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Sexual debut and HIV-related sexual risk-taking by birth cohort among men who have sex with men in the United States

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Abstract

Age-discordant and earlier sexual debut are risk factors for HIV among men who have sex with men (MSM). Despite differences in the sociopolitical landscape over time, there are no studies sampling participants from the United States that have examined the role of birth cohort in relations between sexual debut characteristics and sexual risk among MSM. We assessed sexual debut patterns and associations with sexual risk-taking in 812 adult MSM stratified by ten-year birth cohorts (i.e., before 1970, 1970–1979, 1980–1989, after 1990). Sexual debut characteristics differed by birth cohort. In multivariate models controlling for birth cohort, both younger age of sexual debut and younger age of anal sex debut were associated with an increased likelihood of condomless sex. Men born in the 1990s had increased odds of engaging in sexual risk regardless of sexual debut characteristics. Sexual risk reduction interventions tailored to the unique needs of young MSM are encouraged.

Keywords

MSM; HIV; sexual debut; age-discordant sexual debut; sexual risk

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INTRODUCTION

The prevalence of HIV among gay, bisexual, and other men who have sex with men (MSM) continues to increase (1). In the United States (U.S.), MSM account for 65% of new HIV infections, with young MSM (YMSM) between the ages of 13 to 24 years having elevated incidence rates compared with older MSM (2). A number of factors have been posited to explain the increasing incidence of HIV among YMSM, including decreasing age of sexual debut and participation in age-discordant sexual debut (i.e., having sex with an older partner). Both of these characteristics have been associated with an increased risk of engaging in condomless anal intercourse (C₀AI) and contracting sexually transmitted infections (STIs), including HIV (3,4).

Age of sexual debut has decreased over time in both heterosexual and MSM populations (5–7). However, MSM debut at an earlier age than self-identified heterosexuals (8), and earlier debut has been associated with increased risk for HIV infection (3,9). Historically, YMSM were less likely to debut with a partner from their current peer group (4,10), possibly due to the stigma associated with the coming out process (11) and the minority status of MSM in the general population (12). Furthermore, many YMSM report being attracted to older partners, due to a belief that older partners may be able to provide mentorship and are more stable and emotionally mature (13). For older MSM living in a youth-centric society, having a younger partner may give them a sense of power and virility as well as a means to reframe their own aging in a more positive light (13). Given these factors, YMSM were more likely to debut with an older partner (4,10). As older men are more likely than younger men to have HIV (14), partnering with older MSM heightens the risk of HIV acquisition in YMSM (4).

Age of sexual debut and age-discordant sexual debut are likely shaped by the sociopolitical context in which they occur. Different birth cohorts have distinct exposures to social changes surrounding the gay rights movement and the HIV epidemic. For example, men born prior to 1970 benefitted from the sexual revolution (15) and the emergence of the gay rights movement (16) as well as the absence of HIV during their formative sexual years. For men born in the 1970s and 1980s, the start and the peak of the HIV epidemic in the U.S. (i.e., 1981–1996) coincided with their formative years (17). For these men, the high number of AIDS-related deaths during this time and the fusion of HIV and gay-related stigma created a cohort effect that exacerbated HIV fear and worry (18). In contrast, YMSM (i.e., men born after 1990) are growing up in time in which HIV has become a manageable, chronic disease (19) and structural changes, such as the legalization of gay marriage (20), reflect a more tolerant climate regarding same-sex relationships (21). Given these historical and cultural factors, YMSM may be more likely to engage in risk behaviors due to HIV optimism or complacency (22,23). Furthermore, they may feel more comfortable coming out at earlier ages (24), which could lead to earlier sexual debuts and more opportunities to debut with age-concordant partners.

Despite differences in the sociopolitical landscape over time, we could locate no studies sampling MSM in the U.S. that have examined the role of birth cohort in the associations between age of sexual debut, age-discordant sexual debut, and sexual risk behavior.

Therefore, we sought to assess sexual debut characteristics and sexual risk-taking by birth cohort. We hypothesized that, among cohorts in which same-sex relationships became more acceptable and HIV became a more manageable, chronic disease, (1) age of sexual debut would decrease, (2) age-discordant sexual debut would become less common, and (3) sexual risk-taking would increase.

METHODS

MSM were recruited online for a cross-sectional, Internet-based survey of sexual risk and sexually explicit online media use. Recruitment and eligibility screening procedures are described in detail elsewhere (25). Participants ($N = 1,170$) were recruited via banner advertisements from MSM websites and Facebook during 2012. Eligible participants reported (1) age ≥ 18 years; (2) male sex; (3) having anal or oral sex or engaging in mutual masturbation with ≥ 1 man in the prior year; (4) accessing a MSM website ≥ 1 time in the prior year; (5) using sexually explicit online media in the past year; and (6) being a U.S. resident. At least one participant was recruited from each state in the U.S. except South Dakota. The survey was administered through the University of Washington catalyst platform. Upon completion of the ~30 minute survey, participants were offered the opportunity to enter a drawing to win one of fifteen \$50 gift certificates. Informed consent was obtained from all individual participants included in the study. All study procedures were reviewed and approved by the University of Washington Institutional Review Board.

Measures

Socio-demographics—Socio-demographic characteristics were assessed with standard formats and coded as follows: age (continuous); race/ethnicity (White, Black/African American, Other); education ($<$ associate degree, associate degree or higher); current living situation (stable housing, other); urban residence (yes, no); self-identifying as gay (yes, no); “out” to everyone or almost everyone (yes, no); and currently have a primary partner (yes, no). Stable housing was defined as living in a residence that is owned or rented by the participant. Ten-year birth cohorts were determined based on self-reported age and the year the survey was administered (before 1970 [age 43+], 1970–1979 [age 33 – 42], 1980–1989 [age 23 – 32], after 1990 [age 18 – 22]). The rationale for using decade demarcations for birth cohort is, as explained above, that individuals born during each of these birth cohorts had unique exposures to key sociopolitical movements related to the sexual revolution, gay rights, and the HIV epidemic during the formative portion of the sexual lives.

Sexually transmitted infection (STI) testing—Participants were asked their HIV serostatus; when they were last tested for HIV; if they had been diagnosed with gonorrhea, Chlamydia, or syphilis in the past three months; if they had ever been diagnosed with genital or anal herpes (herpes simplex virus or HSV) or warts (human papillomavirus or HPV); and if they had been told by a healthcare provider in the past three months that they had any STI that they could not recall the name of or they had not been asked about already in the survey. HIV and STI testing items were coded as follows: HIV-serostatus (HIV-seropositive, HIV-seronegative or unknown); HIV test within the past year (yes, no); and any STI in the past three months, including lifetime viral STIs (yes, no).

Sexual behavior—Participants were asked to report on sexual behavior that was voluntary (i.e., “not forced”). Age of sexual debut was assessed with the question, “About how old were you the first time you had sexual contact of any kind with a male? (age in years).” Partner age discordance at sexual debut was calculated using the participant’s reported age at sexual debut and the reported age of the participant’s sexual debut partner. Following established categories in the literature (26), age-discordant sexual debut was coded: same age or younger, 2–4 years older, 5+ years older. Age of anal sex debut was assessed with the question, “About how old were you the first time you had anal sex with a male? (age in years).” Number of lifetime sexual partners was also assessed (<25, 25–99, 100+). We inquired about sexual behavior in the prior three months (i.e., number of male partners, condom use during insertive or receptive anal intercourse with male partners, and number of C₀AI partners who directly told participants they were HIV-seropositive, HIV-seronegative, or who did not disclose their HIV serostatus). Composite variables for C₀AI (yes, no), serodiscordant C₀AI (yes, no), serodiscordant insertive C₀AI (yes, no), and serodiscordant receptive C₀AI (yes, no) were created using these sexual behavior characteristics and the participants’ self-reported HIV serostatus. Serodiscordant C₀AI was defined as C₀AI with a partner of discordant or unknown HIV serostatus.

Analyses

Analyses were conducted among a subset of participants ($n = 812$, 69%) who reported sexual debut between the ages of 8 and 22. These cut-offs were chosen for logistical and theoretical reasons. First, age 8 was chosen as the lower cut-off as it is one standard deviation below the average age of puberty onset for U.S. boys (27). Second, age 22 was chosen as the upper cut-off as it represents the oldest age a member of the youngest birth cohort (i.e., participants born after 1990) could report having their sexual debut due to the survey being conducted in 2012. Ages 8 to 22 also represents a key developmental period for MSM marked by significant biopsychosocial changes, including key psychosexual learning, increasing independence and opportunities to engage in risk behaviors, as well as increasing awareness of one’s same-sex attraction and corresponding negotiation of sexual identity (28,29).

To assess differences between participants who were retained for the analyses ($n = 812$, 69%) and those who reported a sexual debut outside of the specified age range ($n = 358$, 31%: <8 years old $n = 54$, >22 years old $n = 313$), chi-square tests were conducted. No significant differences were found by race/ethnicity, urban residence, primary partner status, or HIV serostatus. However, participants excluded from the analyses were more likely to be recruited from men-seeking-men websites (63% vs. 46%, $p < .001$), have a higher annual income (>\$30,000: 62% vs. 43%, $p < .001$), have an associate degree or higher education (64% vs. 58%, $p < .001$), and have stable housing (81% vs. 75%, $p < .05$). Furthermore, they were less likely to self-identify as gay (83% vs. 92%, $p < .001$) or be “out” about their sexuality (50% vs. 57%, $p < .05$).

Of the 812 MSM in the analytic sample, only 11 (1%) had missing data on one or more key variables (age of sexual debut, age of anal sex debut, age-discrepant sexual debut, any C₀AI, any serodiscordant C₀AI, any serodiscordant insertive C₀AI, serodiscordant receptive

C₀AI). To assess differences between participants with missing data versus those with complete data, Fisher's Exact Tests were conducted on the sociodemographic characteristics. No significant differences were found between those with missing versus complete data.

To assess differences by birth cohort in socio-demographics, HIV/STI testing, number of sexual partners, sexual risk behavior, and sexual debut characteristics, we conducted chi-square tests and analyses of variance. Pairwise comparisons were assessed using the Fisher-Hayter method (30). We fit multivariate logistic regression models to further assess relations between birth cohort; sexual debut characteristics; and sexual risk behaviors (i.e., C₀AI, serodiscordant C₀AI, serodiscordant insertive C₀AI, and serodiscordant receptive C₀AI). Each multivariate logistic regression model included birth cohort and one of the sexual debut variables (i.e., age of sexual debut, age-discrepant sexual debut, or age of anal sex debut) with one of the four sexual risk variables as the outcome. To account for multiple comparisons, we used an adjusted alpha ($\alpha = 0.01$) for our logistic regression models. Age of sexual debut and age of anal sex debut were entered as continuous variables. Partner age discordance at sexual debut was entered as a dummy variable. To account for confounders, we adjusted all models for recruitment source, race/ethnicity, having a primary partner, and HIV serostatus. All analyses were conducted in Stata 12.1 (31).

RESULTS

Of the 812 participants, 243 (30%) were born before 1970, 105 (13%) were born in the 1970s, 269 (33%) in the 1980s, and 195 (24%) in the 1990s. As shown in Table 1, the majority of participants were white (68%), well-educated (58% with an associate degree or higher), stably housed (75%), lived in an urban area (90%), and self-identified as gay (92%). More than half (65%) reported testing for HIV in the past year. HIV testing differed by birth cohort; men born in the 1980s reporting the highest prevalence of HIV testing in the year prior to the survey. HIV and STI prevalence were 16% and 22%, respectively; both were linearly associated with birth cohort, with the highest prevalence among participants born before 1970 and the lowest among participants born in the 1990s. Number of sexual partners (past three months and lifetime) also decreased linearly by birth cohort. In the three months prior to the survey, 61% of participants reported C₀AI, 29% reported serodiscordant C₀AI, 18% reported serodiscordant insertive C₀AI, and 21% reported serodiscordant receptive C₀AI.

Mean age of sexual debut and anal sex debut were 15.6 ($SD = 3.4$) and 17.6 ($SD = 2.8$), respectively. As shown in Figure 1, mean age of sexual debut differed by birth cohort, and followed an inverted U-shape pattern (14.6, 15.8, 16.2, and 15.9 for pre-1970, 1970s, 1980s, and 1990s birth cohorts, respectively, $F(3, 808) = 10.7, p < .001$). In pairwise comparisons, significant differences in age of sexual debut were seen between those born pre-1970 and participants born in the 1970s ($FH = 4.3, p < .05$), 1980s ($FH = 7.6, p < .05$), and 1990s ($FH = 5.8, p < .05$). Mean age of anal sex debut also differed by birth cohort, and followed an inverted U-shape pattern (17.2, 17.9, 17.8, and 17.4 for pre-1970, 1970s, 1980s, and 1990s birth cohorts, respectively, $F(3, 808) = 2.6, p < .05$). In pairwise comparisons, significant differences in age of anal sex debut were seen between those born pre-1970 and participants born in the 1980s ($FH = 3.4, p < .05$). About half (47%) of the participants reported debuting

with a male partner who was the same age or younger; 359 (44%) reported debuting with a partner who was their same age or within one year (+ or -) of their age, 21 (3%) reported debuting with an even younger partner (range -2 to -4 years). Almost a quarter (24%) reported debuting with a partner who was 2-4 years older and 30% reported debuting with a partner who was 5 or more years older. The youngest birth cohort was the least likely to report having their sexual debut with a partner who was five or more years older (Figure 2).

According to the multivariate logistic regression models controlling for birth cohort, as age of sexual debut increased, the odds of engaging in sexual risk behaviors decreased (Table 2: Models 1-4). Similarly, controlling for birth cohort, as age of anal sex debut increased the odds of engaging in sexual risk behaviors decreased (Table 2: Models 5-8). Reporting sexual debut with an older partner was not associated with engaging in sexual risk behaviors (Table 2: Models 9-12). We also created a continuous partner age-discordance variable and the results (not shown) remained unchanged. Finally, regardless of age of sexual debut, age at anal sex debut, or partner age-discrepancy at sexual debut, the odds of engaging in serodiscordant receptive C₀AI increased linearly by birth cohort, with the youngest birth cohort having the highest odds of reporting serodiscordant receptive C₀AI (Table 2: Models 4, 8, and 12).

DISCUSSION

In this large sample of sexually active MSM, we found evidence for significant birth cohort differences in sexual debut characteristics and engagement in sexual risk behaviors. Our sample was relatively HIV aware; more than half of the sample reported having been tested for HIV in the prior year, with the highest testing rate for the men born in the 1980s. The sample endorsed multiple markers of condomless sex, both behavioral (61% reported C₀AI) and biological (22% reported having an STI and 16% reported being HIV-seropositive). The prevalence of STI diagnoses, including HIV, decreased with each birth cohort. This decrease was expected because older cohorts have been sexually active for longer and have had a higher number of partners from which to acquire an infection.

Consistent with prior reports (10,26), the men in our study reported a same-sex sexual debut during mid-adolescence (average age 15.6 years) and a subsequent anal sex debut about two years later (average age 17.6 years). Our findings reveal an inverted U-shaped pattern in which the ages of sexual debut and anal sex debut are the earliest for the pre-1970s cohort, increase for the middle cohorts (1970s, 1980s), and then appear to decrease for the 1990s cohort. However, these differences vary on the order of just over a year for age at sexual debut (range 14.6-16.2) and months for age at anal sex debut (range 17.2-17.9). Further, the more recent birth cohorts were less likely to report sexually debuting with a partner who was five or more years older than them and more likely to endorse sexual risk behavior. Specifically, the odds of engaging in serodiscordant receptive C₀AI increased linearly by birth cohort, with the youngest birth cohort having the highest odds of reporting recent serodiscordant receptive C₀AI.

Both the sexual debut and the sexual risk findings may be attributable to the increasing acceptance of same-sex relationships and the decreasing salience of the HIV epidemic in the

U.S. (18,21). The decrease in age of sexual debut and increase in risk-taking among the youngest birth cohort may be related to increasing comfort with coming out at earlier ages (24) and changes in the perception of HIV from a “death sentence” to a manageable, chronic illness (19), especially in light of better treatments and the rise of pharmacologic prevention approaches (32).

The finding that earlier age of sexual debut (controlling for birth cohort) is associated with sexual risk behavior corroborates prior research, including studies conducted with MSM (33), MSM of color (3), and heterosexual women and men (34,35). Several explanations for this pattern have been proposed, including that younger individuals may be unprepared emotionally, have less power to negotiate sexual situations, or lack sexual knowledge (34). Regardless of the explanation, the consistent finding of higher rates of C₀AI for those who sexually debut at younger ages warrants public health attention and interventions to delay sexual debut seem justified.

Interestingly, at least one study of heterosexual adults in the U.S. compared earlier, later, or average age of sexual debut. This study found that the average age group fared the best; that is, they reported fewer psychosocial and sexual problems and less sexual risk. The authors concluded that there may be a “critical favorable stage” for sexual debut (34). This is an interesting counterpoint to a call to delay sexual debut as long as possible. Some MSM-specific work also found that sexual debut before age 14 was a critical cut-point for the prediction of negative consequences, including HIV acquisition (33). Research on sexual debut may need to move away from younger/older frame to determine characteristics of a healthy sexual debut.

Taken together, these findings have implications for sex education and HIV prevention for YMSM. YMSM would benefit from targeted HIV prevention efforts that include content specific to their needs (36). The majority of sexual health education curricula do not address the unique informational needs of YMSM (37). YMSM may not have health care providers or other MSM role models who can provide this information, and heterosexual parents may want to help but may be unsure of YMSM-specific needs (38). Content (YMSM-specific) and timing (early adolescence) should be considered for any sex education or HIV prevention programs which aim to decrease C₀AI or HIV among YMSM.

Another noteworthy finding was that although the more recent birth cohorts were more likely to engage in sexual risk behaviors, they were less likely to have older partners at sexual debut. About half of the men reported that their first male sexual partner was the same age or younger, and the most recent birth cohort was the least likely to report debuting with a partner five or more years older. Despite the lack of a statistically significant association between debuting with an older partner and sexual risk behaviors in our sample, the majority of research indicates that age-discordant sexual debut is associated with subsequent sexual risk behaviors, including condomless sex (4). However, the literature on this topic is mixed. One study found that age-concordant sexual debut dyads were riskier (26). Some have argued that sexual debut is a strong learning situation during which condom use or non-use is reinforced (39). Interestingly, age-discordant sexual partnerships in general

(i.e., not specific to the sexual debut partnership) do not appear to account for new HIV infections among YMSM (40,41). This topic warrants further study.

This study has several limitations. First, our design is cross-sectional and, thus, the associations should not be assumed to be causal. Second, our study enrolled only MSM who reported consuming sexually explicit online media, which could result in a biased sample; that concern can be mitigated by evidence that, in prior studies, 98–99% of online-recruited MSM report sexually explicit online media use (42,43). Third, there is disagreement about what age cut-offs should be used for sexual debut variables and for birth cohort boundaries (4,44); analyses that use different parameters might lead to a different pattern of associations. Our analyses were restricted to participants who debuted between age 8 and 22. Although the upper age ceiling is not ideal, given that older cohorts may have experienced greater sexual prejudice which could have delayed their sexual debut, it is necessary for these analyses. Specifically, without the upper age restriction, each birth cohort would have a different range of potential debut ages, which would automatically create significant differences in the average age of debut and would be a confound that biases the results. Fourth, our analytic methods involved recoding continuous variables to categorical variables; although this is a common practice for non-normally distributed risk behaviors, it does decrease statistical power (45). Finally, online assessment methods do not allow for objective verification of data, and online recruitment has the potential to oversample younger MSM, more technologically-oriented MSM, white MSM, and MSM from higher socioeconomic strata, limiting generalization to other groups of MSM. This concern is reduced by evidence that MSM, overall, are heavy users of technology (46) and that our procedures followed best practices (47). Future studies using online recruitment methods for MSM might oversample MSM of color, use more fine-grained measures, which include partner and partnership characteristics, and measure the timing of consensual sexual debut in relation to any sexual abuse or victimization (48).

In conclusion, our findings suggest that earlier sexual debut is a risk factor for HIV among MSM. Furthermore, although it appears that the prevalence of age-discordant sexual debut may be decreasing over time, the age of same-sex sexual debut and anal sex debut also appears to be decreasing. As same-sex relationships become more socially accepted and HIV is viewed as a manageable, chronic disease, development of YMSM-specific sexual curricula and risk reduction interventions are needed.

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Figure 1. Mean age of sexual and anal sex debut by birth cohort among 812 men who have sex with men in the United States

^aAnalysis of variance was used to test for equality of means.

^b $F(3,808) = 10.7, p < .001$

^c $F(3,808) = 2.6, p = .04$

Figure 2. Partner age at sexual debut by birth cohort among 812 men who have sex with men (MSM) in the United States

^aA chi-square test was used to assess differences in proportions by birth cohort; $\chi^2(6) = 12.6$, $p < .05$.

Socio-demographic, HIV/STI, and sexual behavior characteristics by birth cohort among 812 men who have sex with men (MSM) in the United States.

Table 1

	Birth Cohort					χ^2
	Total <i>N</i> = 812	<1970 <i>n</i> = 243	1970–1979 <i>n</i> = 105	1980–1989 <i>n</i> = 269	1990– <i>n</i> = 195	
Socio-demographics	n (%)	n (%)	n (%)	n (%)	n (%)	
Race/Ethnicity						34.9***
Caucasian American	553 (68)	197 (81)	72 (69)	157 (58)	127 (65)	
Black/African American	112 (14)	19 (8)	19 (18)	48 (18)	26 (13)	
Other	147 (18)	27 (11)	14 (13)	64 (24)	42 (22)	
Age, ^a m ^b (SD) ^c	34 (13.3)	52 (6.1)	38 (3.0)	26 (2.7)	20 (1.4)	2914***
Associate degree or higher	466 (58)	186 (77)	67 (64)	170 (63)	43 (22)	139***
Own or rent domicile	606 (75)	220 (91)	89 (86)	212 (79)	85 (44)	140***
Urban residence	728 (90)	217 (89)	93 (89)	243 (90)	175 (90)	0.30
Gay sexual orientation	745 (92)	223 (93)	94 (90)	249 (93)	179 (92)	0.75
“Out” to almost everyone or everyone	462 (57)	146 (60)	60 (57)	154 (58)	102 (52)	2.92
Primary partner	339 (42)	106 (44)	56 (53)	115 (43)	62 (32)	14.1**
HIV/STI testing						
HIV test past year	527 (65)	141 (58)	71 (68)	200 (74)	115 (60)	18.0***
HIV-seropositive	130 (16)	80 (33)	19 (18)	28 (10)	3 (2)	153***
Any STI past three months	173 (22)	78 (34)	25 (24)	46 (18)	24 (13)	30.3***
Number of lifetime sexual partners						283***
<25	378 (47)	36 (15)	31 (30)	145 (54)	166 (85)	
25–99	221 (27)	74 (31)	35 (33)	88 (33)	24 (12)	
100+	210 (26)	131 (54)	39 (37)	35 (13)	5 (3)	
Sexual risk behaviors in the prior 3 months						
Number of partners, ^d m (SD)	4 (7.4)	5 (6.5)	5 (8.2)	4 (9.3)	3 (3.8)	3.66*

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Socio-demographics	Birth Cohort					χ^2
	Total <i>N</i> = 812	<1970 <i>n</i> = 243	1970–1979 <i>n</i> = 105	1980–1989 <i>n</i> = 269	1990– <i>n</i> = 195	
C₀AI^e	493 (61)	135 (57)	66 (63)	177 (66)	115 (59)	5.41
Serodiscordant C₀AI	229 (29)	67 (28)	33 (32)	75 (28)	54 (28)	0.60
Serodiscordant Insertive C₀AI	143 (18)	42 (18)	18 (17)	52 (19)	31 (16)	0.99
Serodiscordant Receptive C₀AI	167 (21)	44 (19)	24 (23)	55 (21)	44 (23)	1.47

^a Analysis of variance was used to test for equality of means. $F(3,808) = 2914.7, p < .001$.

^b m = mean.

^c SD = standard deviation.

^d Analysis of variance was used to test for equality of means. $F(3,806) = 3.66, p < .05$.

^e C₀AI = condomless anal intercourse.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Multivariate logistic regression analyses assessing relations between birth cohort, sexual debut characteristics, and engagement in sexual risk behaviors among 812 men who have sex with men (MSM) in the United States.

Table 2

Models 1–4 ^a									
	C ₀ AI ^b		Serodiscordant C ₀ AI		Serodiscordant Insertive C ₀ AI		Serodiscordant Receptive C ₀ AI		
	AOR ^c	(99% CI) ^d	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)	
Birth Cohort									
Before 1970	ref		ref		ref		ref		
1970–1979	1.6	0.8 – 3.0	1.7	0.8 – 3.4	1.3	0.5 – 2.9	1.9	0.9 – 4.3	
1980–1989	2.1	1.2 – 3.7	1.7	0.9 – 3.1	1.8	0.9 – 3.6	2.0	1.0 – 4.0	
1990–	1.8	1.0 – 3.3	2.0	1.0 – 3.9	1.6	0.7 – 3.6	2.7	1.3 – 5.9	
Age at sexual debut ^e	0.90	0.85 – 0.96	0.93	0.88 – 0.99	0.92	0.86 – 0.99	0.93	0.86 – 0.99	
Models 5–8 ^a									
	C ₀ AI		Serodiscordant C ₀ AI		Serodiscordant Insertive C ₀ AI		Serodiscordant Receptive C ₀ AI		
	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)	
Birth Cohort									
Before 1970	ref		ref		ref		ref		
1970–1979	1.5	0.8 – 2.9	1.7	0.8 – 3.4	1.2	0.5 – 2.9	2.0	0.9 – 4.4	
1980–1989	2.0	1.1 – 3.4	1.6	0.9 – 3.0	1.7	0.9 – 3.4	2.0	1.0 – 3.9	
1990–	1.6	0.9 – 3.0	1.8	0.9 – 3.6	1.5	0.7 – 3.3	2.6	1.2 – 5.5	
Age at anal sex debut ^e	0.88	0.82 – 0.95	0.90	0.83–0.97	0.91	0.83–0.98	0.88	0.81 – 0.96	
Models 9–12 ^a									
	C ₀ AI		Serodiscordant C ₀ AI		Serodiscordant Insertive C ₀ AI		Serodiscordant Receptive C ₀ AI		
	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)	
Birth Cohort									
Before 1970	ref		ref		ref		ref		
1970–1979	1.3	0.7 – 2.5	1.5	0.7 – 3.0	1.1	0.5 – 2.6	1.7	0.8 – 3.7	
1980–1989	1.8	1.1 – 3.2	1.5	0.8 – 2.7	1.6	0.8 – 3.1	1.8	0.9 – 3.6	

Models 1–4 ^a									
	C ₀ AI ^b		Serodiscordant C ₀ AI		Serodiscordant Insertive C ₀ AI		Serodiscordant Receptive C ₀ AI		
	AOR ^c	(99% CI) ^d	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)	
1990–	1.6	0.9 – 2.9	1.7	0.9 – 3.4	1.4	0.6 – 3.2	2.4	1.1 – 5.2	
Partner age at sexual debut									
Same age or younger	ref		ref		ref		ref		
2–4 years older	1.4	0.8–2.3	1.5	0.9 – 2.5	1.2	0.7 – 2.2	1.6	0.9 – 2.9	
5+ years older	1.4	0.9–2.2	1.2	0.7 – 1.9	0.9	0.5 – 1.6	1.4	0.8 – 2.5	

^a Adjusted for recruitment source, race/ethnicity, having a primary partner, and HIV serostatus.

^b C₀AI = Condomless anal intercourse.

^c AOR = Adjusted odds ratio.

^d CI = Confidence interval.

^e Age at sexual debut and age at anal sex debut are continuous variables.