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Latent Classes of Sexual Risk Among Black Men Who Have Sex With Men and Women

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Abstract

Black men who have sex with men and women (BMSMW) are at high risk for HIV and other sexually transmitted infections (STIs). Despite knowing that HIV/STI risk varies by sexual positioning practices, limited data have characterized the risk profiles of BMSMW. This study utilized latent class analysis (LCA) to explore BMSMW's sexual risk profiles regarding condomless sexual positioning practices. Participants were BMSMW who participated in intervention studies in Los Angeles, Chicago, and Philadelphia. LCA was used to characterize sexual risk profiles. Age, study location, HIV status, social support, and internalized homophobia were used as covariates in a multinomial regression model predicting the likelihood of latent class membership. Among the 546 participants, three latent classes of risk were identified: Seropositive Serosorters, Seronegative/unknown Serosorters, and Main Partners Only. All groups had the greatest probabilities of condomless sex with main partners. Seropositive Serosorters had the highest probabilities of condomless sex with HIV-positive partners. Seronegative/unknown Serosorters had highest probabilities of condomless sex with HIV-negative or unknown status partners. HIV-positive BMSMW had 87% lower odds of being classified as Seronegative/unknown Serosorters than Seropositive Serosorters than HIV-negative/unknown status BMSMW (AOR=0.13, 95% CI=0.06, 0.28). HIV-positive BMSMW had 71% lower odds of being classified as Main Partners only than Seropositive Serosorters than HIV-negative/unknown status BMSMW (AOR=0.29, 95% CI=0.16, 0.51). Findings highlight opportunities for clinicians to promote condom use and risk reduction among BMSMW with differing sexual risk profiles. Increased

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understanding of sexual positioning practices among BMSMW might help address HIV/STIs among this group.

Keywords

Black MSMW; Black MSM; sexual positioning; HIV risk; STI risk

Introduction

Black men who have sex with men and women (BMSMW) are an important subpopulation at elevated risk for HIV and other sexually transmitted infections (STIs). HIV prevalence among MSMW is 17.9%; within samples of ≥ 90% racial/ethnic minority MSMW, most of whom were Black, HIV prevalence is 28.4% (Friedman et al., 2014). Condom use by BMSMW is influenced by both the gender of and relationship status with their sexual partners. BMSMW are less likely to use condoms with female partners than with male partners (Dodge, Jeffries IV, & Sandfort, 2008; Snowden et al., 2009; Sullivan, Salazar, Buchbinder, & Sanchez, 2009) and more likely to do so with casual than primary partners regardless of gender (Mustanski, Newcomb, & Clerkin, 2011; Newcomb, Ryan, Garofalo, & Mustanski, 2014).

Behavioral risks for acquiring or transmitting HIV/STIs via condomless sex vary by sexual positioning practices (Baggaley, White, & Boily, 2010; Vittinghoff et al., 1999). Men who participate in condomless receptive anal intercourse (RAI) with male partners are more likely to acquire HIV and rectal STIs than men who only participate in condomless insertive anal intercourse (IAI) (Patel et al., 2014). Practicing both IAI and RAI during anal sex with male partners, aka versatility, increases the chance of infection from and transmission to sexual partners (Lyons et al., 2011; van Druten, van Griensven, & Hendriks, 1992; Wiley & Herschkorn, 1989). HIV risk per condomless RAI act among men who have sex with men (MSM) is 138 per 10,000 exposures, compared to 11 per 10,000 exposures for condomless IAI (Patel et al., 2014). For men who practice both condomless RAI and IAI, the probability of transmission was 39.9% per partner; the per-partner probabilities of HIV transmission for men who only practiced condomless RAI or only condomless IAI was 40.4% and 21.7%, respectively (Baggaley et al., 2010).

Varying sexual positioning practices with male and female partners create different sexual risk profiles among different subgroups of BMSMW. With male partners, MSMW could practice RAI and IAI with the same partner within the same sexual encounter, practice RAI and IAI with the same partner separately in different sexual encounters, or practice RAI with certain male partners and IAI with others (Dangerfield II, Smith, Williams, Unger, & Bluthenthal, 2016). Some MSM practice seropositioning, whereby they choose RAI or IAI depending on the HIV-status of the partner (Grov, Rendina, Moody, Ventuneac, & Parsons, 2015; Hart et al., 2003; Wilton et al., 2015), but BMSM are less likely than MSM of other ethnicities to engage in seropositioning (Maulsby, Millett, et al., 2013). While studies have found that MSMW are less likely than men who have sex with men only (MSMO) to engage

in RAI (Friedman et al., 2014; Maulsby, Sifakis, et al., 2013), few data describe a complete profile of sexual positioning practices and sexual risk among BMSMW.

To address this gap, this study utilized latent class analysis (LCA) to explore sexual risk profiles with male and female partners among BMSMW. LCA is a useful method to highlight nuanced patterns of risk by exploring how a set of behaviors manifest to create different behavioral profiles (Gilreath et al., 2014; Lanza & Rhoades, 2011; Sullivan, Childs, & O'Connell, 2009). Latent classes of behavioral profiles emerge and reveal conditional probabilities of a set of behaviors within the profile, showing the likelihood of behavior given membership to a latent class (Lanza & Rhoades, 2011). There has been debate involving the risk of BMSMW being a "bridge" population, connecting higher-risk BMSM to lower-risk women, for whom most HIV infections are attributed to heterosexual contact (CDC, 2016b; Satcher, Durant, Hu, & Dean, 2007). Some have described varying sexual risks with male and female partners; others have contested the nature of elevated risk to female partners based on the low reported numbers of HIV infections attributed to MSMW (Jeffries IV, 2014; Malebranche, Arriola, Jenkins, Dauria, & Patel, 2010; Satcher et al., 2007). Utilizing LCA to explore conditional probabilities of sexual behaviors is one way to explore and clarify BMSMW's varying risk to and from male and female partners.

Examining how sexual positioning practices might manifest to create different profiles of sexual risk among BMSMW could provide data for understanding high HIV/STI risk among BMSMW and their partners. Independent, binary outcome measures of condomless sexual acts limit the understanding of sexual risk taking among this group of men; utilizing a method that captures a profile of sexual positioning practices provides more insight into nuanced patterns of sexual risk. Sexual positioning practices and HIV/STI risk for BMSMW result from a complex relationship between individual and partner age and HIV status, partner type, and partner gender (Dangerfield II et al., 2016; Hampton et al., 2012; Hubach et al., 2013; Lauby et al., 2008; Mansergh & Marks, 1998; Nelson, Gamarel, Pantalone, Carey, & Simoni, 2016; Osmond, Pollack, Paul, & Catania, 2007; Scott et al., 2014). LCA is one way to explore the conditional probabilities of behaviors within profiles of sexual "risk" and to consider the complex relationship factors that influence condomless sexual acts.

The primary aim of this study was to identify latent classes of sexual risk among BMSMW regarding condomless sexual positioning practices with male and female partners. This study also explored the factors that predict class membership: age, study location, HIV status, marital status, and sexual orientation. Age (Koblin et al., 2013; Scott et al., 2014), relationship status (Johns, Pingel, Eisenberg, Santana, & Bauermeister, 2012; Malebranche, Fields, Bryant, & Harper, 2007), and bisexual identity (Dodge, Jeffries, & Sandfort, 2008; Harawa et al., 2008) have been linked to varying sexual risks among BMSMW. Additionally, BMSMW are more likely than Black MSMO to have undiagnosed HIV infection (Maulsby, Sifakis, German, Flynn, & Holtgrave, 2011; Young, Shoptaw, Weiss, Munjas, & Gorbach, 2009). The findings of this study might be informative for developing tailored and targeted interventions for high-risk BMSMW in the U.S.

Methods

In 2009, the Centers for Disease Control and Prevention (CDC) funded three research teams to prospectively study and develop interventions for BMSMW in Los Angeles, CA, Chicago, IL, and Philadelphia, PA. This analysis was conducted on baseline data from the study and included participants assigned to both the intervention and control condition (N=584). All participants identified as Black or African American, reported at least one male and one female sexual partner during the previous six months, and had condomless sex with at least one of these partners. Men were recruited using a modified chain referral approach, word-of-mouth, and outreach efforts. Participants completed an audio computer-assisted self-interview (ACASI) using the Questionnaire Development System (NOVA Research, Bethesda, MD). The current analysis included men who reported having oral or anal sex with at least one man, and oral, vaginal, or anal sex with at least one woman in the previous three months, resulting in 546 BMSMW included in this study. Study procedures were approved by the institutional review boards at Charles R. Drew University, the University of Southern California, Nova Southeastern University, and the Public Health Management Corporation.

Measures

Latent Class Indicators

Condomless Sexual Intercourse.: Participants provided their number of condomless RAI and IAI encounters with their most recent main male partners and condomless vaginal or anal sex with their most recent main female partners. Participants also provided their number of condomless RAI and IAI encounters with HIV-positive and HIV-negative/status-unknown non-main male partners and condomless vaginal and anal sex encounters with HIV-positive and HIV-negative/status-unknown non-main female partners. These responses were dichotomized into “zero” (0) versus “any” (1). Frequency and types of oral sex practices with partners were not measured. Therefore, men who might have only practiced oral sex with partners were captured in the “zero” (0) category for RAI and/or IAI practice with partners.

Covariates Predicting Latent Class Membership

Age and Study Location.: Age (in years) was determined based on participants’ year of birth and was used as a continuous variable to explore the odds of class membership with each year increase in age. The Los Angeles and Philadelphia study sites were used as covariates to predict the odds of class membership relative to participants in Chicago.

HIV Status.: Participants reported HIV testing history and the results of their last HIV test as “Negative-I do not have HIV,” “Positive-I do have HIV,” or “Inconclusive-neither positive nor negative.” Participants who had been tested were recoded into a dichotomous variable: “HIV-positive” and “HIV-negative or status unknown.” Participants who reported that they had never been tested for HIV or that their results were inconclusive were included in the “HIV-negative or status unknown” category.

Marital Status.: Participants were asked to provide their marital status. Response options included “Married to a man,” “Married to a woman,” or “Single.” Marital status was dichotomized into two groups of men who reported being married to either a man or woman and those who reported being single.

Sexual Orientation.: Participants were asked to note their sexual orientation from one of the following options: Bisexual, Gay/Homosexual/Same-Gender Loving, Heterosexual or Straight, Other, or None. Due to the sparseness in identities other than “Bisexual,” sexual orientation was dichotomized into a two-category variable comparing those who identified as anything other than Bisexual to those who identified as Bisexual.

Statistical Analysis—LCA was utilized to explore and identify participants’ risk profiles regarding 12 types of condomless sexual positioning practices (Table 2). Latent class indictors included IAI and RAI with main and non-main male partners in addition to vaginal and anal sex with main and non-main female partners. Non-main partners were stratified by HIV-status. A series of LCA models specifying one to five latent classes was tested. Each model ran with 2,000 starts with a maximum number of iterations for each run being 1,000 to ensure that the global maximum likelihood estimates were reached. Indices used to determine the optimal LCA solution included the Akaike Information Criteria (AIC), the Bayesian Information Criteria (BIC), and the sample size-adjusted BIC (aBIC). These criteria tested the improvement in fit for the model under consideration compared with a model with one less class.

The best-fitting model was identified by considering the lowest log likelihood, AIC, BIC, and aBIC values before these values increased with the addition of another class. Additionally, the Lo-Mendell-Rubin/Likelihood Ratio Test (LMR/LRT) was used to determine whether there was a statistically significant improvement in fit with the inclusion of one more class (Lo, Mendell, & Rubin, 2001; Nylund, Asparouhov, & Muthén, 2007). The entropy and interpretability of the classes were also considered during model selection.

After identifying the best-fitting latent class solution, age, study location, HIV status, marital status, and sexual orientation were used in a multinomial regression model. This three-step approach allows one to initiate the multinomial regression and control for uncertainty in class assignment while maintaining the class structure and meaning found initially (Asparouhov & Muthén, 2014; Vermunt, 2010). This approach yielded adjusted odds ratios (AORs) and confidence intervals (CIs) illustrating associations between these predictors and class membership. The analysis was conducted using Mplus Version 7.4. Covariates were treated as auxiliary variables using the R3STEP option.

Results

Of the sample of 546 BMSMW, 413 (75.6%) self-identified as bisexual, 9.9% as homosexual, gay or same-gender loving, and 6.9% as heterosexual or straight. The mean age was 43.3 years (standard deviation=9.7 years); ages ranged from 18 to 70 years. About 36% of participants were from Los Angeles, 27.8% from Philadelphia, and 36.5% from Chicago. Nearly half (48.7%) of participants had annual individual incomes of less than $5,000 and

40.4% self-reported being HIV-positive (Table 1). Table 2 describes the frequency of condomless RAI and IAI with main and non-main male partners and condomless vaginal and anal sex with main and non-main female partners. The most prevalent behavior with men was condomless IAI with main partners (79.7%). The most prevalent behavior with women was condomless vaginal sex with main partners (86.4%).

A comparison of model fit indicated that a three-class solution was optimal (Table 3) and showed the lowest log likelihood, AIC, BIC, and aBIC values before these values increased in the four-class solution. Additionally, the LMR/LRT showed that adding another class to this solution would not improve the model. The distribution of the latent classes highlighted three distinct latent classes of Black MSMW: Class 1 (Seropositive Serosorters), Class 2 (Seronegative/unknown Serosorters), and Class 3 (Main Partners Only). Class 3 (Main Partners Only) was the largest (55.7%), followed by Class 2 (Seronegative/unknown Serosorters (22.7%), and Class 1 (Seropositive Serosorters, 20.1%).

Table 4 displays the profiles of latent classes of sexual risk regarding condomless sexual positioning practices among BMSMW and the conditional probabilities of sexual risk behaviors within each class. Across all three classes, BMSMW had the highest conditional probabilities of having condomless IAI (vs. not having condomless IAI) with main male partners and condomless vaginal sex (vs. not having condomless vaginal sex) with main female partners. Conditional probabilities for condomless sex with main male partners were highest for Class 1 (Seropositive Serosorters, 80.9%) but relatively equal across classes for condomless vaginal sex with main female partners (range=64.6% to 68.0%). Unique to BMSMW with Class 1 (Seropositive Serosorters) membership, the highest conditional probabilities of condomless sex were with main male and female partners as well as HIV-positive non-main male and female partners.

Conversely, for BMSMW in Class 2 (Seronegative/unknown Serosorters), the highest conditional probabilities of condomless sex occurred during vaginal sex (98.1%) and anal sex (81.9%) with female HIV-negative or status-unknown non-main partners. For this Seronegative/unknown Serosorters group, conditional probabilities of condomless sex with HIV-negative or status unknown non-main partners were greatest with female partners. Class 3 (Main Partners Only) had lower conditional probabilities than the other classes for condomless sex across all sexual positioning practices. Among BMSMW in this class, the highest conditional probabilities for condomless sex were for IAI with main male partners (56.5%) and vaginal sex with female partners (67.7%).

Table 5 highlights the predictors of class membership relative to Class 1 (Seropositive Serosorters) using multinomial logistic regression. Age, marital status, and sexual orientation were not associated with class membership. Study location and HIV status were associated with class membership. BMSMW classified as Class 2 (Seronegative/unknown Serosorters) had greater odds of being in Los Angeles (AOR=3.52; 95% CI=1.89, 6.58) and Philadelphia (AOR=5.05; 95% CI=2.21, 11.52) than in Chicago compared to BMSMW in Class 1 (Seropositive Serosorters). BMSMW in Class 3 (Main Partners Only) had greater odds of being in Philadelphia than in Chicago compared to those in Class 1 (Seropositive Serosorters) (AOR=2.56; 95% CI=2.12, 5.86). BMSMW in Classes 2 (Seronegative/

unknown Serosorters) and 3 (Main Partners Only) had lower odds of being HIV-positive versus HIV-negative or status unknown than those in Class 1 (Seropositive Serosorters). Specifically, BMSMW in Class 2 (Seronegative/unknown Serosorters) had 87% lower odds of being HIV-positive than BMSMW in Class 1 (Seropositive Serosorters) (AOR=0.13, 95% CI=0.62, 0.28); Class 3 (Main Partners Only) had 71% lower odds of being HIV-positive versus HIV-negative or status unknown than Class 1 (Seropositive Serosorters) (AOR=0.29, 95% CI=0.16, 0.51).

Discussion

Three latent classes of sexual risk among BMSMW were highlighted: Seropositive Serosorters, Seronegative/unknown Serosorters, and Main Partners Only. While only 20.1% of BMSMW were classified as “Seropositive Serosorters,” this group had the highest probabilities of condomless sexual positioning practices with main male and female partners and HIV-positive non-main male and female partners. Men in the Seronegative/unknown Serosorters class had the second highest probabilities of condomless sex with main male and female partners, and the highest probabilities of condomless sex with HIV-negative or status unknown non-main male and female partners. Men in the Main Partners Only class accounted for over half of the sample and had the lowest probabilities of condomless sex acts with male and female partners.

BMSMW classified as Seropositive Serosorters had the highest probabilities of condomless sex with main partners and with HIV-positive non-main partners. HIV-negative BMSMW in this group could be at high risk for HIV infection from partners; however, HIV-positive BMSMW were more likely to be classified as Seropositive Serosorters than all other classes. One potential explanation for this could be that HIV-positive BMSMW are serosorting and/or seropositioning, intentionally choosing to engage in condomless sexual practice with partners that they know are HIV-positive. Some HIV-positive MSM have condomless sex with main partners or other HIV-positive partners (Boom et al., 2013; Crosby, Mena, & Geter, 2016; Dodge, Jeffries IV, & Sandfort, 2008; Harawa et al., 2014; Maulsby, Sifakis, et al., 2013; Prestage et al., 2009; Wilton et al., 2015). However, because the temporal relationship between partner and participant HIV infection is unknown, it is unclear whether participants were choosing partners known to be HIV-positive, or whether they were HIV-positive because of condomless sex with HIV-positive partners.

Nevertheless, up to 68% of HIV transmissions among MSM may be from main partners (Sullivan et al., 2009) and HIV-positive persons are likely to practice safer sex behaviors after learning their HIV status (CDC, 2015c; Fox et al., 2009; Gwadz et al., 2016). Engaging in HIV care and adhering to antiretroviral therapy would reduce the likelihood of HIV transmission from HIV-positive MSM to their partners. Treatment adherence is lower among Black (vs. white) MSM (Maulsby, Millett, et al., 2013; Oster et al., 2011).

For BMSMW, antiretroviral therapy adherence and engagement in HIV care could be further complicated because of perceptions of racism, low socioeconomic status, and gay-identified messaging that may not appeal to MSMW (Bogart, Landrine, Galvan, Wagner, & Klein, 2013; Maulsby, Sifakis, et al., 2013). Even with undetectable viral loads, BMSMW and their

partners are still susceptible to other STIs (Fleming & Wasserheit, 1999; Kidd, Stenger, Kirkcaldy, Llata, & Weinstock, 2015; Solomon et al., 2014; Wasserheit, 1992), and the profiles within latent classes 1 and 2 (Seropositive Serosorters and Seronegative/unknown Serosorters) demonstrate high potential for STI acquisition and transmission. Future studies should explore the relationship between condomless sexual positioning practices and STI prevalence, which can increase HIV risk and transmission (Craib et al., 1995; Girometti, Gutierrez, Nwokolo, McOwan, & Whitlock, 2016; Solomon et al., 2014).

Seronegative/unknown Serosorters had the highest probabilities of condomless sexual positioning practices with non-main HIV-negative or status-unknown partners. HIV-negative or status-unknown men were more likely than HIV-positive men to be classified as Seronegative/unknown Serosorters than Seropositive Serosorters. This is an important finding because men in this class might also be serosorting, which could increase infection risk if the men incorrectly guess the HIV status of their partners (CDC, 2014a; Jin et al., 2009). Men in this class have a high risk of HIV/STI acquisition from non-main partners who might mistakenly be believed to be HIV-negative. Some BMSMW do not use condoms with female partners because they perceive females as “safer” than male partners (Dodge et al., 2008; Harawa et al., 2006; Malebranche et al., 2010). It is unclear how many of the non-main partners of men in this class are of unknown status. Research should continue to assess HIV status disclosure among BMSMW who might be serosorting to evaluate the communication involved in HIV status disclosure.

Highlighting the profiles of sexual risk among BMSMW provides an opportunity to develop tailored and targeted messaging for individuals at highest risk for HIV and STIs. A clinical screening tool could be developed to capture sexual positioning practices and create an algorithm of sexual risk among clinic patients. Healthcare providers could use this tool to provide tailored prevention services such as additional education, condom use, or pre-exposure prophylaxis (PrEP) to high-risk BMSMW who report varying patterns of condomless sex. Healthcare providers and other health agencies could also utilize the perspectives of this study to uncover additional ways to circumvent structural barriers for BMSMW such as racism and gay-identified messaging. Mixed methods approaches could be utilized to uncover how BMSMW with different sexual risk profiles engage in health care and/or screen for HIV and STIs (Dangerfield II, Craddock, Bruce, & Gilreath, 2017). Specifically, LCA could be utilized to explore the relationship between sexual risk profiles and healthcare utilization behaviors. Qualitative methods could be utilized to explore the ways to circumvent barriers to engaging in prevention services. Moreover, research should examine strategies for increasing the uptake of PrEP among HIV-negative BMSMW who engage in condomless sex.

This study had limitations. This sample was not representative of BMSMW in the U.S., mean age was 43 years, the majority had low socioeconomic status, and all had recently engaged in sexual risk behaviors. Men also self-reported their HIV status. This study combines BMSMW who report being HIV-negative, BMSMW whose tests were inconclusive, and BMSMW who had never been tested; these groups could have different risk profiles, but are included in the same category. Given the survey items, it is also not possible to discern exactly how many of the non-main partners were HIV-negative or status

unknown; participants were asked to identify partners who were not HIV-positive as HIV-negative/status unknown. Finally, this study also does not highlight the role of sexual positioning preferences in the context of these underlying sexual risk profiles. Future studies could address these limitations by using more representative samples of BMSMW and qualitative methods to understand the motivations for sexual risk taking among BMSMW who display the highest probabilities of risk.

Despite these limitations, this study provides insight into the sexual risk profiles of BMSMW by providing a comprehensive profile of sexual positioning practices. Future research with this population might include prospective analyses to explore the extent to which BMSMW might maintain or change latent class membership over time. Latent transition analysis could be one useful method to explore this phenomenon (Lanza, Patrick, & Maggs, 2010; Pines et al., 2014). Research should also explore the role of oral sex practices in the sexual positioning behaviors among BMSMW, which—despite its low risk for HIV infection—can contribute to STI acquisition and transmission. With better understanding of sexual risk behaviors among BMSMW, interventions will be more suited for addressing HIV/STIs among BMSMW and their sexual partners.

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Table 1:

Demographic and clinical characteristics of Black men who have sex with men and women (BMSMW)

	N=546	(%)
Age		
Range	18–70	
Mean (standard deviation)	43.3	9.7
Sexual identity		
Bisexual	413	75.6
Heterosexual or straight	38	6.9
Homosexual, gay, or same gender loving	54	9.9
Other/None	41	7.6
Study location		
Philadelphia	152	27.8
Los Angeles	195	35.7
Chicago	199	36.5
Employment status		
Full time	38	7.0
Part time/occasional	67	12.3
Unemployed	272	49.8
Retired	11	2.0
Disabled (unable to work)	158	28.9
Individual income in the past 12 months *		
Less than $5,000	259	48.7
$5000–$9999	141	26.5
$10,000 – $19,999	85	15.9
$20,000 – $29,999	29	5.5
$30,000 and over	18	3.4
Marital status		
Married to a woman	42	7.7
Married to a man	8	1.5
Not married	496	90.8
Highest level of education completed		
Less than high school	120	21.9
High school diploma or equivalent	215	39.4
Technical school/some college	157	28.8
College graduate or higher	54	9.9
Self-reported HIV status *		
Negative	300	57.9
Inconclusive	9	1.7

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	N=546	(%)
Positive	209	40.4
Never tested	22	4.0

* Due to missing data for some variables, some totals are less than 546

Table 2:

Frequency of condomless sexual positioning practices with male and female main[a] and non-main partners among Black MSMW

	N=546 (%)	Mean (SD)
Any Main Male Partners	424 (78.1)	
Concurrent	354 (83.5)	
Condomless IAI with main male partners		4.9 (7.8)
Condomless RAI with main male partner		3.2 (8.7)
Any Casual Male Partners	388 (71.8)	
Any HIV-negative or status unknown casual male partners	250 (64.4)	
Any condomless IAI with HIV-negative non-main partners	182 (72.8)	3.3 (6.7)
Any condomless RAI with HIV-negative non-main partners	108 (43.2)	1.9 (6.5)
Any HIV-positive casual male partners	197 (51.9)	
Any condomless IAI with HIV-positive non-main partners	133 (67.5)	3.6 (11.4)
Any condomless RAI with HIV-positive non-main partners	95 (48.2)	1.6 (3.0)
Any Main Female Partners	419 (77.0)	
Concurrent	357 (82.0)	
Any condomless vaginal sex with most recent main female partner	362 (86.4)	7.9 (12.2)
Any condomless anal sex with most recent main female partner	209 (49.88)	2.9 (8.1)
Any Casual Female Partners	369 (68.9)	
Any HIV-negative casual female partners	246 (66.7)	
Any condomless vaginal sex with HIV-negative non-main female partners	184 (74.8)	4.1(6.6)
Any Condomless anal sex with HIV-negative non-main female partners	26 (16.99)	2.4 (6.5)
Any HIV-positive casual female partners	154 (41.73)	
Any Condomless vaginal sex with HIV-positive non-main female partners	97 (62.99)	2.9 (8.1)
Any condomless anal intercourse with HIV-positive non-main female partners	74 (48.05)	2.2 (7.7)

[a]Sex with main partners was based on the most recent male and female partners that participants had.

Table 3:

Tests of model fit

	Loglikelihood	AIC	BIC	aBIC	Entropy	LMR/LRT
1 Class	−7624.63	15313.26	15450.95	15349.37		
2 Class	−7178.26	14466.26	14703.17	14528.57	.973	.039
3 Class	−6901.29	13958.58	14294.19	14046.58	.996	.197
4 Class	−6924.32	14050.65	14485.22	14164.60	.979	.694
5 Class	−6687.47	13622.94	14156.47	13762.84	.980	.489

AIC, Akaike Information Criterion

BIC, Bayesian Information Criterion

aBIC, sample size-adjusted BIC

LMR/LRT, Lo-Mendell-Rubin/Likelihood Ratio Test

Table 4:

Latent classes and conditional probabilities of condomless sexual positioning practices with male and female partners among Black MSMW (n=518)

	Class 1 Seropositive Serosorters n (%) 110 (20.1)	**Class 2 Seronegative/unknown Serosorters n (%) 124 (22.7)**	**Class 3 Main Partners Only n (%) 312 (57.1)**
Latent Class Indicators			
Condomless IAI w/main male partner	***.809***	***.609***	***.565***
Condomless RAI w/main male partner	.679	.403	.262
Condomless IAI w/HIV-positive non-main male partner	**.703**	.157	.119
Condomless RAI w/HIV-positive non-main male partner	**.608**	.162	.026
Condomless IAI w/HIV-negative or status unknown non-main male partner	.230	**.596**	.281
Condomless RAI w/HIV-negative or status unknown non-main male partner	.265	.347	.122
Condomless vaginal sex w/main female partner	***.680***	***.646***	***.677***
Condomless anal sex w/main female partner	.488	.486	.310
Condomless vaginal sex w/HIV-positive non-main female partner	**.725**	.012	.054
Condomless anal sex w/HIV-positive non-main female partner	**.638**	.000	.013
Condomless vaginal sex w/HIV-negative or status unknown non-main female partner	.206	**.981**	.132
Condomless anal sex w/HIV-negative or status unknown non-main female partner	.165	**.819**	.000

Table 5:

Multinomial regression predicting class membership relative to Class 1: Seropositive Serosorters (n=518)

Class 1: Seropositive Serosorters=REF	**AOR (95% CI)**	***p***
Class 2: Seronegative/unknown Serosorters		
Age	1.01 (0.97, 1.05)	.601
Study Location		
Los Angeles	3.52 (1.89, 6.58)	.003
Philadelphia	5.05 (2.21, 13.24)	.001
Chicago	REF	
HIV-Positive	0.13 (0.06,0.28)	<.001
Married	0.47 (0.15,1.48)	.197
Sexual Orientation: Gay, Heterosexual, Other	1.08 (0.48, 2.40)	.846
Class 3: Main Partners Only		
Age	0.99 (0.97, 1.02)	.655
Study location		
Los Angeles	1.73 (0.93, 3.24)	.084
Philadelphia	2.56 (2.12, 5.86)	.025
Chicago	REF	
HIV-Positive	0.29 (0.16, 0.51)	<.001
Married	0.65 (0.29, 1.51)	.325
Sexual Orientation: Gay, Bisexual, Other	1.13 (0.57, 2.25)	.724