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Age Cohort Differences in Sexual Behaviors among Black Men Who Have Sex with Men and Women in Los Angeles, Philadelphia, and Chicago

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Abstract

Little attention has focused on generational or age-related differences in HIV/STI risk behaviors among Black men who have sex with men and women (BMSMW). We examined sexual risk behaviors between BMSMW ages 40 and under compared to over age 40. Analysis was conducted using CDC-sponsored intervention data among BMSMW in Los Angeles, Chicago, and Philadelphia (n=546). Pearson's chi-square tests were conducted to evaluate associations between age groups and behavioral outcomes. Logistic regression was used to evaluate the odds of behavioral outcomes by age group, adjusting for sexual orientation and study location, within strata of HIV status. HIV-positive BMSMW over age 40 had 62% reduced odds of having a non-main female partner of HIV-negative or unknown status compared to those ages 40 and under (AOR 0.38, 95% CI=0.15, 0.95). Among HIV-negative BMSMW, older cohort was associated with greater odds of having condomless insertive anal intercourse with most recent main male partner (AOR 2.44, 95% CI=1.12, 5.32) and having a concurrent partnership while with their recent main female partner (AOR=2.6, 95% CI=1.10, 4.67). For both groups, odds of engaging in

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certain risk behaviors increased with increasing age. Prevention efforts should consider generational differences and age on the varying HIV risks among BMSMW.

Introduction

A growing number of studies have highlighted important behavioral differences between men who have sex with men only (MSMO) and men who have sex with men and women (MSMW), showing that Black MSMW (BMSMW) are at high risk for HIV infection compared to other risk groups (Ford, Whetten, Hall, Kaufman, & Thrasher, 2007; Maulsby, Sifakis, German, Flynn, & Holtgrave, 2013; Operario, Smith, Arnold, & Kegeles, 2009). Compared to MSMO, MSMW report higher prevalence of substance use, exchanging sex for money or drugs, and higher numbers of sexual partners (Dyer et al., 2013; Maulsby et al., 2013). BMSMW in particular are less likely to test for HIV, more likely to have been arrested at least twice in their lifetime, to make less than \$5,000 a year, to score higher on internalized homophobia and depressive measures, and to score lower on social support measures compared to Black MSMO (Dyer et al., 2013; Wheeler, Lauby, Liu, Sluytman, & Murrill, 2008). These sociodemographic and behavioral differences create different sexual health risk profiles for HIV acquisition for BMSMW compared to other groups of MSM.

Advances in HIV treatment and prevention options have changed messages about risk for MSM groups. Extant literature has described lower concern about HIV transmission and increased sexual risk taking due to the availability of highly active anti-retroviral treatment (HAART) for HIV-positive individuals and pre-exposure prophylaxis (PrEP) for HIV-negative individuals (Brooks et al., 2011; Hoff et al., 2015; Liu et al., 2013; Ostrow et al., 2002; Venkatesh et al., 2010). The widespread availability of HAART in 1996 led to dramatic declines in AIDS and HIV-related deaths by reducing the viral load of HIV-infected individuals, which, coupled with behavioral interventions, decreased HIV incidence during that time (Detels et al., 1998; Hammer et al., 1997; Wolitski, Valdiserri, Denning, & Levine, 2001). Similarly, PrEP use among HIV-negative MSM has implications for sexual behavior; up to 36% of Black MSM (BMSM; including homosexual and bisexual men) reported that they would be likely to decrease their condom use while on PrEP (Brooks et al., 2011; Golub, Kowalczyk, Weinberger, & Parsons, 2010; Tripathi, Whiteside, & Duffus, 2013). In another study of HIV-negative MSM, those with reduced HIV concern were significantly more likely to report engaging in condomless receptive anal intercourse (RAI); HIV-positive men with greatest reduced concern due to HAART or safer-sex fatigue were more likely to report condomless insertive anal intercourse (IAI) (Ostrow et al., 2002; Stolte, Dukers, Geskus, Coutinho, & de Wit, 2004). Less is known about the relationship between generational differences in HIV treatment and prevention options and behavioral risks among BMSMW specifically.

Behavioral risks for acquiring or transmitting HIV and STIs via condomless sex vary by sexual positioning practices with male and female partners. Specifically, men who practice condomless RAI with male partners are more likely to acquire HIV and rectal STIs compared to men who only participate in IAI with male partners (Jin et al., 2010; Kent et al., 2005; Patel et al., 2014). RAI with male partners creates high risk for HIV acquisition

because the lining of the rectum is thin and may allow HIV to greater access to the blood stream during sex; IAI confers lower risk because the primary access for HIV is through the much smaller opening of the penis (CDC, 2014a, 2014b; Edwards & Carne, 1998). Men who practice both insertive and receptive roles for anal sex may be at high risk for HIV and STI infection via RAI and could also potentiate subsequent risk for HIV infection to both male and female partners through IAI and vaginal intercourse (Beyrer et al., 2012; Lyons et al., 2011; Wolitski & Branson, 2002). There is inconsistent evidence about the sexual risk taking with male and female partners for BMSMW. Qualitative data show that some BMSMW are less likely to use condoms with female than male partners because they perceive females to be safer sexual partners compared to males (Dodge, Jeffries IV, & Sandfort, 2008; Harawa et al., 2008). It is important, then, to add to the scant literature on the patterns of HIV-positive and negative BMSMW's sexual risk behaviors with both male and female partners.

Little attention has focused on the relationship between age, cohort, and HIV/STI risk among BMSMW. Life Course Theory (LCT) and cultural-historical activity theory (CHAT) provide useful frameworks for exploring sexual health/behaviors as the result of dynamic processes involving historical context, environmental context, and the individual (Bronfenbrenner, 1979; Elder Jr., 1996; Friedman & Rossi, 2015; Pouget et al., 2016). This lens directs us to consider the relationship between generational differences, historical events, developmental trajectories, individual behaviors, and health outcomes. Studies have shown behavioral differences between younger and older cohorts of BMSM as a whole, particularly men ages 30 and under compared to men over 30 (Koblin et al., 2013; Scott et al., 2014; Vagenas et al., 2016). Younger age has been associated with HIV incidence and sexual risk taking (Koblin et al., 2013; Mansergh & Marks, 1998; Osmond, Pollack, Paul, & Catania, 2007), and personal development accompanying age also influences sexual risk-taking among BMSM (Dangerfield II, Smith, Anderson, et al., 2017). Research has yet to examine whether similar patterns emerge when focused on BMSMW.

Men born prior to the 1980s came of age during the first generation of the HIV/AIDS epidemic. They witnessed its fatal consequences, when most people came to medical attention only in the later stages of disease and when effective treatments were unavailable. Those born during and after that time witnessed a very different epidemic in which the disease became more and more treatable. Pouget et al. (2016) theorized that "big events," macro social and structural events such as disasters and large-scale changes in policy, change risk contexts and can subsequently affect HIV transmission. Men ages 40 and older at present would have reached their mid-20s and early 30s before the introduction of HAART when deaths related to HIV and AIDS were at their highest. Comparatively, men aged 40 and under spent most of their adult lives in a context where HAART was readily available and biomedical interventions were increasingly coupled with targeted HIV prevention information. In addition, AIDS-related deaths and community viral loads have declined dramatically, creating a different sexual risk environment. Coupled with the evidence that age is associated with sexual risk taking among BMSM (Dangerfield, Smith, Anderson, et al., 2017; Koblin et al., 2013; Mustanski, Newcomb, & Clerkin, 2011), this study stratified analyses among HIV-negative and HIV-positive BMSMW in two age cohorts (40 and older and under 40 years old), and explored the odds of behavioral risk with increased age.

Methods

Data from this study come from a CDC-sponsored multi-site intervention study focused on BMSMW in Los Angeles, CA., Chicago, IL., and Philadelphia, PA. Analysis was conducted on baseline data from the overall study and includes participants assigned to both the intervention and control condition. Participants in the intervention had to identify as Black or African American, and report condomless sex with a man or woman in the past three months. 584 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). To describe the profiles of bisexually active BMSMW, the analysis presented here was limited to 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 past three months, which resulted in 546 BMSMW included in this analysis. Study procedures were approved by the institutional review board at the University of Southern California Health Sciences Campus.

Measures and Outcome Variables

HIV Status—Participants reported the results of their last HIV test as “Negative-I do not have HIV,” “Positive-I do have HIV,” and “Inconclusive-neither Positive nor Negative.” 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.

Age—Age was dichotomized into 40 and under versus over 40 years as a proxy for two age cohorts of men in prior to and following the era of HAART. Age was also utilized as a continuous variable to explore potential changes in odds of behavioral outcomes with increasing years of age.

Sexual Orientation—Participants were asked to identify their sexual orientation from categories including “Heterosexual or straight,” “Homosexual, gay, or same gender-loving,” “Bisexual,” “Unsure/Questioning,” “Other,” or “None.” Responses of “Unsure/Questioning,” “Other,” and “None” were combined into a single category, and sexual orientation was used a covariate in logistic regression models to adjust for behavioral differences in sexual orientation (Dyer et al., 2013; Harawa et al., 2008).

Number of Sexual Partners—Participants were asked to provide information about male and female partners within the past three months, including number and HIV status of partners. Participants provided the number of main male and female intercourse partners within the past three months. Participants identified the number of HIV-positive and HIV-negative casual male and female partners within the past three months. These items for male and female partners were dichotomized into “Zero” versus “Any.”

Condomless Sexual Intercourse—Participants were asked to provide the number of condomless RAI and IAI encounters with main and casual male partners, in addition to condomless vaginal and anal sex encounters with main and casual female partners. These responses were dichotomized into “Zero” versus “Any.”

Concurrent Sexual Partnerships—For main male and female partners, participants were asked to report if they had sex with anyone during the time they were in a relationship with their main partner. Response options were “Yes” or “No.” Some participants self-reported having more than one main partner.

Statistical Analysis

Pearson’s chi-square and Fisher’s exact tests were conducted to evaluate the association between age groups and selected behavioral outcomes. Binary logistic regression was used to evaluate the odds of selected behavioral outcomes, including condomless IAI and RAI with main and casual male partners and condomless vaginal and anal intercourse with main and casual female partners. Multinomial logistic regression models were adjusted for differences in sexual orientation and study location across age groups given the variability in sexual risk taking by sexual orientation (Dodge et al., 2008; Goldbaum et al., 1998; Maulsby et al., 2013; Saleh & Operario, 2009). These models were also stratified by HIV status to observe these patterns among HIV-negative/unknown men and HIV- positive men separately; previous research suggests that people can reduce HIV risk behaviors after testing HIV-positive (Colfax et al., 2002; Gorbach, Drumright, Daar, & Little, 2006; Steward et al., 2009). Multinomial logistic regression models were also conducted using age as a continuous variable to explore the odds of sexual risk behaviors with one year of increased age. All analyses were conducted using Statistical Analytic Software (SAS) 9.0.

Results

Of the 546 BMSMW in this analysis, 29.0% were age 40 and under, and 70.1% were over the age of 40 (Table 1). The mean age was 43.3 years (SD 9.7, range 18–70). In this sample of BMSMW, 75.6% identified as bisexual; 9.9% identified as homosexual, gay, or same gender loving; 9% identified as heterosexual or “straight.” Half (49.8%) of the sample reported that they were unemployed, and 40.4% reported that they were HIV-positive.

Bivariate associations between age and sexual behaviors with main and non-main male partners stratified by HIV status are summarized in Table 2. Among HIV-negative/status unknown BMSMW, older age was associated with having any condomless IAI with most recent main male partners in the past 3 months (89.1% compared to 75.0%; $X^2 = 7.31, p < 0.01$). Among the same group, younger age cohort was associated with having any non-main male partners who were HIV-negative or whose status was unknown (87.7% compared to 74.3%; $X^2 = 5.15, p = 0.02$). Among HIV-positive men, older age cohort was associated with having a concurrent sexual partnership while in relationship with most recent main male partner (88.2% compared to 75.6%; $X^2 = 3.92, p = 0.047$).

Table 3 reports bivariate associations between these age cohorts and sexual behaviors with main and non-main female partners. Among HIV-negative/status unknown participants, older age cohort was associated with having multiple main female partners (39% compared to 34.0%; $X^2 = 7.62, p = .021$). Older age cohort was also associated with having a concurrent sexual relationship while in a relationship with their most recent main female partner (87.5% compared to 74.7%; $X^2 = 6.33, p = .011$) and having multiple non-main female partners in the past three months (52.5% compared to 35.3%; $X^2 = 8.13, p = .017$). Among HIV-positive men

with any non-main female partners, younger age was associated with having any non-main female partners of HIV-negative or unknown status (52.6% versus 47.4%; $\chi^2 = 5.44$, $p = 0.019$). Older age was associated with having any HIV-positive non-main female partners ($p < 0.01$).

Table 4 shows the logistic regression analysis of the odds of sexual risk behaviors of BMSMW over 40 years compared to BMSMW 40 and under, adjusted for self-identified sexual orientation and study location and stratified by HIV status. Among HIV-negative BMSMW who reported having a main male partner in the past three months, the older group had 2.44 greater odds than the younger group of having condomless IAI (AOR 2.44, 95% CI=1.12, 5.32). The older group also had 2.26 greater odds of having a concurrent partnership while with their most recent main female partner (AOR 2.26, 95% CI=1.10, 4.67), and a 63% lower odds of having any HIV-negative or status unknown non-main male partners, among those who reported having non-main male partners. Among HIV-positive BMSMW who reported having at least one non-main female partner in the past three months, men over the age of 40 had nearly 70% lower odds of having HIV-negative or status unknown non-main female partners compared to those 40 and under (AOR 0.38, 95% CI=0.15, 0.95). They also had 3.03 times the odds of having a non-main female partner who was HIV-positive (AOR 3.03, 95% CI=1.24, 7.37).

Table 5 displays the logistic regression models using age as a continuous variable to explore odds of sexual risks by increasing age in years rather than age group. Among HIV-negative BMSMW who reported having a main partner in the past three months, the odds of condomless IAI with main male partners increased by 7% for every year of increase in age (AOR 1.07, 95% CI= 1.03, 1.11). Odds of having a concurrent relationship with the most recent female partner increased by 4% for every year of increase in age. Among HIV-positive BMSMW, the odds of having any HIV-negative or status-unknown non-main female partners decreased by 4% for every year of increase in age (AOR 0.96, 95% CI= 0.92, 1.00). The odds of having any HIV-positive non-main female partners increased by 5% with each year of increased age (AOR 1.05, 95% CI=1.00, 1.10).

Discussion

This study highlighted differences in sexual risk behaviors for BMSMW by age cohort and HIV status. In the multivariate models, there were statistically significant differences regarding age and some behaviors by HIV status, including having condomless IAI with the most recent main male partner, having HIV-negative or status unknown non-main partners, having a concurrent sexual partnership while with the most recent main female partner, and having HIV-positive non-main female partners.

This study found that among HIV-negative BMSMW who reported having a main male partner in the past three months, those over the age of 40 were significantly more likely to report condomless IAI with their most recent main male partner. Previous research has found that younger non-gay identified BMSM were more likely to report condomless sex with male partners than older non-gay identified BMSM (Hampton et al., 2012). Research has also found that younger BMSM (including bisexual Black men) were more likely to report

condomless RAI with HIV-positive partners or partners with unknown HIV status compared to older BMSM (Koblin et al., 2013). Our analyses did not find statistically significant differences in RAI practice among the age cohorts of either HIV status. However, older BMSMW could be more solidified in their sexual/health practices and might be less likely to use condoms for IAI with main male partners compared to younger BMSMW who have been exposed to increased HIV prevention messaging (Dangerfield II, Smith, Anderson, et al., 2017).

We also found that the older cohort of HIV-negative/status unknown BMSMW were more likely to report having a concurrent sexual partnership while in relationship with most recent main female sexual partners. It is unclear whether concurrent partnerships among were with males or females; however, data show evidence of higher proportion of concurrent partnership among MSMW than MSMO, particularly concurrent condomless sex with male and female partners (Maulsby et al., 2013; Operario et al., 2009). This may be particularly important for Black women in partnerships with BMSMW, who experience the highest incidence of HIV infections after MSM groups in the U.S. (CDC, 2016; Kaiser Family Foundation, 2014).

Among HIV-positive BMSMW who reported non-main female partners, we found that older BMSMW were less likely to have HIV-negative or status unknown non-main female partners and more likely than younger BMSMW to have an HIV-positive non-main female partner. This suggests that HIV-positive BMSMW could be serosorting. Other research has found that older non-gay identified BMSM were more likely to engage in condomless sex with women compared to younger non-gay identified BMSM (Hampton et al., 2012), which could have implications for STIs for BMSMW and their partners, since STI transmission risk increases in the presence of HIV infection (Fleming & Wasserheit, 1999; Wasserheit, 1992).

We also observed that among both HIV-negative and HIV-positive groups, the odds of sexual risk behaviors (i.e., condomless IAI, concurrent partnership while with most recent main female partner, and having HIV-positive female partners) increase with increasing age. This offers important insights about the sexual health trajectories among BMSMW. These data raise the question of whether increased risk in age among BMSMW is attributable to a personal developmental trajectory along the life course or if older BMSMW also experience condom use fatigue with age. Other studies have found fatigue with HIV prevention messaging and behaviors among other populations of men who have sex with men (Adam, Husbands, Murray, & Maxwell, 2005; Rowniak, 2009). This calls for a need to explore the relationship between trajectories of sexual behaviors and HIV prevention behaviors for BMSM.

Other research on the HIV and STI risk among Black gay and bisexual men shows that sexual preferences change over time in part due to personal growth and changing circumstances over the life course (Dangerfield II, Smith, Anderson, et al., 2017). Sexual decisions and risk for each encounter are also nested within developmental stages of adulthood, which could change with age, as suggested by our findings of increased odds of risk with increasing age. Behavioral risk HIV and STIs within a sexual encounter (i.e.,

sexual positioning, serosorting, condom use) among BMSM may also be relative and contextual based upon age, HIV status, partner type, and partner gender (Dangerfield II, Smith, Williams, Unger, & Bluthenthal, 2016). Still, all of these developmental and situational/sexual contexts are nested within larger historical contexts that provide varying risk environments for HIV infection (Dangerfield, Smith, Anderson, et al., 2017; Dangerfield, Smith, Williams, et al., 2017; Elder Jr., 1996; Rhodes, 2002). Specifically, the changing nature of the AIDS epidemic due to increasing prevention options may create varying perceptions of risk for different cohorts of BMSM (Brooks et al., 2011; Dangerfield II, Smith, Anderson, et al., 2017; Hoff et al., 2015; Venkatesh et al., 2010). Future research should consider both generational and development changes in risk taking among various age cohorts of BMSMW.

Overall, our findings highlight important behavioral differences by age cohort and HIV status. We observe that age is related to risk among BMSMW in some ways, safer in other ways, and that there could be a trend in increased risk as age increases. Still, this study's findings also give rise to an important framework of looking at the effects of both historical and developmental forces on sexual behaviors, health, and risk among BMSMW. These generational differences and developmental trajectories in risk offer meaningful insights into the profiles of BMSMW that need to be addressed in intervention. Future interventions on BMSMW might consider the role that generational differences in exposure to HIV prevalence, disease outcomes, and prevention messages might have on sexual risk taking.

There are limitations associated with the study. This sample of BMSMW was not representative of BMSMW; many were recently incarcerated, most have low socioeconomic status, in addition to endorsing several sexual risk behaviors as required for the randomized control trial. Men self-reported HIV-status, and the cross-sectional nature of the analysis makes it difficult to isolate age and cohort effects. Many variables potentially associated with sexual risk behaviors (e.g., substance use, mental health, and partner violence) were not included in the multivariate models, which could potentiate residual confounding. The lack of socioeconomic diversity in this group may limit generalization of these findings. Additionally, these data lack power for examining differences within smaller age cohorts and prevent us from quantifying the relationship between HAART as a "big event" and sexual behaviors among this sample. While other research compares individuals 30 and younger to men over 30, the low sample size of men under the age of 30 limited our ability to detail a dichotomy between that age group. Still, this work provides a framework for highlighting differences in sexual risk behaviors among BMSMW by age group, which is an understudied subpopulation among the larger and general group of MSM.

Future research should explore this issue among a wider range of age cohorts. Efforts should examine the varying roles of PrEP in the sexual lives of both younger and older BMSMW population. Additionally, it is important to explore these sexual risk profiles by age cohort in a more heterogeneous and representative sample of BMSMW and to uncover motivations for condomless IAI, concurrent sexual partnerships, choosing HIV-negative/unknown or HIV positive partners among older and younger HIV-positive and HIV-negative groups.

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Table 1

Baseline characteristics of behaviorally bisexual* BMSMW in behavioral prevention studies in Los Angeles, Chicago, and Philadelphia, 2011 to 2012

	n=546(%)
<u>Age</u>	
Range	18-70
Mean (SD)	43.3(9.7)
40 and under	163(29.8)
Over 40	383(70.1)
<u>Self-reported Sexual Orientation</u>	
Heterosexual or straight	38(6.9)
Homosexual, gay, or same gender loving	54(9.9)
Bisexual	413(75.6)
Other	41(7.5)
<u>Location</u>	
Philadelphia	152(27.8)
Chicago	199(36.5)
Los Angeles	195(35.7)
<u>Employment Status</u>	
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)
<u>Income in the past 12 months</u> **	
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)
<u>Marital Status</u>	
Married to a woman	42(7.7)
Married to a man	8(1.5)
Not married	496(90.8)
<u>Highest level of education completed</u>	
Less than high school	120(21.9)
High School Diploma/GED	215(39.4)
Tech school/Some College	157(28.8)
College graduate or higher	54(9.9)
<u>Ever spent one night without a place to stay in the past 12 months</u>	
No	277(50.7)
Yes	269(49.3)

	n=546(%)
<u>Self-reported HIV status</u> **	
Negative	300(57.9)
Inconclusive	9(1.7)
Positive	209(40.4)

* Defined as reporting at least one male and at least one female partner in the past three months

** Due to missing data for some variables, some totals are less than 550

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Table 2

Bivariate analyses of behavioral outcomes with male partners among BSMW in Los Angeles, Chicago, and Philadelphia stratified by self-reported HIV status and age cohort, 2010 to 2012

	HIV-negative/status unknown (n=309)		χ^2	<i>p</i>	HIV-positive (n=209)		χ^2	<i>p</i>
	40 and under n (%)	Over 40 n (%)			40 and under n (%)	Over 40 n (%)		
<u>Number of Main Male partners*</u>								
Zero	34 (33.0)	48 (23.5)	3.18	0.203	6 (12.8)	26 (16.2)	5.53	0.063
One	47 (45.6)	104 (51.0)			20 (42.5)	92 (57.1)		
Multiple	22 (21.4)	52 (25.5)			21 (44.7)	43 (26.7)		
<u>Concurrent partnership while w/most recent main male partner*</u>								
No	16 (23.2)	24 (15.4)	1.99	0.158	10 (24.4)	16 (11.8)	3.92	.047
Yes	53 (76.8)	132 (84.6)			31 (75.6)	119(88.2)		
<u>Condomless IAI** w/ most recent main male partner*</u>								
Zero	17 (25.0)	17 (10.9)			8 (20.0)	38 (28.4)		
Any	51 (75.0)	139 (89.1)	7.31	<0.01	32 (80.0)	96 (71.6)	1.10	0.292
<u>Condomless RAI*** w/most recent main male partner</u>								
Zero	36 (52.9)	94 (61.0)	1.27	0.258	15 (37.5)	57 (42.5)	0.32	0.570
Any	32 (47.1)	60 (39.0)			25 (62.5)	77 (57.5)		
<u>Number of non-main male partners*</u>								
Zero	27 (26.7)	62 (30.5)	0.59	0.744	8 (17.4)	43 (26.7)	2.36	0.306
One	24 (23.8)	49 (24.1)			9 (19.6)	36 (22.4)		
Multiple	50 (49.5)	92 (45.3)			29 (63.0)	82 (50.9)		
<u>HIV-negative or status unknown non-main male partners*</u>								
Zero	9 (12.3)	36 (25.7)			16 (43.2)	68 (57.6)		
Any	64 (87.7)	104 (74.3)	5.15	0.023	21 (56.8)	50 (42.4)	2.34	0.125
<u>Condomless IAI w/HIV-negative or status unknown non-main male partners*</u>								
Zero	17 (26.6)	18 (17.3)	2.05	0.151	10 (47.6)	21 (42.9)	0.14	0.713
Any	47 (73.4)	86 (82.7)			11 (52.3)	28 (57.1)		
<u>Condomless RAI w/HIV-negative or status unknown non-main male partners*</u>								
Zero	39 (60.9)	69 (67.6)	0.78	0.377	7 (33.3)	21 (42.9)	0.56	0.456
Any	25 (39.1)	33 (32.4)			14 (66.7)	28 (57.1)		
<u>HIV-positive non-main male partners*</u>								

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	HIV-negative/status unknown (n=309)		χ^2	<i>p</i>	HIV-positive (n=209)		χ^2	<i>p</i>
	40 and under n (%)	Over 40 n (%)			40 and under n (%)	Over 40 n (%)		
Zero	54 (74.0)	91 (65.9)	1.43	0.231	9 (25.0)	21 (18.1)	0.83	0.364
Any	19 (26.0)	47 (34.1)			27 (75.0)	95 (81.9)		
<u>Condomless IAI w/HIV-positive non-main male partners*</u>								
Zero	5 (27.8)	16 (35.6)	0.35	0.554	9 (33.3)	26 (27.4)	0.36	0.545
Any	13 (72.2)	29 (64.4)			18 (66.7)	69 (72.6)		
<u>Condomless RAI w/non-main male partners*</u>								
Zero	9 (50.0)	30 (66.7)	1.51	0.218	9 (34.6)	43 (45.7)	1.02	0.311
Any	9 (50.0)	15 (33.3)			17 (65.4)	51 (54.3)		

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

** Insertive anal intercourse

*** Receptive anal intercourse

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Table 3

Bivariate analyses of behavioral outcomes with female partners among BMSMW in Los Angeles, Chicago, and Philadelphia stratified by self-reported HIV status and age cohort, 2010 to 2012

	HIV-negative/status unknown (n=309)		χ^2	p	HIV-positive (n=209)		χ^2	p
	40 and under n (%)	Over 40 n (%)			40 and under n (%)	Over 40 n (%)		
<u>Number of main female partners</u> *								
Zero	28 (27.2)	29 (14.1)	7.62	0.021	15(31.9)	48(29.8)	1.51	0.469
One	40 (38.8)	94 (46.2)			23(48.9)	68(42.2)		
Multiple	35 (34.0)	82 (39.7)			9(19.2)	45(28.0)		
<u>Concurrent partnership while w/ most recent main female partner</u> *								
No	19 (25.3)	22 (12.5)	6.33	0.011	5(15.6)	14(12.4)	FET**	0.766
Yes	56 (74.7)	154 (87.5)			27(84.4)	99(87.6)		
<u>Condomless vaginal sex w/most recent main female partner</u> *								
Zero	7 (9.3)	12 (6.9)	0.44	0.541	9(28.1)	25(22.5)	0.43	0.512
Any	68 (90.7)	162 (93.1)			23(71.9)	86(77.5)		
<u>Condomless anal sex w/most recent main female partner</u>								
Zero	35 (46.7)	78 (44.8)	0.07	0.789	21 (67.7)	62 (55.9)	1.41	0.235
Any	40 (53.3)	98 (55.2)			10 (32.3)	49 (44.1)		
<u>Non-main female partners</u> *								
Zero	39 (38.2)	59 (29.2)	8.13	0.017	15 (32.6)	43 (27.4)	.85	0.654
One	27 (26.5)	37 (18.3)			15 (32.6)	48 (30.6)		
Multiple	36 (35.3)	106 (52.5)			16 (34.8)	66 (42.0)		
<u>Number of HIV-negative or status unknown non-main female partners</u> *								
Zero	12 (19.0)	36 (24.8)	0.73	0.392	9 (29.3)	60 (52.6)	5.44	0.019
Any	51 (81.0)	109 (75.1)			22 (52.6)	54 (47.4)		
<u>Condomless vaginal sex w/HIV-negative or status non-main female partners</u> *								
Zero	10 (19.6)	17 (16.0)	0.31	0.578	11 (50.0)	18 (34.6)	1.53	0.215
Any	41 (80.4)	89 (83.9)			11 (50.0)	34 (65.4)		
<u>Condomless anal sex w/HIV-negative or status unknown non-main female partners</u>								
Zero	28 (56.0)	44 (42.3)	2.54	0.110	13 (59.1)	33 (62.3)	0.07	0.797
Any	22 (44.0)	60 (57.7)			9 (40.9)	20 (37.7)		
<u>Number of HIV-positive non-main female partners</u> *								
Zero	45 (71.4)	97 (70.3)	0.03	0.865	19 (63.3)	37 (32.7)	9.31	<0.01
Any	18 (28.6)	41 (29.7)			11 (36.7)	76 (67.3)		

	<u>HIV-negative/status unknown (n=309)</u>		<u>χ^2</u>	<u>p</u>	<u>HIV-positive (n=209)</u>		<u>χ^2</u>	<u>p</u>
	<u>40 and under n (%)</u>	<u>Over 40 n (%)</u>			<u>40 and under n (%)</u>	<u>Over 40 n (%)</u>		
<u>Condomless vaginal sex w/HIV-positive non-main female partners</u>								
Zero	9 (50.0)	22 (55.0)	0.12	0.724	4 (36.4)	17 (22.7)	FET	0.451
Any	9 (50.0)	18 (45.0)			7 (63.6)	58 (77.3)		
<u>Condomless anal sex w/HIV-positive non-main female partners</u>								
Zero	10(55.6)	26(66.7)	0.65	0.418	6 (54.5)	30 (40.0)	FET	0.514
Any	8(44.4)	13(33.3)			5 (45.5)	45 (60.0)		

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

** FET-Fisher's Exact Test

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Table 4

Logistic regression analysis of behavioral characteristics comparing BMSMW over 40 years to those 40 and under stratified by self-reported HIV status, adjusted for sexual orientation and location, 2010 to 2012

	<u>HIV-negative/status unknown</u>		<u>HIV-positive</u>	
	<u>UOR (95% CI)</u>	<u>AOR (95% CI)</u>	<u>UOR (95% CI)</u>	<u>AOR (95% CI)</u>
Concurrent partner while with most recent main male partner	1.66 (0.81, 3.37)	0.75 (0.75, 3.41)	2.39 (0.99, 5.80)	2.13 (0.82, 5.53)
Condomless IAI with most recent main male partner	2.73 (1.29, 5.74)	2.44 (1.12, 5.32)	0.63 (0.26, 1.49)	0.65 (0.26, 1.62)
Any HIV-negative or status unknown non-main male partners	0.41 (0.18, 0.89)	0.37 (0.16, 0.85)	0.56 (0.26, 1.18)	0.76 (0.33, 1.71)
Concurrent partnership while w/most recent main female partner	2.37 (1.19, 4.72)	2.26 (1.10, 4.67)	1.31 (0.43, 3.95)	1.04 (0.31, 3.52)
Any HIV-negative or status unknown non-main female partners	0.73 (0.34, 1.52)	0.66 (0.31, 1.41)	0.37 (0.16, 0.86)	0.38 (0.15, 0.95)
Any HIV-positive non-main female partners	1.05 (0.54, 2.03)	1.15 (0.58, 2.27)	3.54 (1.53, 8.22)	3.03 (1.24, 7.37)

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Table 5

Logistic regression analysis of behavioral characteristics of BMSMW with age as a continuous variable adjusted for sexual orientation and location, 2010 to 2012

	<u>HIV-negative/status unknown</u>		<u>HIV-positive</u>	
	<u>UOR (95% CI)</u>	<u>AOR (95% CI)</u>	<u>UOR (95% CI)</u>	<u>AOR (95% CI)</u>
Concurrent partner while w/most recent main male partner	1.02 (0.98,1.05)	1.02 (0.97, 1.05)	1.05 (1.00, 1.09)	1.04 (0.99,1.09)
Condomless IAI w/most recent main male partner	1.07 (1.03, 1.11)	1.07 (1.03, 1.11)	0.99 (0.95,1.04)	0.99 (0.95, 1.04)
Any HIV-negative or status unknown non-main male partners	0.99 (0.95, 1.02)	0.99 (0.96,1.02)	0.97 (0.93, 1.02)	0.98 (0.94, 1.03)
Concurrent partnership while w/most recent main female partner	1.04 (1.01, 1.07)	1.04 (1.01,1.08)	1.03 (0.97, 1.09)	1.03 (0.97, 1.09)
Any HIV-negative or status unknown non-main female partners	1.00 (0.96, 1.03)	0.99 (0.97,1.03)	0.96 (0.91, 0.99)	0.96 (0.92, 1.00)
Any HIV-positive status unknown on-main female partners	0.99 (0.97, 1.02)	1.00 (0.97, 1.03)	1.06 (1.01, 1.11)	1.05 (1.00, 1.10)

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