

# HIV Education and Sexual Risk Behaviors Among Young Men Who Have Sex with Men

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## Abstract

**Purpose:** Men who have sex with men (MSM) have nearly 80 times the lifetime risk of human immunodeficiency virus (HIV) relative to men who have sex with women only (MSW), and young MSM (YMSM) accounted for 95% of estimated HIV diagnoses among adolescents between 13 and 24 years in 2015. We aimed to evaluate HIV education and sexual risk behaviors among YMSM relative to young MSW (YMSW) and to evaluate the relationship between HIV education and YMSM sexual risk behaviors.

**Methods:** We used Youth Risk Behavior Surveillance System data from 13 states that collected information on sex of sexual contacts and on HIV education in 2011 and/or 2013. We assessed HIV education, number of sexual partners ever and in the past three months, and condom use at last sex in logistic regression analyses controlling for age, race/ethnicity, state, and year.

**Results:** YMSM were less likely to report school-based HIV education and more likely to report sexual risk behaviors relative to YMSW. HIV education was associated with reduced sexual risk behaviors among all students and with significant additional reductions in sexual risk behaviors among YMSM.

**Conclusion:** There is a need for HIV education programs to reach YMSM, who are at increased risk of HIV.

**Keywords:** education, men who have sex with men, prevention, sexual risk behavior

## Introduction

YOUNG MEN WHO have sex with men (YMSM) have a substantially elevated burden of human immunodeficiency virus (HIV) relative to young men who have sex with women only (YMSW).<sup>1</sup> YMSM accounted for 95% of estimated HIV diagnoses among adolescents between 13 and 24 years and for 27% of new HIV diagnoses among MSM in the United States in 2015.<sup>1</sup> There are also racial and ethnic disparities in the burden of HIV among MSM.<sup>2,3</sup> The disproportionate rate of HIV among YMSM relative to YMSW is explained partly by biological<sup>4,5</sup> effects that increase the risk of HIV acquisition for YMSM and by the high prevalence of HIV among the MSM with whom YMSM partner.<sup>2,6,7</sup> Stigma<sup>8</sup> and other structural factors, such as the inclusivity of sex education, may also play a role.

Prior evidence suggests that young men who have sex with both men and women (YMSMW) may also have different HIV risk and risk behaviors than young men who have sex with men only (YMSMO).<sup>9,10</sup> Understanding differences by sexual behavior groups may reveal key areas for interventions in youth. Despite the disproportionate burden of HIV among

YMSM, there is little information on whether HIV education is reaching YMSM or on YMSM sexual risk behaviors.<sup>11,12</sup> Most evidence on MSM sexual behaviors is from adults<sup>13,14</sup> and most evidence on sex education is focused on changes in sexual risk behaviors in the general population.

Schools are an ideal setting for sex education programs because school-based education has the ability to reach most adolescents. Evidence indicates that comprehensive sex education in schools can reduce a range of sexual risk behaviors, including delaying age of first sex, reducing the number of sexual partners, and increasing condom use.<sup>15,16</sup> A 2001 study also indicated that sex education that included sexual minorities was associated with greater reductions in sexual risk behaviors among sexual minority adolescents.<sup>17</sup> Even so, only 24% of U.S. public high schools (state range: 11%–56%) reported using curricula or supplementary sex education materials relevant to sexual minorities (e.g., used inclusive language) in 2014.<sup>18</sup> When school-based sex education does not reach YMSM, they may learn about sex from sexually explicit material or other sources that do not emphasize HIV prevention.<sup>19</sup> Understanding whether the HIV education and sexual behaviors of YMSM differ from those of YMSW, and the extent to which HIV education

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is associated with sexual risk behaviors among YMSM, is important for informing approaches to sex education that effectively reduce transmission of HIV and other sexually transmitted infections (STIs) to adolescents.<sup>20</sup>

The landscape for sex education and HIV prevention among YMSM has changed rapidly in recent years and since the last study on HIV education and sexual risk behaviors among sexual minority adolescents was published in 2001.<sup>17</sup> Life-prolonging HIV treatment has been available for as long as many YMSM have been alive. Newly diagnosed HIV infections are declining, which may change perceptions about HIV transmission.<sup>1</sup> There have also been cultural changes, such as increased support for sexual minority rights, that may affect sex education.<sup>21,22</sup> At the same time, mobile phones are changing sexual culture and potentially sexual risk through applications that facilitate sexual encounters, while also promoting access to information on the Internet. There have also been advances in HIV prevention, with recent studies demonstrating that daily oral pre-exposure prophylaxis (PrEP) can prevent HIV infections effectively and safely.<sup>23–27</sup>

This changing landscape suggests a need for up-to-date information on the sex education and sexual risk behaviors of YMSM to address the continuing epidemic. We chose to focus on HIV education as a particularly important component of sex education for YMSM. We investigated two main questions: (1) Do self-reported school-based HIV education or sexual risk behaviors differ among YMSM relative to YMSW and (2) is school-based HIV education associated with reduced sexual risk behaviors among YMSM?

## Methods

### Sample

We used state Youth Risk Behavior Surveillance System (YRBSS) data from all 13 states with Youth Risk Behavior Surveys (YRBS) that inquired about sex of sexual contacts and about HIV education in 2011 and/or 2013 and had weighted data.<sup>28</sup> While 2015 state YRBS data had been released at the time of the study, the 2015 YRBS wave did not include questions on HIV education. The YRBS also has a nationally representative survey, but the 2011 and 2013 national YRBS did not

include data on sex of sexual contacts. Students from states in the Northeast, Southeast, Midwest, and Southwest regions of the United States are included in the sample (Table 1).

YRBS data from each state were weighted to be representative of high school students in the state. For states that had data on sex of sexual contacts and on HIV education in both 2011 and 2013, we pooled the data from two years to increase the sample size. To account for pooling two years of data, we divided sample weights by two. For states that collected the relevant data in only one of the two study years, we included the data only for that year. The data that we combined from multiple states are representative of the students in the included states.<sup>29</sup> We restricted the analysis to students who had been sexually active to assess sexual risk behaviors. We excluded students who reported ever being forced to have sex because we could not distinguish whether self-reported sexual risk behaviors pertained to forced or consensual sex, and we would not expect students to be able to make their own decisions about sexual risk behaviors in the context of forced sex. We defined two subpopulations of students to conduct the analyses: (1) students who had any lifetime sexual partner and (2) students who had two or more lifetime partners, a population defined to make comparisons between YMSW and YMSMW, who by definition had a least one male and one female partner.

### Exposure

In our analyses of the relationships between sex of sexual contacts and the outcomes of HIV education and sexual risk behaviors, the exposure of interest was whether students were YMSM. We categorized males as YMSM if they reported sexual behavior with males only or with males and females in response to the question “During your life, with whom have you had sexual contact?” Based on the same question, we further divided YMSM into subgroups of YMSMO and YMSMW to assess risk behaviors, comparing YMSMO with YMSW with any lifetime sex partner and comparing YMSMW with YMSW with two or more lifetime sex partners. We categorized males as YMSW if they reported sexual behavior with females only. Students who indicated that they had never had sex were excluded from the analysis.

TABLE 1. OUTCOMES DATA IN STATES THAT COLLECTED DATA ON SEX OF SEXUAL CONTACTS

State	<i>Sex of sexual contacts</i>		<i>HIV education</i>		<i>Sex partners ever</i>		<i>Sex partners 3 months</i>		<i>Condom use</i>	
	2011	2013	2011	2013	2011	2013	2011	2013	2011	2013
Connecticut	x	x	x		x	x	x	x	x	x
Delaware	x	x	x	x	x	x	x	x	x	x
Florida	x	x	x		x		x		x	
Hawaii	x	x	x	x	x	x	x	x	x	x
Illinois	x	x	x	x	x	x	x	x	x	x
Kentucky		x		x		x		x		x
Maine		x		x		x		x		x
Michigan	x	x	x	x	x	x	x	x	x	x
New Hampshire	x	x	x	x	x		x	x	x	x
New Mexico		x		x		x		x		x
Ohio	x	x	x	x	x	x	x	x		x
Rhode Island	x	x	x	x	x	x	x	x	x	x
Wisconsin	x	x	x	x	x	x	x	x	x	x

“x” indicates that states collected data on the variable in the year 2011 or 2013.  
HIV, human immunodeficiency virus.

In our analyses of the relationship between HIV education and sexual risk behaviors, the exposures of interest were whether students reported receiving HIV education in school as well as a term interacting HIV education and being YMSM. Students could answer “yes,” “no,” or “not sure” in response to the question, “Have you ever been taught about AIDS or HIV infection in school?” We coded this question as a binary variable indicating whether or not students responded “yes.”

*Outcomes*

We first assessed the outcome of learning about HIV in school. We then assessed sexual risk behavior outcomes, including whether students had four or more lifetime sexual partners, whether students had three or more sexual partners in the past three months, and condom use at last sex. We ascertained the number of sexual partners based on answers to the questions, “During your life, with how many people have you had sexual intercourse” and “during the past three months, with how many people did you have sexual intercourse?” Based on student answers to these questions, we created binary variables indicating whether students surpassed four or more lifetime partners or three or more partners in the past three months, with cut points based on prior YRBS analyses of sexual behavior.<sup>30,31</sup> Students reported on condom use in response to the question, “The last time you had sexual intercourse, did you or your partner use a condom?” For YMSMW, we did not have data on the number of partners of each sex or on whether condom use at last sex pertained to a male or female partner.

*Analyses*

In all analyses, we used linearized standard errors that accounted for the multistage sampling design. We first described the sample, adjusting for the sampling design with linearized standard errors as recommended for the YRBS.<sup>28</sup> We then assessed whether HIV education and risk behaviors differed between YMSM and YMSMO relative to YMSW among students with any lifetime sexual partner, or between YMSMW and YMSW among students who had two or more lifetime sex partners. For each of these analyses, we estimated multiple logistic regression models controlling for age, race/ethnicity, state, and year. The YRBS does not include information on individual student socioeconomic status. To highlight potentially intersecting disparities, we also reported information on racial and ethnic differences in HIV education and sexual risk behaviors.

Next, we assessed the relationship between HIV education and sexual risk behaviors through an additional set of logistic regression analyses. We assessed both HIV education and a term interacting HIV education with being YMSM to estimate how the relationship between HIV education and sexual risk behaviors among YMSM compared to that of the general population of male high school students. We again controlled for age, race/ethnicity, state, and year and estimated linearized standard errors that accounted for the multistage sampling design. For this analysis, we did not further divide YMSM into YMSMO and YMSMW because we had limited power due to the small sample sizes of the subgroups.

*Ethics statement*

The Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) determined that this study was ex-

empt in decision FWA #00000287. We used only deidentified, delinked data. The Centers for Disease Control and Prevention (CDC) IRB approves the national YRBS and determined that a YRBS conducted by a state is public health practice rather than research. Decisions to seek IRB approval, and whether to seek parental permission, are based on state procedures. Students completed the anonymous questionnaires in classroom settings.

**Results**

A total of 30,617 adolescent males participated in the 2011 and 2013 YRBS in the 13 states that collected information on both sex of sexual contacts and HIV education. Of these males, 17,606 (adjusted mean [AM]: 58.2%) reported ever having sex, 844 (AM: 6.93%) were excluded because they reported having been forced to have sex, and 390 (AM: 2.2%) were excluded because they did not report their age or race. Of 16,372 participants remaining, 15,337 (AM: 94.1%) reported sex exclusively with females, 549 (AM: 2.9%) reported sex exclusively with males, and 486 (AM: 3.0%) reported sex with both males and females. We describe the study population by sex of sexual contacts in Table 2. The sample was predominantly non-Hispanic White, with AMs of 62% of YMSM and 66% of YMSW reporting that they were White. Approximately half of YMSM and YMSW were aged 17 or older and half were aged 16 or younger.

We summarize differences in HIV education and in sexual risk behaviors among YMSM, YMSMO, and YMSMW relative to YMSW in Table 3. Relative to 90% of YMSW, just 84% of YMSM reported learning about HIV in school (adjusted odds ratio [AOR] 0.63, 95% confidence interval [CI]: 0.47–0.85). Lower rates of HIV education were particularly driven by YMSMW, with 81% of YMSMW reporting receiving HIV

TABLE 2. CHARACTERISTICS OF YOUNG MEN WHO HAVE SEX WITH MEN AND YOUNG MEN WHO HAVE SEX WITH WOMEN PARTICIPANTS

	YMSM		YMSW	
	%	95% CI	%	95% CI
Race/ethnicity				
White	62.1	56.9–67.4	65.6	62.5–68.7
Black	16.5	11.5–21.4	16.3	13.3–19.3
Hispanic	13.9	10.8–17.0	12.5	11.4–13.5
Other race	7.5	5.6–9.5	5.6	5.2–6.1
Age				
14 or younger	6.7	4.6–8.8	6.1	5.3–7.0
15	18.8	14.6–22.9	19.9	18.4–21.4
16	24.2	19.9–28.5	26.6	25.1–28.1
17	28.3	23.7–32.9	27.9	26.4–29.4
18 and older	22.0	16.9–27.2	19.4	17.6–21.1
Grade				
9 <sup>th</sup>	18.8	14.4–23.2	19.8	17.5–22.0
10 <sup>th</sup>	22.2	17.9–26.5	24.9	22.7–27.2
11 <sup>th</sup>	30.1	25.1–35.2	27.2	25.1–29.4
12 <sup>th</sup>	28.9	23.6–34.1	28.2	25.8–30.5
Observations	1,035		15,337	

We used Centers for Disease Control and Prevention-specified weights making data representative of high school students in each state.

CI, confidence interval; YMSM, young men who have sex with men; YMSW, young men who have sex exclusively with women.

TABLE 3. HUMAN IMMUNODEFICIENCY VIRUS RISK BEHAVIORS AMONG HIGH SCHOOL STUDENTS

	<i>Multivariable analysis</i>		
	%	AOR	95% CI
<b>Taught about HIV in school</b>			
Any lifetime sex partners: YMSM, YMSMO, and YMSW		<i>N</i> = 16,372	
YMSW	89.7		Ref.
YMSM	84.1	0.63***	0.47–0.85
YMSMO	86.8	0.80	0.54–1.19
<b>Race/ethnicity</b>			
Non-Hispanic White	91.6		Ref.
Non-Hispanic Black	83.9	0.49***	0.39–0.61
Hispanic	86.2	0.59***	0.49–0.71
Other race/ethnicity	86.0	0.59***	0.46–0.76
≥2 lifetime partners: YMSMW and YMSW		<i>N</i> = 11,776	
YMSW	88.8		Ref.
YMSMW	81.1	0.50***	0.35–0.71
<b>Four or more lifetime sex partners</b>			
Any lifetime sex partners: YMSM, YMSMO, and YMSW		<i>N</i> = 10,928	
YMSW	29.8		Ref.
YMSM	35.4	1.20	0.88–1.65
YMSMO	22.4	0.57**	0.36–0.91
<b>Race/ethnicity</b>			
Non-Hispanic White	23.8		Ref.
Non-Hispanic Black	46.9	3.01***	2.40–3.77
Hispanic	36.1	1.87***	1.59–2.21
Other race/ethnicity	32.4	1.63***	1.34–1.98
≥2 lifetime partners: YMSMW and YMSW		<i>N</i> = 6,553	
YMSW	48.9		Ref.
YMSMW	49.4	1.46*	0.98–2.18
<b>Three or more sex partners in past 3 months</b>			
Any lifetime sex partners: YMSM, YMSMO, and YMSW		<i>N</i> = 11,241	
YMSW	5.4		Ref.
YMSM	14.9	2.93***	1.91–4.51
YMSMO	4.6	0.78	0.39–1.56
<b>Race/ethnicity</b>			
Non-Hispanic White	3.9		Ref.
Non-Hispanic Black	10.5	2.71***	2.04–3.59
Hispanic	8.7	2.13***	1.63–2.79
Other race/ethnicity	6.2	1.50***	1.04–2.17
≥2 lifetime partners: YMSMW and YMSW		<i>N</i> = 6,884	
YMSW	8.7		Ref.
YMSMW	25.8	4.6***	2.76–7.53
<b>Condom use at last sex</b>			
Any lifetime sex partners: YMSM, YMSMO, and YMSW		<i>N</i> = 10,714	
YMSW	72.0		Ref.
YMSM	48.9	0.38***	0.29–0.51
YMSMO	48.7	0.37***	0.24–0.58
<b>Race/ethnicity</b>			
Non-Hispanic White	69.9		Ref.
Non-Hispanic Black	75.4	1.24*	0.99–1.58
Hispanic	68.6	0.91	0.78–1.08
Other race/ethnicity	70.9	1.04	0.84–1.29
≥2 lifetime partners		<i>N</i> = 6,548	
YMSW	70.0		Ref.
YMSMW	49.1	0.36***	0.25–0.53

The *N* for each analysis differs based on the states and years in which the Youth Risk Behavior Surveys included each outcome question. We conducted logistic regression analyses controlling for race/ethnicity, age, state, and year and using Centers for Disease Control and Prevention-specified weights to make data representative of high school students in each state. HIV education and sexual risk behaviors for YMSMW were computed relative to YMSW with two or more lifetime sexual partners because YMSMW must have had at least two sex partners to have had sexual contact with both sexes.

\* $P < 0.1$ , \*\* $P < 0.05$ , \*\*\* $P < 0.01$ .

AOR, adjusted odds ratio; YMSW, young men who have sex exclusively with women; YMSM, young men who have sex with men; YMSMO, young men who have had sex with men only; YMSMW, young men who have sex with men and women; HIV, human immunodeficiency virus.

TABLE 4. HUMAN IMMUNODEFICIENCY VIRUS EDUCATION AND SEXUAL RISK BEHAVIORS AMONG YOUNG MEN WHO HAVE SEX WITH MEN

	<i>M%</i>	<i>AOR</i>	<i>95% CI</i>
Four or more lifetime sex partners			
No HIV education	39.4	Ref.	
HIV education	29.0	0.77**	0.63–0.95
YMSW	29.8	Ref.	
YMSM	35.4	3.22***	1.45–7.17
YMSM × No HIV education	68.7	Ref.	
YMSM × HIV education	29.6	0.31***	0.13–0.75
Observations			<i>N</i> = 10,928
Three or more sex partners in past 3 months			
No HIV education	13.6	Ref.	
HIV education	5.0	0.47***	0.33–0.66
YMSW	5.4	Ref.	
YMSM	14.9	7.06***	2.98–16.76
YMSM × No HIV education	50.8	Ref.	
YMSM × HIV education	8.6	0.27**	0.10–0.75
Observations			<i>N</i> = 11,241
Condom use at last sex			
No HIV education	64.3	Ref.	
HIV education	71.5	1.26**	1.01–1.56
YMSW	72.0	Ref.	
YMSM	48.9	0.12***	0.07–0.24
YMSM × No HIV education	20.5	Ref.	
YMSM × HIV education	54.3	3.65***	1.77–7.55
Observations			<i>N</i> = 10,714

The *N* for each analysis differs based on the states and years in which the Youth Risk Behavior Surveys included each outcome question. We conducted logistic regression analyses controlling for race/ethnicity, age, state, and year and using Centers for Disease Control and Prevention-specified weights to make data representative of high school students in each state. We estimated interaction terms for HIV education and YMSM; these estimates reflect additional relationships between HIV education and sexual risk behaviors among YMSM, in addition to the relationship between HIV education and sexual risk behaviors in the general population of young men. \*\**P* < 0.05, \*\*\**P* < 0.01. YMSM, young men who have sex with men; YMSW, young men who have sex exclusively with women; HIV, human immunodeficiency virus.

education in school (AOR: 0.50, 95% CI: 0.35–0.71). YMSMW had greater odds of having three or more sexual partners in the past three months (AOR 4.6, 95% CI: 2.76–7.53), with 26% of YMSMW reporting three or more partners relative to 9% of YMSW who had two or more lifetime sex partners. Less than half of YMSM, including both YMSMO and YMSMW, reported condom use at last sex, relative to 72% of YMSW (AOR 0.38, 95% CI: 0.29–0.51). There was not a statistically significant difference in the odds of having four or more lifetime partners between YMSMW and YMSW with two or more lifetime sex partners (AOR 1.46, 95% CI: 0.98–2.18), while YMSMO had lower odds of having four or more lifetime sex partners (AOR: 0.57, 95% CI: 0.36–0.91). Relative to non-Hispanic White students, students who were non-Hispanic Black, Hispanic, and of other race or ethnicity were less likely to report HIV education and more likely to report four or more lifetime sexual partners and three or more sex partners in the past three months. There were no racial or ethnic differences in condom use at last sex.

We summarize the results of the relationship between school-based HIV education and sexual risk behaviors in Table 4. Self-reported school-based HIV education was associated with significant reductions in the odds of male adolescents having four or more lifetime sexual partners (AOR: 0.77, 95% CI: 0.63–0.95) and having three or more sexual

partners in the past three months (AOR: 0.47, 95% CI: 0.33–0.66), as well as with significantly increased odds of condom use among adolescent males (AOR: 1.26, 95% CI: 1.01–1.56). School-based HIV education was also associated with significant further reductions in the odds of YMSM having four or more lifetime sexual partners (AOR 0.31, 95% CI: 0.13–0.75) and in having three or more sexual partners in the past three months (AOR 0.27, 95% CI: 0.10–0.75) and with significantly increased odds of using a condom at last sex (AOR 3.65, 95% CI: 1.77–7.55).

**Discussion**

YMSM reported lower rates of school-based HIV education than YMSW. YMSM also reported more risky sexual behaviors, including lower condom use at last sex; less than half of YMSM reported using a condom at last sex, relative to 72% of YMSW. In addition to lower condom use, YMSMW had greater odds of having three or more sex partners in the past three months. There were also racial disparities in HIV education and in numbers of sexual partners ever and in the past three months. Intersectional disparities affecting racial or ethnic minorities and YMSM may contribute to particularly high rates of HIV among racial and ethnic minority YMSM.<sup>1,2</sup> Riskier sexual behaviors could exacerbate biological and sexual

network factors that increase the risk of HIV transmission among YMSM. School-based HIV education was associated with significantly reduced sexual risk behaviors among all adolescent males, and with additional significant reductions in sexual risk behaviors among YMSM.

Lower reported HIV education among YMSM, particularly YMSMW, relative to YMSW may reflect that sex education is often not inclusive of sexual minority students.<sup>18</sup> These findings are consistent with prior research indicating that YMSM do not feel that sex education materials designed for the general population are pertinent to their needs.<sup>17,32,33</sup> The CDC's School Health Profiles report indicates that just 24% of schools reported providing curricula or supplementary material on safe sex for sexual minorities.<sup>18</sup> Lower levels of learning about HIV in school among YMSM may partly explain lower condom use among YMSMO and YMSMW and greater numbers of sexual partners among YMSMW. Other factors, such as social norms or different ways of meeting partners, may also contribute to differences between YMSM and YMSW sexual risk behaviors.

Our findings that YMSM were less likely to report HIV education and that receiving HIV education was associated with reduced sexual risk behaviors among YMSM reflect a need to better ensure that HIV education reaches YMSM. There is a large body of evidence supporting the efficacy of school-based sex education programs for reducing sexual risk behaviors,<sup>15,16,34,35</sup> and school-based programs have the advantage of reaching most children.<sup>32</sup> Our findings are also consistent with a 2001 study indicating that HIV education was associated with reduced sexual risk behaviors among sexual minorities in Massachusetts.<sup>17</sup> Given the substantially elevated burden of HIV and other STIs among YMSM, it is especially important to reach YMSM with sex education that includes information on HIV and STI transmission and prevention, including with PrEP, in the context of sex between two males.<sup>36</sup> Including information on YMSM sexual health in sex education classes may also normalize same-sex sexual behavior and reduce stigma that can come from excluding marginalized populations.<sup>37</sup>

Historically, sex education and sexual orientation have been highly politicized.<sup>38,39</sup> Seven states currently ban positive discussion of same-sex sexual behavior or orientation by school teachers or staff members,<sup>40</sup> and three states require inclusion of negative information about sexual minorities in sex education.<sup>41</sup> Efforts to make sex education more inclusive of sexual minorities are likely to face opposition.<sup>42</sup> Despite the challenges, nine states mandate that sex education be inclusive of sexual minorities without mandating negative coverage,<sup>41</sup> demonstrating that inclusive sex education is feasible.

### Limitations

Our study has some limitations but also provides important and novel evidence on differences in YMSM HIV education and sexual risk behaviors. Limitations include that there may be unmeasured differences in student or school characteristics that affect both exposure to HIV education and sexual risk behaviors. For instance, the YRBSS data that we used did not include a measure of socioeconomic status. The data did not include detailed information on HIV education, including whether students learned about HIV prevention or the class in

which students learned about HIV. The data also did not include detailed descriptions of sexual behaviors. For adolescent males with both male and female partners, we could not assess whether the number of total partners, partners within the past three months, or condom use at last sex pertained to male or female partners; although the differences we found in HIV education and in sexual risk behaviors among YMSM are relevant regardless of whether sex partners were male or female.

The generalizability of the study is also limited because only 13 of 50 states collected data on both the sex of adolescent sexual contacts and HIV education; the study results are representative in these states, but not the entire country. We also excluded participants who reported ever being forced to engage in sex because we could not distinguish whether sexual risk behaviors reported by these students occurred in the context of forced or consensual sexual relationships. Consistent with recent findings from the 2015 nationally representative YRBS,<sup>30</sup> YMSM reported elevated rates of being forced to have sexual intercourse. More research is necessary to determine why YMSM experience elevated rates of forced intercourse and to inform interventions to reduce forced sexual intercourse among YMSM. While these are significant limitations, evidence that YMSM report lower levels of HIV education and that HIV education was significantly associated with reduced sexual risk behaviors among YMSM is important given the high and rising rates of HIV among YMSM. Our results suggest that there may be important differences in HIV education and sexual risk behaviors between YMSM and YMSW.

### Conclusion

Although YMSM made up more than 95% of HIV diagnoses among individuals between the ages of 13 and 24 years in 2015,<sup>1</sup> YMSM reported being less likely to receive HIV education and more likely to engage in sexual risk behaviors. YMSM had particularly lower odds of reporting condom use at last sex, an alarming finding given the high and increasing rates of HIV transmission among YMSM.<sup>1</sup> HIV education was associated with reduced sexual risk behaviors among all students, and with significant additional reductions in sexual risk behaviors among YMSM. Reaching YMSM with school-based sex education that incorporates relevant information on condom use, PrEP, and elevated HIV risk among YMSM could play an important role in reducing sexual risk behaviors and reducing HIV transmission.

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### Disclaimer

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### Author Disclosure Statement

No competing financial interests exist.

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