14.88)*
Numbers may not add to totals due to missing values IQR: Interquartile Range * p-value < .05				



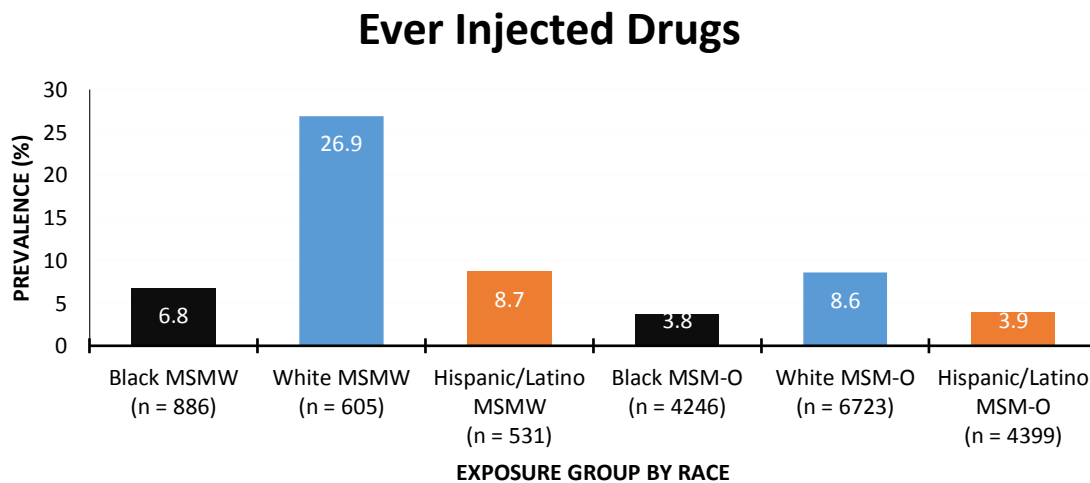
**Table 5. Risk Behaviors with Last Partner among MSMW**

	<b>Total</b> 4,398 (100)	<b>Male Partners</b> 2,199 (50.0)	<b>Female Partners</b> 2,199 (50.0)	<b>Prevalence Difference</b>
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>% (95% CI)</b>
<b>Last Partner Main or Casual</b>				
Main	1,307 (29.76)	597 (27.20)	710 (32.32)	5.12 (2.42, 7.82)*
Casual	3,085 (70.24)	1,598 (72.80)	1,487 (67.68)	
<b>Exchange sex</b>				
Yes	500 (11.37)	313 (14.23)	187 (8.50)	-5.73 (-7.60, -3.86)*
<b>Condomless anal or vaginal sex</b>				
Yes	1,826 (41.66)	721 (32.91)	1,105 (50.41)	17.50 (14.63, 20.38)*
<b>Knowledge of partner's HIV status</b>				
Yes	2,070 (47.09)	1,071 (48.75)	999 (45.43)	-3.32 (-6.27, -0.37)*
<b>Alcohol use during sex</b>				
Yes	2,148 (48.90)	1,011 (46.00)	1,137 (51.80)	5.80 (2.85, 8.75)*
<b>Drug use during sex</b>				
Yes	1,146 (26.09)	571 (25.98)	575 (26.20)	0.22 (-2.38, 2.81)
<b>Concurrent Partnership</b>				
Yes	2,010 (45.70)	490 (22.28)	1,520 (69.12)	46.84 (44.24, 49.44)*
No	1,517 (34.49)	1,234 (56.12)	283 (12.87)	-43.25 (-45.75, -40.74)*
One night stand	871 (19.80)	475 (21.60)	396 (18.01)	-3.59 (-5.95, -1.24)*
Numbers may not add to totals due to missing values				
* p-value < .05				

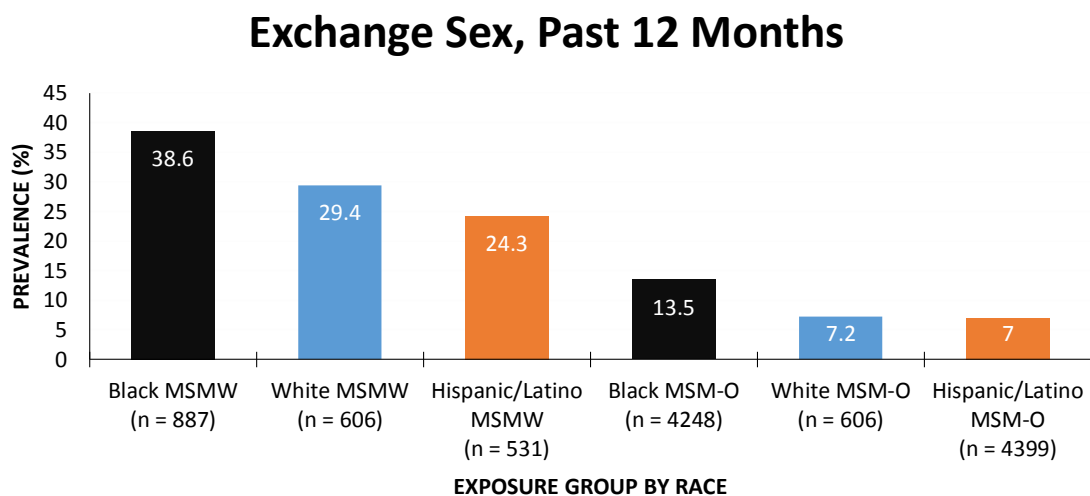
**Figure 1. Race-Stratified Prevalence of Condomless Anal Sex with Male Partners, Past 12 Months**



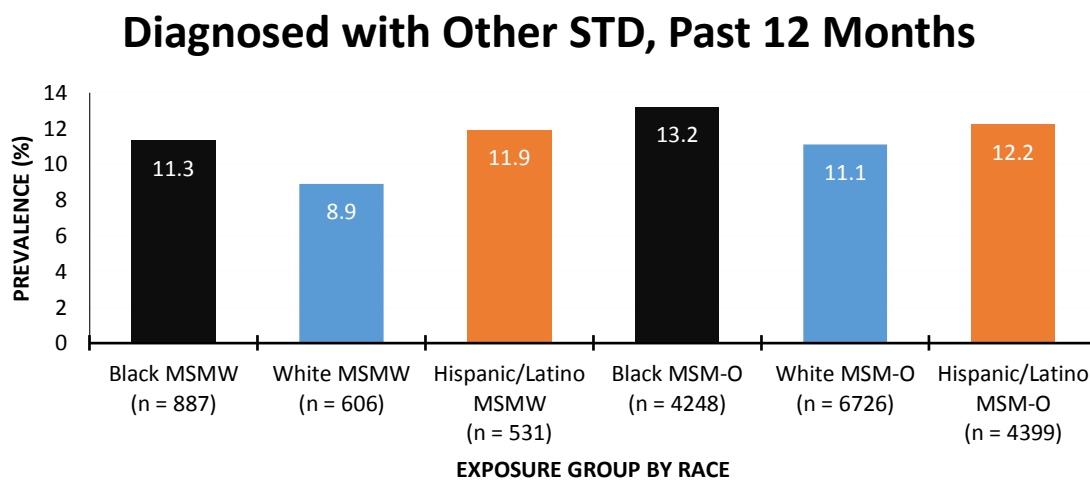
**Figure 2. Race-Stratified Prevalence of Ever Injecting Drugs**



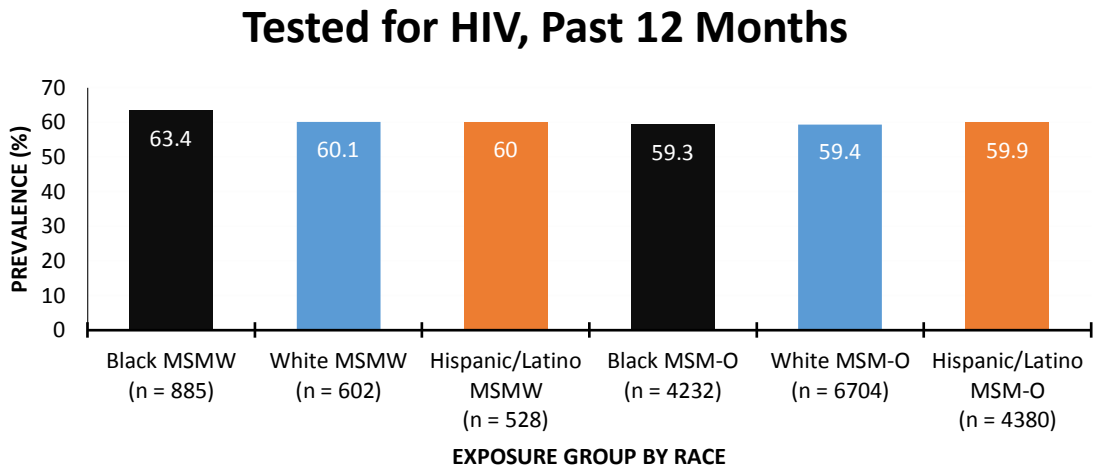
**Figure 3. Race-Stratified Prevalence of Exchange Sex, Past 12 Months**



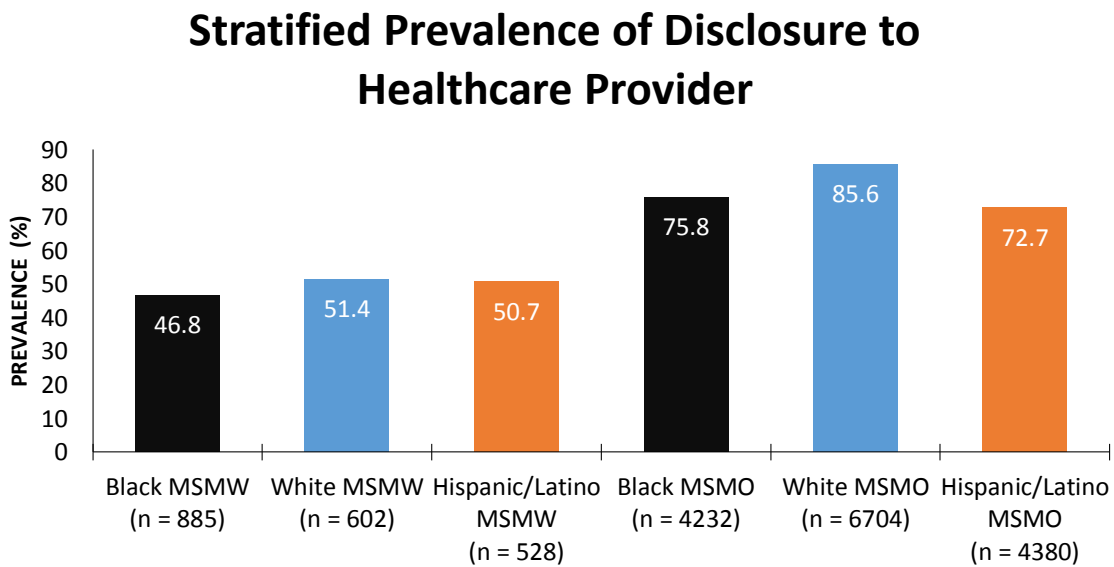
**Figure 4. Race-Stratified Prevalence of Diagnosis of Other STDs, Past 12 Months**



**Figure 5. Race-Stratified Prevalence of HIV Testing, Past 12 Months**



**Figure 6. Race-Stratified Prevalence of Disclosure to Healthcare Providers**



## THESIS REFERENCES

- Bingham, T. A., Harawa, N. T., & Williams, J. K. (2013). Gender role conflict among African American men who have sex with men and women: Associations with mental health and sexual risk and disclosure behaviors. *American Journal of Public Health, 103*(1), 127-133.
- Bond, L., Wheeler, D.P., Millett, G.A., LaPollo, A.B., Carson, L.F., & Liau, A. (2009). Black men who have sex with men and the association of down-low identity with HIV risk behavior. *American Journal of Public Health, 99*(1), 92-95.
- Centers for Disease Control and Prevention (2015). HIV Basics | HIV/AIDS. Retrieved from <http://www.cdc.gov/hiv/basics/index.html>.
- Centers for Disease Control and Prevention (2014). 2013 Sexually Transmitted Diseases Surveillance. Retrieved from [www.cdc.gov/std/stats13](http://www.cdc.gov/std/stats13).
- Centers for Disease Control and Prevention (2013). HIV testing and risk behaviors among gay, bisexual, and other men who have sex with men – United States. *MMWR. Morbidity and Mortality Weekly Report, 62*, 958-962.
- Centers for Disease Control and Prevention. (2011). Results of the expanded HIV testing initiative – 25 jurisdictions, United States, 2007-2010. *MMWR. Morbidity and Mortality Weekly Report, 60*, 805-810.
- Centers for Disease Control and Prevention. (2006). Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR. Morbidity and Mortality Weekly Report, 55*(RR14), 1-17.
- Clews, C. (2014, April 21). 1980s. HIV/AIDS: Why was AIDS called 'the gay plague'? - Gay in the 80s. Retrieved from <http://www.gayinthe80s.com/2014/04/1980s-hiv-aids-why-was-aids-called-the-gay-plague/>

- Dodge, B., Jeffries, W.L., & Sandfort, T.G.M. (2008). Beyond the down low: Sexual risk, protection, and disclosure among at-risk black men who have sex with both men and women (MSMW). *Archives of Sexual Behavior*, 37, 683-696.
- Dodge, B., Schnarrs, P.W., Reece, M., Martinez, O., Goncalves, G., Malebranche, D., Van Der Pol, B., Nix, R., & Fortenberry, J.D. (2013). Sexual behaviors and experiences among behaviorally bisexual men in the Midwestern United States. *Archives of Sexual Behavior*, 42, 247-256.
- Doll, L. S., Petersen, L. R., White, C. R, Johnson, E. S., Ward, J. W., & The Blood Donor Study Group. (1992). Homosexually and non-homosexually identified men who have sex with men: A behavioral comparison. *Journal of Sex Research*, 29(1), 1-14.
- Fields, E.L., Bogart, L.M., Smith, K.C., Malebranche, D.J., Ellen, J., & Schuster, M.A. (2015). “I always felt I had to prove my manhood”: Homosexuality, masculinity, gender role strain, and HIV risk among young black men who have sex with men. *American Journal of Public Health*, 105(1), 122-131.
- Flores, S.A., Bakeman, R., Millett, G.A., Peterson, J.L. (2009). HIV risk among bisexually and homosexually active racially diverse young men. *Sexually Transmitted Diseases*, 36(5), 325-329.
- Ford, C.L., Whetten, K.D., Hall, S.A., Kaufman, J.S., & Thrasher, A.D. (2007). Black sexuality, social construction, and research targeting ‘the down low’ (‘the DL’). *Annals of Epidemiology*, 17, 209-216.
- Friedman, M.R., Kurtz, S.P., Buttram, M.E., Wei, C., Silvestre, A.J., Stall, R. (2014). HIV risk among substance-using men who have sex with men and women (MSMW): Findings from South Florida. *AIDS and Behavior*, 18, 111-119.

- Gorbach, P.M., Murphy, R., Weiss, R.E., Hucks-Ortiz, C., Shoptaw, S., (2009). Bridging sexual boundaries: Men who have sex with men and women in a street-based sample in Los Angeles. *Journal of Urban Health*, 86(1), 63-76.
- Greene, E., Frye, V., Mansergh, G., Colfax, G.N., Hudson, S.M., Flores, S.A., Hoover, D.R., Bonner, S., Koblin, B.A. (2012). Correlates of unprotected vaginal or anal intercourse with women among substance-using men who have sex with men. *AIDS and Behavior*, 17 (3), 889-899.
- Hubach, R., Dodge, B., Goncalves, G., Malebranche, D., Reece, M., Van Der Pol, B., Martinez, O., Schnarrs, P., Nix, R., Fortenberry, D. (2014). Gender matters: condom use and nonuse among behaviorally bisexual men. *Archives of Sexual Behavior*, 43, 707-717.
- Irvin, R., Wilton, L., Scott, H., Beauchamp, G., Wang, L., Betancourt, J., Lubensky, M., Wallace, J., & Buchbinder, S. (2014). A study of perceived racial discrimination in black men who have sex with men (MSM) and its association with healthcare utilization and HIV testing. *AIDS and Behavior*, 18, 1272-1278.
- Jeffries, W., Dodge, B. (2007). Male bisexuality and condom use at last sexual encounter: results from a national survey. *Journal of Sex Research*, 44(3), 278-289.
- Jeffries, W. (2010). HIV testing among bisexual men in the United States. *AIDS Education and Prevention*, 22(4), 356-370.
- Jeffries, W.L., Marks, G., Lauby, J., Murrill, C.S., & Millett, G.A. (2013). Homophobia is associated with sexual behavior that increases risk of acquiring and transmitting HIV infection among black men who have sex with men. *AIDS and Behavior*, 17, 1442-1453.
- Jeffries, W. (2014). Beyond the bisexual bridge: Sexual health among U.S. men who have sex with men and women. *American Journal of Preventive Medicine*, 47(3), 320-329.

- Jenness, S.M., Kobrak, P., Wendel, T., Neaigus, A., Murrill, C., & Hagan, H. (2011). Patterns of exchange sex and HIV infection in high-risk heterosexual men and women. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 88(2), 329-341.
- Joseph, H., Belcher, L., O'donnell, L., Fernandez, M., Spikes, P., & Flores, S. (2014). HIV testing among sexually active Hispanic/Latino MSM in Miami-Dade County and New York City: Opportunities for increasing acceptance and frequency of testing. *Health Promotion Practice*, 15(6), 867-880.
- Kalichman, S.C., Roffman, R.A., Picciano, J.F., & Bolan, M. (1998). Risk for HIV infection among bisexual men seeking HIV-prevention services and risk posed to their female partners. *Health Psychology*, 17, 320-327.
- Lapinski, M., Braz, M., & Maloney, E. (2010). The down low, social stigma, and risky sexual behaviors: Insights from African-American men who have sex with men. *Journal of Homosexuality*, 57(5), 610-633.
- Latkin, C., Yang, C., Tobin, K., Penniman, T., Patterson, J., & Spikes, P. (2011). Differences in the social networks of African American men who have sex with men only and those who have sex with men and women. *American Journal of Public Health*, 101(10), 18-23.
- Leigh, B.C., Ames, S.L., & Stacy, A.W. (2008). Alcohol, drugs, and condom use among drug offenders: An event-based analysis. *Drug and Alcohol Dependence*, 93(1), 38-42.
- Magnus, M., Kuo, I., Phillips, G., Shelley, K., Rawls, A., Montanez, L., . . . Greenberg, A. (2010). Elevated HIV prevalence despite lower rates of sexual risk behaviors among Black men in the District of Columbia who have sex with men. *AIDS Patient Care and STDs*, 24(10), 615-622.
- Mansergh G., Shouse R.L., Marks G., Guzman, R., Rader, M., Buchbinder, S., & Colfax, G.N. (2006). Methamphetamine and sildenafil (Viagra) use are linked to unprotected receptive and insertive



anal sex, respectively, in a sample of men who have sex with men. *Sexually Transmitted Infections*, 82, 131–134.

Maulsby, C., Sifakis, F., German, D., Flynn, C.P., Holtgrave, D. (2013). HIV risk among men who have sex with men only (MSMO) and men who have sex with men and women (MSMW) in Baltimore. *Journal of Homosexuality*, 60(1), 51-68.

McGarrity, L.A., & Huebner, D.M. (2014). Is being out about sexual orientation uniformly healthy? The moderating role of socioeconomic status in a prospective study of gay and bisexual men. *Annals of Behavioral Medicine*, 47, 28-38.

McKirnan, D. J., Stokes, J. P., Doll, L. S., & Burzette, R. G. (1995). Bisexually active men: Social characteristics and sexual behavior. *The Journal of Sex Research*, 32(1), 65-76.

Millett, G., Peterson, J., Wolitski, R., & Stall, R. (2006). Greater risk for HIV infection of Black men who have sex with men: A critical literature review. *American Journal of Public Health*, 96(6), 1007-1019.

Millett, G., Flores, S., Peterson, J., & Bakeman, R. (2007). Explaining disparities in HIV infection among Black and white men who have sex with men: A meta-analysis of HIV risk behaviors. *AIDS*, 21, 2083-2091.

Montgomery, J.P., Mokotoff, E.D., Gentry, A.C., & Blair, J.M. (2003). The extent of bisexual behavior in HIV-infected men and implications for transmission to their female partners. *AIDS Care*, 15, 829-837.

Peterson, J., & Jones, K. (2009). HIV prevention for Black men who have sex with men in the United States. *American Journal of Public Health*, 99(6), 976-980.

- Peterson, J. L., Coates, T. J., Catania, J. A., Middleton, L., Hilliard, B., & Hearst, N. (1992). High-risk sexual behavior and condom use among gay and bisexual African-American men. *American Journal of Public Health, 52*(11), 1490-1494.
- Purcell, D.W., Johnson, C.H., Lanki, A., Prejean, J., Stein, R., Denning, P., Gaul, Z., Weinstock, H., Su, J., & Crepaz, N. (2012). Estimating the population size of men who have sex with men in the United States to obtain HIV and syphilis rates. *Open AIDS Journal, 6*, 98-107.
- Reisner, S.L., Mimiaga, M.J., Mayer, K.H., Tinsley, J.P., & Safren, S.A. (2008). Tricks of the trade: Sexual health behaviors, the context of HIV risk, and potential prevention intervention strategies for male sex workers. *Journal of LGBT Health Research, 4*(4), 195-209.
- Schrimshaw, E.W., Siegel, K., Downing, M.J., & Parsons, J.T. (2013). Disclosure and concealment of sexual orientation and the mental health of non-gay-identified, behaviorally bisexual men. *Journal of Consulting and Clinical Psychology, 81*(1), 141-153.
- Scott-Sheldon, L.A J., Carey, M.P., Vanable, P.A., Senn, T.E., Coury-Doniger, P., & Urban, M.A. (2009). Alcohol consumption, drug use, and condom use among STD clinic patients. *Journal of Studies on Alcohol and Drugs, 70*(5), 762-770.
- Siegel, K., Schrimshaw, E.W., Lekas, H.M., & Parsons, J.T. (2008). Sexual behaviors of non-gay identified non-disclosing men who have sex with men and women. *Archives of Sexual Behavior, 37*, 720-735.
- Smith, D. et al. (2013) Condom efficacy by consistency of use among MSM: US. 20<sup>th</sup> Conference on Retroviruses and Opportunistic Infections, Atlanta, abstract 32.
- Stokes, J. P., McKirnan, D. J., Doll, L. S., & Burzette, R. G. (1996). Female partners of bisexual men: What they don't know might hurt them. *Psychology of Women Quarterly, 20*(2), 267-284.

- Sullivan, P.S., Peterson, J., Rosenberg, E.S., Kelley, C.F., Cooper, H., Vaughan, A., Salazar, L.F., Frew, P., Wingood, G., DiClemente, R., del Rio, C., Mulligan, M., Sanchez, T.H. (2014). Understanding racial HIV/STI disparities in black and white men who have sex with men: A multilevel approach. *PLoS ONE*, 9(3), 1-11.
- Weatherburn, P., Hickson, F., Reid, D.S., Davies, P.M., & Crosier, A. (1998), Sexual HIV risk behavior among men who have sex with both men and women. *AIDS Care*, 10, 463-471.
- Zule, W., Bobashev, G., Wechsberg, W., Costenbader, E., Coomes, C. (2009). Behaviorally bisexual men and their risk behaviors with men and women. *Journal of Urban Health*. 86(1), 548-562.