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# Association between HIV/AIDS Education and Reduced Risky Sexual Behaviors amongst African American Adolescents living in the United States in 2013

Jasmine A. Rockwell

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## ABSTRACT

### Association between HIV/AIDS Education and Reduced Risky Sexual Behaviors amongst African American Adolescents living in the United States in 2013

By

Jasmine A. Rockwell

November 30, 2016

**Purpose:** Adolescent contraction of HIV and other sexually transmitted infections (STIs) is a major public health problem in the United States. Sex education is usually regarded as effective in increasing HIV/AIDS knowledge and helps to lead to a reduction in risky sexual behaviors. Yet, there are still concerns whether sex education will actually increase sexual behavior in adolescents. According to the CDC, in 2010, adolescents aged 13-24 accounted for an estimated 26% of all new HIV infections in the United States with African American adolescents accounting for an estimated 57% (7,000) of all new HIV infections among youth. There is a critical need to understand if sex education in schools can help adolescents reduce risky sexual behaviors. The objective of this study is to explore the association between HIV/AIDS education and reduced risky sexual behaviors amongst African American adolescents living in the United States in 2013 using the 2013 Youth Risk Behavior Survey (YRBS).

**Methods:** A cross-sectional study was conducted using data from the YRBS. The participants include 9<sup>th</sup> through 12<sup>th</sup> grade public or private high school students in the United States who have taken 2013 National Youth Risk Behavior Survey (YRBS) in school. The YRBS is a national school-based survey held by CDC and state, territorial, tribal, and local surveys conducted by state, territorial, and local education and health agencies and tribal governments. A total of 2880 African American adolescents and 5382 White American adolescents were included in the study.

**Results:** A total of five outcomes were assessed: had sex before 13, had sex with 4 or more people in life, used alcohol/drugs last time had sex, used condom last time had sex, and risky sexual behavior which combined the other 4 outcomes. The primary exposure variable was whether participants received HIV/AIDS education at School. When looking at the multivariable model for the association between engaging in risky sexual behavior and other participant characteristics for African American adolescents and White American Adolescents, having 5 or more drinks within the last 30 days (AOR = 2.52, 95% CI: 1.91, 3.33) and using marijuana one or more times in the last 30 days (AOR = 3.58, 95% CI: 2.68, 4.77) were significantly associated with risky sexual behavior, after adjusting for all covariates in the model. Also, adolescent females (AOR = 0.62, 95% CI: 0.48, 0.79) were more likely than males and African American adolescents (AOR = 1.63, 95% CI: 1.28, 2.18) were more likely than White adolescents to engage in risky sexual behaviors after adjusting for all variables in the model. Age and ever taught

about HIV/AIDS at school were not significantly associated with risky sexual behavior, after adjusting for all covariates.

**Conclusions:** There was not an association found between receiving HIV/AIDS education in school and reduced risky sexual behaviors. Although this study did not find evidence that HIV/AIDS education in school can reduce risky sexual behavior in African American adolescents when compared amongst each other or when compared to White American Adolescents, the literature has shown numerous examples that HIV/AIDS education is effective in reducing risky sexual behaviors. There needs to be further studies that exam how in depth educators are going when describing HIV/AIDS risk factors in sex education classes. Improved school-based HIV/AIDS education classes will yield better results in future studies.

Keywords: Adolescents; HIV/AIDS education; Risky Sexual Behaviors; African Americans

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amongst African American Adolescents living in the United States in 2013

By

Jasmine A. Rockwell

B.S., University at Buffalo

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APPROVAL PAGE

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By

Jasmine A. Rockwell

Approved:

Richard Rothenberg, MD, MPH

Committee Chair

Rhonda Conerly Holliday, Ph.D., M.A.

Committee Member

11-30-2016

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## Author's Statement Page

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Jasmine A. Rockwell

Signature of Author

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## **Introduction**

### *Background*

Adolescence (10-19 years) is a time where many individuals begin to mature and discover their sexuality and develop an increased need for access to sexual and reproductive health information and services. Sex education is regarded as being an effective tool in increasing HIV/STI knowledge and leads to a reduction in risky sexual behavior. Yet, there are concerns whether sex education can lead to earlier sex initiation, greater frequency of sexual activity, and potentially lead to a reduction in use of protection during sexual activity [17].

Adolescent HIV/AIDS is its own epidemic and needs to be controlled and managed apart from the adult HIV epidemic [13]. In 2010, adolescents aged 13-24 accounted for an estimated 26% of all new HIV diagnoses in the United States with African American adolescents accounting for an estimated 57% (7,000) of all new HIV infections among youth. At the end of 2012, there were an estimated 62,400 adolescents living with HIV in the United States with 32,000 living with undiagnosed HIV infection [8].

The lack of knowledge on HIV and how it spreads seems to be one major factor leading to a large number of adolescents contracting the virus [3]. Out of all racial/ethnic groups, African American youth have the most severe burden of HIV in the United States. African Americans also account for a higher proportion of new HIV infections, people living with HIV, and of those diagnosed with AIDS [1]. According to the literature, this is due to the fact African American adolescents are more likely to have sex at an earlier age and to have more sexual partners. Therefore, these risky

sexual behaviors put them at an increased risk of contraction of HIV [11]. School-based HIV/AIDS education classes are a way to help reduce risky sexual behaviors and ultimately reduce the burden of disease in the African American adolescent population.

### *Purpose of Study*

The objective of this study is to explore the association between HIV/AIDS education and reduced risky sexual behavior amongst African American adolescents living in the United States in 2013 using the 2013 Youth Risk Behavior Survey (YRBS).

### *Research Question*

- Does receiving HIV/AIDS education in school reduce risky sexual behavior amongst African American adolescents living in the United States in high school in 2013?

### *Hypothesis*

- African American adolescents who have received HIV/AIDS education in school will be less likely to engage in risky sexual behavior compared to African American adolescents who have not received HIV/AIDS education in school.

## **Review of the Literature**

### *Risky Sexual behaviors*

Majority of boys and girls living in countries with the HIV epidemic do not have an understanding of the virus and girls tend to have less of an understanding than boys [9]. The lack of applicable information regarding having protected sex and low knowledge related to outcomes of risky sexual behavior, including unplanned pregnancy and transmission of STIs, were found to be accurate indicators of risky sexual behaviors among African American adolescents. Sexual engagements at a

younger age may place youth at increased risk for HIV contraction. This is the likely cause for low voluntary HIV testing among adolescents with early new infections [22]. Also, early sexual debut may be costly and cause a chain of events resulting in instant negative outcomes [10]. Factors that have been identified among African American adolescents as contributing to risky sexual behavior include substance use and level of knowledge and information on sex and STIs [11].

### *Substance Use*

Substances, such as alcohol, marijuana, and other drugs, produce impaired judgments and lowered inhibitions and can lead to engagement in risky sexual behavior. When use of alcohol was reported, an increased probability of sexual behavior was found in both African American males (96%) and African American females (85%) [14].

Alcohol use is also associated with sexual activity. The literature found that girls 15 years of age who never drank were almost 100% likely to be virgins compared to the observation that 15-year-old girls who drank every day were less than 20% likely to be virgins [6]. Additionally, adolescents who used alcohol or drugs were more likely to engage in sexual activity that put them at greater risk for contraction of STI/HIV and unplanned pregnancy [2].

### *HIV/AIDS education*

Sex education that includes HIV interventions can positively promote the adoption of protective sexual behaviors among adolescents [5]. School-based HIV/AIDS education programs are important and efficient ways for adolescents to obtain knowledge, and change attitudes and behavior about sex-related health issues. School-

based HIV/AIDS education programs can effectively reduce adolescent risky behaviors including delaying initiation of sex, frequency of sex, number of new partners, incidence of unprotected sex, STIs and pregnancy rates; and increase condom and contraception usage among sexually active youth [12].

When looking at a pilot study conducted to test a group-based HIV primary prevention intervention for young men who have sex with men (MSM) to evaluate its initial efficacy, feasibility, and acceptability. The study population consisted of 101 adolescent MSM ages 16-20 years old. The authors used a randomized control trial and placed participants into two different groups: Group 1- Intervention group (MyPEEPS)- participated in a highly interactive program personalized to young MSM ages 16-20. Participants were educated on modes of HIV transmission, increases in condom use, how to increase safe sex-related communication, generate situation-specific risk reduction strategies, and increase awareness about the influence of substance use on sexual risk; Group 2- control group- participated in a non-interactive, lecture-based program. Social cognitive and sexual risk outcomes were assessed at baseline, 6-, and 12-weeks post-intervention.

Results from this study found that during the follow-up period, intervention participants were less likely than controls to engage in any sexual activity under the influence of alcohol or drugs (OR = 0.35; 95 % CI 0.10–1.19, p = .093), and unprotected sex under the influence of alcohol or drugs (OR = 0.21; 95 % CI 0.04–1.13, p = .069) [7].

Another study was conducted to test the effects of a theory-based, middle school pregnancy, HIV, and STI prevention program entitled *It's Your Game: Keep it Real (IYG)*, in delaying sexual behavior. The study population consisted of students from 10

different middle schools from a large urban area in Southeast Texas. The authors used a RCT design. The IYG intervention group (n=349) received 12 seventh-grade and 12 eighth-grade 45 min lessons that combine group-based classroom activities with computer-based instructions and journaling. The control group (n=588) received their routine health classes. Ninth-grade follow up surveys were given to all participants. Results of this study showed almost one-third (29%) of students in the control group initiated sex by ninth grade when compared to approximately one-quarter (23.4%) of the intervention group. Students in the control group were 1.29 times more likely to initiate sex by ninth grade than those in the intervention group [16].

A randomized control trial study was reviewed to assess the short and longer-term impacts of a skills-based HIV, STI, and pregnancy prevention curriculum and service learning. The study included a four-arm experimental design involving 47 classrooms (765 youth) from continuation high schools. Classrooms were randomly assigned to one of four groups including: (1) service learning exclusively; (2) HIV, STI, & pregnancy prevention only; (3) HIV/STI/pregnancy education and service learning; or (4) an attention control curriculum. Each intervention included 32 hours of instruction, administered two to three times a week during school hours. The students completed 3 surveys over 18 months [4]

Results were similar to the previously discussed studies. Those who participated in HIV/STI/ pregnancy prevention education were less likely to engage in vaginal intercourse without a condom [(OR) = .58, p = .04], and significantly reduced exposure to risky sexual engagements when compared to the controls who did not receive the education. All of the studies have had similar results and have provided evidence that

sex education that includes HIV/AIDS education can be effective in reducing risky sexual behaviors for adolescents [4].

Results from the randomized control trials revealed that HIV intervention groups were more likely than the control groups to report consistent condom use, and had fewer engagements in unprotected vaginal intercourse compared to control groups. Also, HIV intervention groups had higher HIV prevention knowledge, and more positive feelings toward condom use than control groups. The literature has shown that sex education can be a key factor in reducing risky sexual behavior in adolescents. This study aims to support current literature's findings by exploring the association between HIV/AIDS education and reduced risky sexual behavior amongst African American adolescents on a national level through the use of the National YRBS survey.

## **Methods**

### *Participants*

A cross-sectional study was conducted to examine the relationship between receiving HIV/AIDS education in school and reduced risky sexual behaviors amongst African American adolescents living in the United States in 2013 using secondary data from the 2013 National Youth Risk Behavior Survey (YRBS). The Youth Risk Behavior Surveillance System (YRBSS) monitors six types of health-risk behaviors that contribute to the leading causes of death and disability among adolescents and adults. Sexual behaviors related to unintended pregnancy and sexually transmitted diseases, including HIV infection and alcohol and other drug use are among those six behaviors that are monitored. YRBSS includes a national school-based survey held by CDC and state, territorial, tribal, and local surveys conducted by state, territorial, and local education and health agencies and tribal governments [21].



Those with missing data for the survey question “Have you ever been taught about AIDS or HIV infection in school?” were excluded from the dataset to give a total sample size of 8,262 adolescents students. This sample size includes 2880 African American adolescents and 5382 White American adolescents. The participants include 9<sup>th</sup> through 12<sup>th</sup> grade public or private high school students in the United States who have taken 2013 YRBS Survey in school [21].

Participant characteristics include race, age, gender, if the participant had five or more drinks in the last 30 days, and/or used marijuana one or more times in the last 30 days. The primary outcomes used were whether a participant engaged in risky sexual behaviors including if they had sex before 13, had sex with 4 or more people in life, used alcohol/drugs last time they had sex, and/or if they used a condom the last time they had sex. The primary exposure was if the participant was ever taught about HIV/AIDS at school.

Race only includes African Americans and White Americans with White being the referent group. Age was grouped as either 15 years or younger or 16 years or older. For this study, 15 years or younger was considered the referent group because this group of adolescents are less likely to engage in risky sexual behaviors compared to 16 years or older [8].

Gender is listed as either male or female with male being the referent group. Adolescent females are at higher risk for contracting HIV compared to adolescent males and considered more likely to engage in risky sexual behaviors [19]. Therefore, males were identified as the referent group. Participants were asked if they had five or more drinks in the last 30 days. Responses include “yes” or “no” with “yes” being the referent

group. Adolescents who drink alcohol are more likely to engage in risky sexual activities making a response of “no” the referent group [11]. Participants were asked if they used marijuana one or more times in the last 30 days. Responses include “yes” or “no” with “yes” being the referent group. Adolescents who use marijuana are more likely to engage in risky sexual activities making a response of “no” the referent group [11]

The primary exposure in this study is if the participant has received HIV/AIDS education at school. Responses include “yes” or “no” with “yes” being the referent group. If the hypothesis were true, those who have received HIV/AIDS education would be less likely to engage in risky sexual activities hence those who answered, “yes” to receiving HIV/AIDS education are considered the referent group.

One of the primary outcomes is if the participant had sex before the age of 13. If the hypothesis were true, those who have received HIV/AIDS education would be less likely to have sex before the age of 13 compared to those who did not receive HIV/AIDS education and therefore “no” would be considered the referent group. Another outcome is have you had sex with 4 or more people in life with responses being “yes” or “no”. If the hypothesis is true, those who have received HIV/AIDS education would have lower sexual partners than those who did not receive HIV/AIDS education and therefore “no” would be considered the referent group. Another outcome is alcohol/drug usage during last time had sex with responses being “yes” or “no”. If the hypothesis is true, those who receive HIV/AIDS education would be less likely to use alcohol/drugs during sex and would make “no” the referent group. Another outcome is condom usage during last time had sex with responses being “yes” or “no”. If the hypothesis were true, those who have received HIV/AIDS education would be more likely to use a condom during sex

therefore making “yes” the referent group. The last outcome combines all four of the other outcomes. If a participant has at least of three of the four outcomes they are considered risky and placed in the “yes” category for risky sexual behavior. If they have less than three outcomes they are placed in the “no” category for risky sexual behavior. “No” is considered to be the referent group.

### *Statistical Analysis*

Analyses were performed using SAS 9.3 [15]. Charts were created using Excel. Using SAS Proc Logistic, crude odds ratios (CORs) and 95% confidence intervals (CIs) were calculated to evaluate the association of HIV/AIDS education and other participant characteristics among African American and White American adolescents separately. SAS Proc Freq was used to calculate the frequency of HIV/AIDS education and the frequency of risky sexual behaviors among African American adolescents and White American adolescents separately. SAS Proc Logistic was used to create multivariable models to estimate the associations between each risky sexual behavior outcome and other participant characteristics. SAS Proc Logistic was used to create Adjusted odds ratios (AORs) and 95% CIs that excluded missing data for any outcome variable. This was done to see the effect of HIV/AIDS education together with the other covariates of interest for African American and White American adolescents separately and combined.

## **Results**

The frequency of HIV/AIDS education amongst African American and White adolescents varied across participant characteristics (Table 1 and Table 2). Out of the African American participants, 2352 (81.67%) were ever taught about HIV/AIDS in

school and 528 (18.33%) were not (Table 1). Of the White American participants, 4702 (87.37%) were ever taught about HIV/AIDS in school and 680 (12.63%) were not (Table 2). The comparison of HIV/AIDS education amongst African American adolescents and White adolescents can be seen in Chart 1.

Of the African American adolescents who were ever taught about HIV/AIDS in school, 132 (5.60%) engaged in the outcome risky sexual behavior and 831 (94.40%) did not. Of the African American adolescents who did not learn about HIV/AIDS in school, 25 (4.73%) engaged in the outcome risky sexual behavior and 163 (95.26%) did not (Table 1). Of the White American adolescents who were ever taught about HIV/AIDS in school, 157 (3.34%) engaged in the outcome risky sexual behavior and 1421 (96.66%) did not. Of the White American adolescents who did not learn about HIV/AIDS in school, 30 (4.41%) engaged in the outcome risky sexual behavior and 174 (95.59%) did not (Table 2). After excluding those with missing data for risky sexual behaviors, a total of 157 (14%) African American adolescents engaged in the outcome risky sexual behaviors and 994 (86%) did not. Of White American adolescents, 187 (10%) engaged in the outcome risky sexual behaviors and 1595 (90%) did not (Chart 2).

When looking at each individual risky sexual behavior and excluding those with missing data for any risky sexual behavior, African American adolescents were found to engage in more risky sexual behaviors than White American adolescents when looking at risky behaviors individually or grouped. The main variables where White American adolescents were found to engage in more risky sexual behaviors than African American adolescents are when looking at behaviors that involved alcohol/drugs usage

and no condom during last time had sex (Chart 3).

For the multivariable model for the association between risky sexual behaviors and other participant characteristics for African American adolescents, the outcomes having sex before the age of 13 and having sex with 4 or more people in life were both associated with all participant characteristics except ever taught about HIV/AIDS at school after adjusting for all covariates in the model. The outcome used alcohol/drugs last time had sex was only associated with having 5 or more drinks in the last 30 days (AOR= 3.56, 95% CI: 2.51, 5.04) and using marijuana more than one times in the last 30 days (AOR= 7.54, 95% CI: 5.09, 11.20) after adjusting for all covariates in the model. The outcome used condom last time had sex was only associated with being female (AOR= 2.11 95% CI: 1.63, 2.73) after adjusting for all covariates in the model. The combined outcome variable risky sexual behavior was only associated with being female (AOR= 0.38, 95% CI: 0.25, 0.56), having 5 or more drinks in the last 30 days (AOR= 2.27, 95% CI: 1.51, 3.40) and using marijuana one or more times in the last 30 days (AOR= 4.46, 95% CI: 2.83, 7.03) after adjusting for all covariates in the model (Table 3).

For the multivariable model for the association between had risky sexual behaviors and other participant characteristics for White American adolescents, the outcome having sex before the age of 13 was associated with being female (AOR= 0.59, 95% CI: 0.43, 0.83), having 5 or more drinks in the last 30 days (AOR= 2.14, 95% CI: 1.48, 3.11), and using marijuana one or more times (AOR= 3.13, 95% CI: 2.16, 4.53) after adjusting for all covariates in the model. The outcome had sex with 4 or more people in life was associated with all participant characteristics except ever taught

about HIV/AIDS at school after adjusting for all covariates in the model. The outcome used alcohol/drugs last time had sex was only associated with having 5 or more drinks in the last 30 days (AOR= 5.96, 95% CI: 4.41, 8.06) and using marijuana more than one times in the last 30 days (AOR= 3.22 95% CI: 2.45, 4.25) after adjusting for all covariates in the model. The outcome used condom last time had sex was associated with being 16 years old or older (AOR= 1.49, 95% CI: 1.13, 1.96), being female (AOR= 2.11 95% CI: 1.63, 2.73), and using marijuana one or more times in the last 30 days (AOR= 1.29, 95% CI: 1.04, 1.60) after adjusting for all covariates in the model. The combined outcome variable risky sexual behavior was only associated with being having 5 or more drinks in the last 30 days (AOR= 2.82, 95% CI: 1.92, 4.15) and using marijuana one or more times in the last 30 days (AOR= 3.10, 95% CI: 2.13, 4.52) after adjusting for all covariates in the model (Table 4).

For the multivariable model for the association between engaging in risky sexual behavior and other participant characteristics for African American adolescents and White American Adolescents, having 5 or more drinks within the last 30 days (AOR = 2.52, 95% CI: 1.91, 3.33) and using marijuana one or more times in the last 30 days (AOR = 3.58, 95% CI: 2.68, 4.77) were significantly associated with risky sexual behavior, after adjusting for all covariates in the model. Also, adolescent females (AOR = 0.62, 95% CI: 0.48, 0.79) were more likely than males and African American adolescents (AOR = 1.63, 95% CI: 1.28, 2.18) were more likely than White adolescents to engage in risky sexual behaviors after adjusting for all variables in the model. Age and ever taught about HIV/AIDS at school were not significantly associated with risky sexual behavior, after adjusting for all covariates (Table 5).

## Discussion

Results from this study revealed that African American adolescents are more likely than White American adolescents to engage in risky sexual behaviors. Also, African American adolescents are less likely to have received HIV/AIDS education in school compared to White American adolescents. There was not an association found between receiving HIV/AIDS education in school and engaging in risky sexual activity. When looking at demographic characteristics, adolescents over the age of 16 were more likely to engage in risky sexual behavior. Also, females were more likely than males to engage in risky sexual behaviors. These results were expected based on the literature and shows that there needs to be increased public health intervention efforts in trying to reduce risky sexual behaviors in females and adolescents over the age of 16.

When looking at substance use in the last 30 days, both having 5 or more drinks and using marijuana one or more times were associated with engaging in risky sexual behaviors for African American and White American adolescents. African American adolescents who reported having 5 or more drinks in the last 30 days were three times more likely to have used alcohol/drugs the last time they had sex compared to African American adolescents who did not have 5 or more drinks in the last 30 days. White American adolescents who reported having 5 or more drinks in the last 30 days were twice as likely to have sex before the age of 13; three times as likely to have had sex with 4 or more people in life; and six times more likely to have used alcohol/drugs last time they had sex compared to White American adolescents who did not have 5 or more drinks in the last 30 days.

African American adolescents who reported using marijuana within the last 30

days were twice as likely to have had sex before the age of 13; four times as likely to have had sex with 4 or more people in life; and were seven times as likely to use alcohol/drugs the last time they has sex compared to African American adolescents who did not use marijuana in the past 30 days. White American adolescents who reported using marijuana within the last 30 days were three times as likely to have had sex before the age of 13; three times more likely to have had sex with 4 or more people in life; and three times more likely to have used alcohol/drugs the last time they had sex compared to White American adolescents who did not use marijuana in the past 30 days. These results suggest that adolescents who use alcohol/drugs are more likely to engage in risky sex and should be educated on how alcohol/drugs may impair judgment during sexual encounters.

*Limitations.* There are several limitations that need to be taken into consideration when assessing the results of this study. One limitation is that the YRBS is not representative of the general population of African American and White American adolescents living in the United States. The participants only include adolescents who attended school in 2013 and do not represent those who did not. Another limitation is that data analysis was conducted using SAS Proc Logistic instead of Proc Surveylogistic. Due to this, the results in this do not take survey design into account and it is not correct to use these results for national estimates. Also, sexual behavior and substance use responses are based on self-report and may not be actually representative of the behaviors the participants engaged in. Third, the survey did not take into consideration the sexual orientation of the participants. Adolescent males who have sex with males (MSM) are at a higher risk for contracting HIV and more likely to engage in risky sexual



behaviors compared to heterosexual males [18]. Also, lesbian and bisexual adolescents are more likely to engage in risky sexual behaviors compared to heterosexual female adolescents [20]. In order to take this into account, sexual orientation should have been included in the multivariable models. Finally, quality and quantity of the HIV/STI education may have differed from state to state. There is not a way to know if some adolescents were receiving full courses on HIV/AIDS risk factors or just learned about what HIV is in one lesson. There may not be a fair comparison because of this.

*Implications.* This study did not establish a relationship between risky sexual behaviors and HIV/AIDS education in school. However, the literature has shown that randomized control trials that include HIV/AIDS lessons in their sex education interventions show a decrease in risky sexual behaviors in their experimental group compared to control groups. The HIV/AIDS education the participants received in this study may not have been informative enough to lead to decreased risky sexual behaviors. HIV and STIs may be discussed in a health classes but discussions may not be intense enough to make adolescents not want to engage in risky sexual activity. Having a whole class on these types of risks may be a key factor in delaying or preventing sexual activity in adolescents.

This study has shown that African American adolescents are more likely to engage in risky sexual behaviors and are less likely to learn about HIV/AIDS in school compared to White American adolescents. This is expected based on the literature and shows that schools with predominately African American students need to be especially focused on for HIV/AIDS interventions. Future studies should include questions about sexual orientation when surveying risky sexual behaviors in adolescents. Sexual

orientation can be associated with increased risky sexual behaviors and should be included in multivariable models to try to eliminate potential confounders.

*Conclusions.* Although this study did not find evidence that HIV/AIDS education in school can reduce risky sexual behavior in African American adolescents when compared amongst each other or when compared to White American Adolescents, the literature has shown numerous examples that HIV/AIDS education is effective in reducing risky sexual behaviors. There needs to be further studies that exam how in depth educators are going when describing HIV/AIDS risk factors in sex education classes. Improved school-based HIV/AIDS education classes will yield better results in future studies.

## References

1. African Americans | Race/Ethnicity | HIV by Group | HIV/AIDS | CDC. *Cdcgov*. 2016. Available at: <http://www.cdc.gov/hiv/group/raciaethnic/africanamericans>. Accessed November 10, 2016.
2. Bachanas P. Predictors of Risky Sexual Behavior in African American Adolescent Girls: Implications for Prevention Interventions. *Journal of Pediatric Psychology*. 2002; 27(6): 519-530.
3. Chin H, Sipe T, Elder R et al. The Effectiveness of Group-Based Comprehensive Risk-Reduction and Abstinence Education Interventions to Prevent or Reduce the Risk of Adolescent Pregnancy, Human Immunodeficiency Virus, and Sexually Transmitted Infections. *American Journal of Preventive Medicine*. 2012; 42(3): 272-294.
4. Coyle K, Glassman J, Franks H, Campe S, Denner J, Lepore G. Interventions to Reduce Sexual Risk Behaviors Among Youth in Alternative Schools: A Randomized Controlled Trial. *Journal of Adolescent Health*. 2013; 53(1): 68-78.
5. DiClemente R, Wingood G, Harrington K et al. Efficacy of an HIV Prevention Intervention for African American Adolescent Girls. *JAMA*. 2004;292(2):171.
6. Elkington K, Bauermeister J, Zimmerman M. Do parents and peers matter? A prospective socio-ecological examination of substance use and sexual risk among African American youth. *Journal of Adolescence*.
7. Hidalgo M, Kuhns L, Hotton A, Johnson A, Mustanski B, Garofalo R. The MyPEEPS Randomized Controlled Trial: A Pilot of Preliminary Efficacy, Feasibility, and Acceptability of a Group-Level, HIV Risk Reduction Intervention for Young Men Who Have Sex with Men. *Arch Sex Behav*. 2014;44(2):475-485.
8. HIV Among Youth | Age | HIV by Group | HIV/AIDS | CDC. *Cdcgov*. 2016. Available at: <http://www.cdc.gov/hiv/group/age/youth/>. Accessed November 10, 2016.
9. Idele P, Gillespie A, Porth T et al. Epidemiology of HIV and AIDS Among Adolescents. *JAIDS Journal of Acquired Immune Deficiency Syndromes*. 2014;66:S144-S153.
10. Lemelin C, Lussier Y, Sabourin S, Brassard A, Naud C. Risky sexual behaviours: The role of substance use, psychopathic traits, and attachment insecurity among adolescents and young adults in Quebec. *The Canadian Journal of Human Sexuality*. 2014;23(3):189-199.

11. Lee Y, Cintron A, Kocher S. Factors Related to Risky Sexual Behaviors and Effective STI/HIV and Pregnancy Intervention Programs for African American Adolescents. *Public Health Nursing*. 2014;31(5):414-427.
12. Ma Z, Fisher M, Kuller L. School-based HIV/AIDS education is associated with reduced risky sexual behaviors and better grades with gender and race/ethnicity differences. *Health Education Research*. 2014;29(2):330-339.
13. Marfatia Y, Naswa S. Adolescent HIV/AIDS: Issues and challenges. *Indian Journal of Sexually Transmitted Diseases and AIDS*. 2010;31(1):1.
14. Perkins H, Meilman P, Leichter J, Cashin J, Presley C. Misperceptions of the Norms for the Frequency of Alcohol and Other Drug Use on College Campuses. *Journal of American College Health*. 1999;47(6):253-258.
15. SAS Institute Inc. 2011. SAS® 9.3 System Options: Reference, Second Edition. Cary, NC: SAS Institute Inc.
16. Tortolero S, Markham C, Peskin M et al. It's Your Game: Keep It Real: Delaying Sexual Behavior with an Effective Middle School Program. *Journal of Adolescent Health*. 2010;46(2):169-179.
17. Vivancos R, Abubakar I, Phillips-Howard P, Hunter P. School-based sex education is associated with reduced risky sexual behaviour and sexually transmitted infections in young adults. *Public Health*. 2013;127(1):53-57.
18. Who is at Risk for HIV?. *Aids.gov*. 2016. Available at: <https://www.aids.gov/hiv-aids-basics/prevention/reduce-your-risk/who-is-at-risk-for-hiv/>. Accessed November 11, 2016.
19. Women | Gender | HIV by Group | HIV/AIDS | CDC. *Cdc.gov*. 2016. Available at: <https://www.cdc.gov/hiv/group/gender/women/>. Accessed November 11, 2016.
20. Ybarra M, Rosario M, Saewyc E, Goodenow C. Sexual Behaviors and Partner Characteristics by Sexual Identity Among Adolescent Girls. *Journal of Adolescent Health*. 2016;58(3):310-316.
21. YRBSS | Youth Risk Behavior Surveillance System | Data | Adolescent and School Health | CDC. *Cdc.gov*. 2016. Available at: <http://www.cdc.gov/healthyyouth/data/yrbs/index.htm>. Accessed November 11, 2016.
22. Zandoni BMayer K. The Adolescent and Young Adult HIV Cascade of Care in the United States: Exaggerated Health Disparities. *AIDS Patient Care and STDs*. 2014;28(3):128-135

**Table 1: Comparison of HIV/AIDS Education at School by other Participant Characteristics for African American Adolescents**

| Participant Characteristics          | Ever taught about HIV/AIDS at School   | Ever taught about HIV/AIDS at School | Crude OR (95% CI) |
|--------------------------------------|--|--------------------------------------|-------------------|
|                                      | (Yes) <sup>R</sup><br>N= 2352 (81.67%) | (No)<br>N= 528 (18.33%)              |                   |
| Age                                  |  |                                      |                   |
| 15 years or younger <sup>R</sup>     | 721 (79.06)                            | 191 (20.94)                          | 1.00              |
| 16 years or older                    | 1629 (82.94)                           | 335 (17.06)                          | 0.78 (0.64,0.95)  |
| Missing                              | 2                                      | 2                                    |                   |
| Gender:                              |  |                                      |                   |
| Male <sup>R</sup>                    | 1158 (81.15)                           | 269 (18.85)                          | 1.00              |
| Female                               | 1193 (82.16)                           | 259 (17.84)                          | 0.94 (0.77,1.13)  |
| Missing                              | 1                                      |                                      |                   |
| Had 5+ drinks last 30 days           |  |                                      |                   |
| Yes                                  |  |                                      |                   |
| No <sup>R</sup>                      | 299 (86.67)                            | 46 (13.33)                           | 0.68 (0.49, 0.94) |
| Missing                              | 1973 (81.56)                           | 446 (18.44)                          | 1.00              |
|                                      | 80                                     | 36                                   |                   |
| Used Marijuana 1+ times last 30 days |  |                                      |                   |
| Yes                                  | 693 (82.70)                            | 145 (17.30)                          | 0.93 (0.74, 1.14) |
| No <sup>R</sup>                      | 1615 (81.57)                           | 365 (18.43)                          | 1.00              |
| Missing                              | 44                                     | 18                                   |                   |
| Had Sex before 13                    |  |                                      |                   |
| Yes                                  | 306 (82.04)                            | 67 (17.96)                           | 1.09 (0.82, 1.46) |
| No <sup>R</sup>                      | 1933 (83.32)                           | 387 (16.68)                          | 1.00              |
| Missing                              | 113                                    | 74                                   |                   |
| Had Sex with 4+ people in life       |  |                                      |                   |
| Yes                                  | 598 (82.60)                            | 126 (17.40)                          | 1.04 (0.83,1.31)  |
| No <sup>R</sup>                      | 1626 (83.17)                           | 329 (16.83)                          | 1.00              |
| Missing                              | 128                                    | 73                                   |                   |
| Used alcohol/drugs last time had sex |  |                                      |                   |
| Yes                                  | 226 (84.01)                            | 43 (15.99)                           | 0.94 (0.65,1.37)  |
| No <sup>R</sup>                      | 779 (83.23)                            | 157 (16.77)                          | 1.00              |
| Missing                              | 1347                                   | 328                                  |                   |
| Used condom last time had sex        |  |                                      |                   |
| Yes <sup>R</sup>                     | 649 (83.74)                            | 126 (16.26)                          | 1.00              |
| No                                   | 325 (82.49)                            | 69 (17.51)                           | 1.09 (0.79,1.51)  |
| Missing                              | 1378                                   | 333                                  |                   |
| Risky Sexual Behavior                |  |                                      |                   |
| Yes                                  | 132 (84.08)                            | 25 (15.92)                           | 0.97 (0.61,1.53)  |
| No <sup>R</sup>                      | 831 (83.60)                            | 163 (16.40)                          | 1.00              |
| Missing                              | 1389                                   | 340                                  |                   |

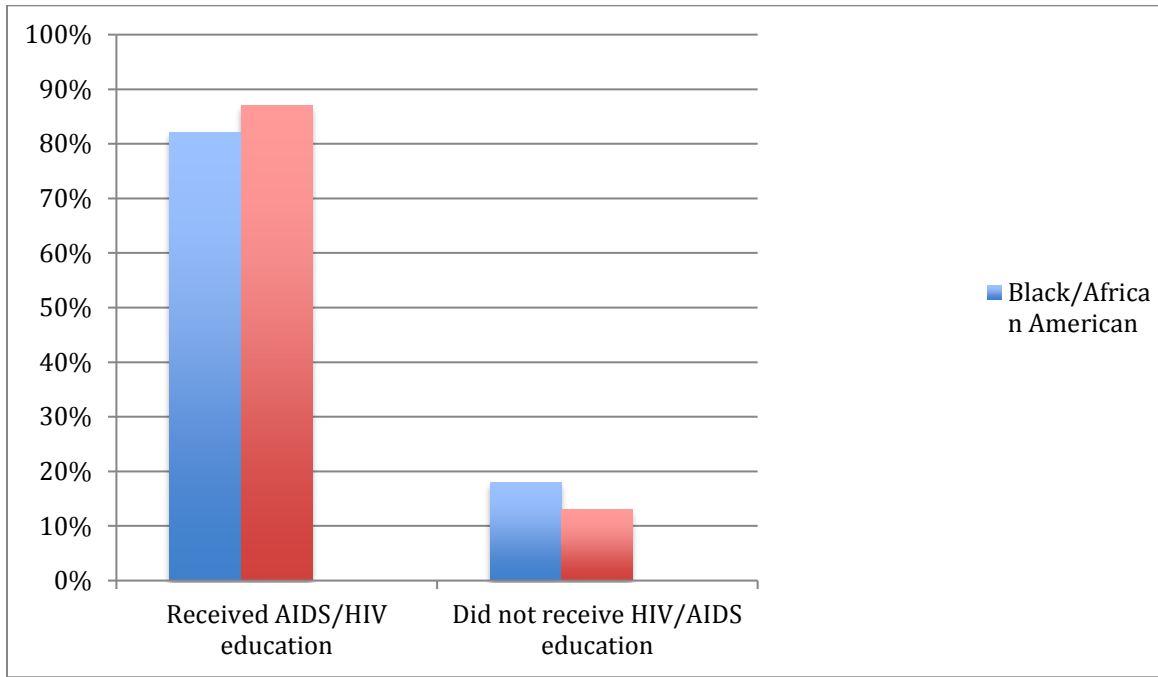
For this analysis, any user who did not give information on whether they had any participant characteristics were coded as missing. The subscript R indicates the referent group.

**Table 2: Comparison of HIV/AIDS Education at School by other Participant Characteristics for White American Adolescents**

| Participant Characteristics          | Ever taught about HIV/AIDS at School   | Ever taught about HIV/AIDS at School | Crude OR (95% CI) |
|--------------------------------------|--|--------------------------------------|-------------------|
|                                      | (Yes) <sup>R</sup><br>N= 4702 (87.37%) | (No)<br>N= 680 (12.63%)              |                   |
| Age                                  |  |                                      |                   |
| 15 years or younger <sup>R</sup>     | 1461 (85.09)                           | 256 (14.91)                          | 1.00              |
| 16 years or older                    | 3241 (88.43)                           | 424 (11.57)                          | 0.75 (0.63,0.88)  |
| Missing                              |  |                                      |                   |
| Gender                               |  |                                      |                   |
| Male <sup>R</sup>                    | 2442 (87.09)                           | 362 (12.91)                          | 1.00              |
| Female                               | 2259 (87.69)                           | 317 (12.31)                          | 0.95 (0.81,1.11)  |
| Missing                              | 2                                      | 2                                    |                   |
| Had 5+ drinks last 30 days           |  |                                      |                   |
| Yes                                  |  |                                      |                   |
| No <sup>R</sup>                      | 1091 (87.70)                           | 153 (12.30)                          | 0.99 (0.81, 1.20) |
| Missing                              | 3517 (87.53)                           | 501 (12.47)                          | 1.00              |
|                                      | 94                                     | 26                                   |                   |
| Used Marijuana 1+ times last 30 days |  |                                      |                   |
| Yes                                  | 1037 (87.44)                           | 149 (12.56)                          | 1.01 (0.83, 1.22) |
| No <sup>R</sup>                      | 3636 (87.49)                           | 520 (12.51)                          | 1.00              |
| Missing                              | 29                                     | 11                                   |                   |
| Had Sex before 13                    |  |                                      |                   |
| Yes                                  | 145 (78.38)                            | 40 (21.62)                           | 2.04 (1.42, 2.92) |
| No <sup>R</sup>                      | 4463 (88.06)                           | 605 (11.94)                          | 1.00              |
| Missing                              | 94                                     | 35                                   |                   |
| Had Sex with 4+ people in life       |  |                                      |                   |
| Yes                                  | 622 (86.51)                            | 97 (13.49)                           | 1.13 (0.89, 1.42) |
| No <sup>R</sup>                      | 3977 (87.85)                           | 550 (12.15)                          | 1.00              |
| Missing                              | 103                                    | 33                                   |                   |
| Used alcohol/drugs last time had sex |  |                                      |                   |
| Yes                                  | 338 (84.92)                            | 60 (15.08)                           | 1.47 (1.07, 2.03) |
| No <sup>R</sup>                      | 1261 (89.24)                           | 152 (10.76)                          | 1.00              |
| Missing                              | 3103                                   | 468                                  |                   |
| Used condom last time had sex        |  |                                      |                   |
| Yes <sup>R</sup>                     | 882 (88.73)                            | 112 (11.27)                          | 1.00              |
| No                                   | 705 (88.13)                            | 95 (11.88)                           | 1.06 (0.79, 1.41) |
| Missing                              | 3115                                   | 473                                  |                   |
| Risky Sexual Behavior                |  |                                      |                   |
| Yes                                  | 157 (83.96)                            | 30 (16.04)                           | 1.56 (1.02, 2.38) |
| No <sup>R</sup>                      | 1421 (89.09)                           | 174 (10.91)                          | 1.00              |
| Missing                              | 3124                                   | 476                                  |                   |

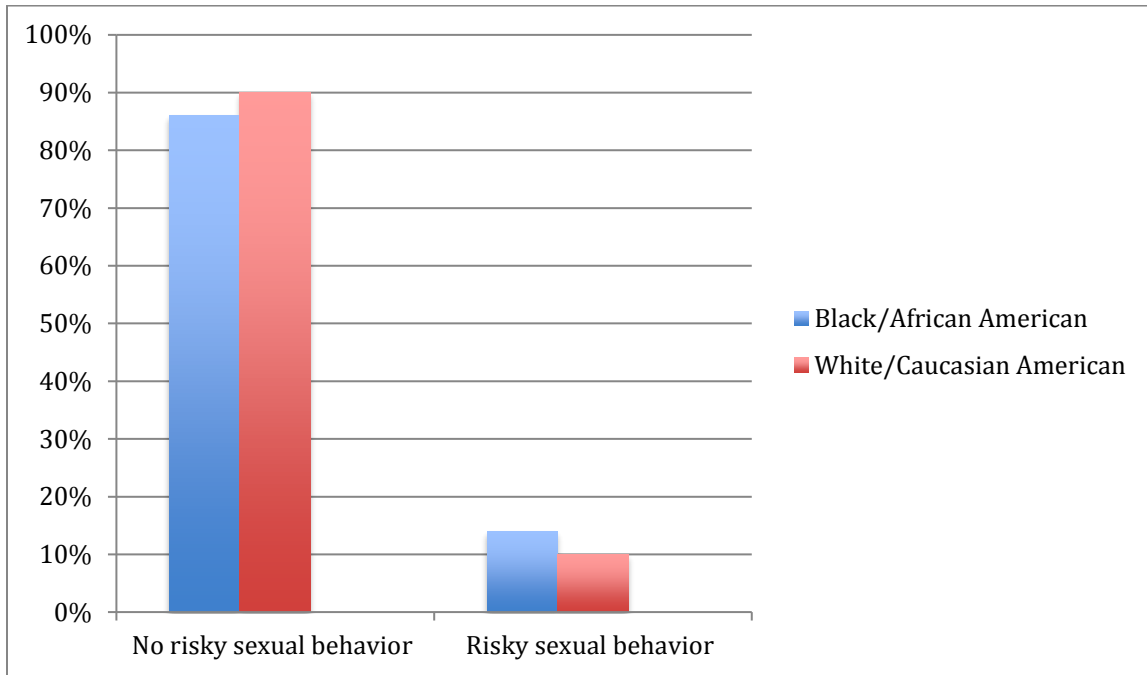
For this analysis, any user who did not give information on whether they had any participant characteristics were coded as missing. The subscript R indicates the referent group

**Chart 1: Comparison of HIV/AIDS education amongst African American Adolescent vs. White American Adolescents**



Excludes those with missing data for HIV/AIDS education

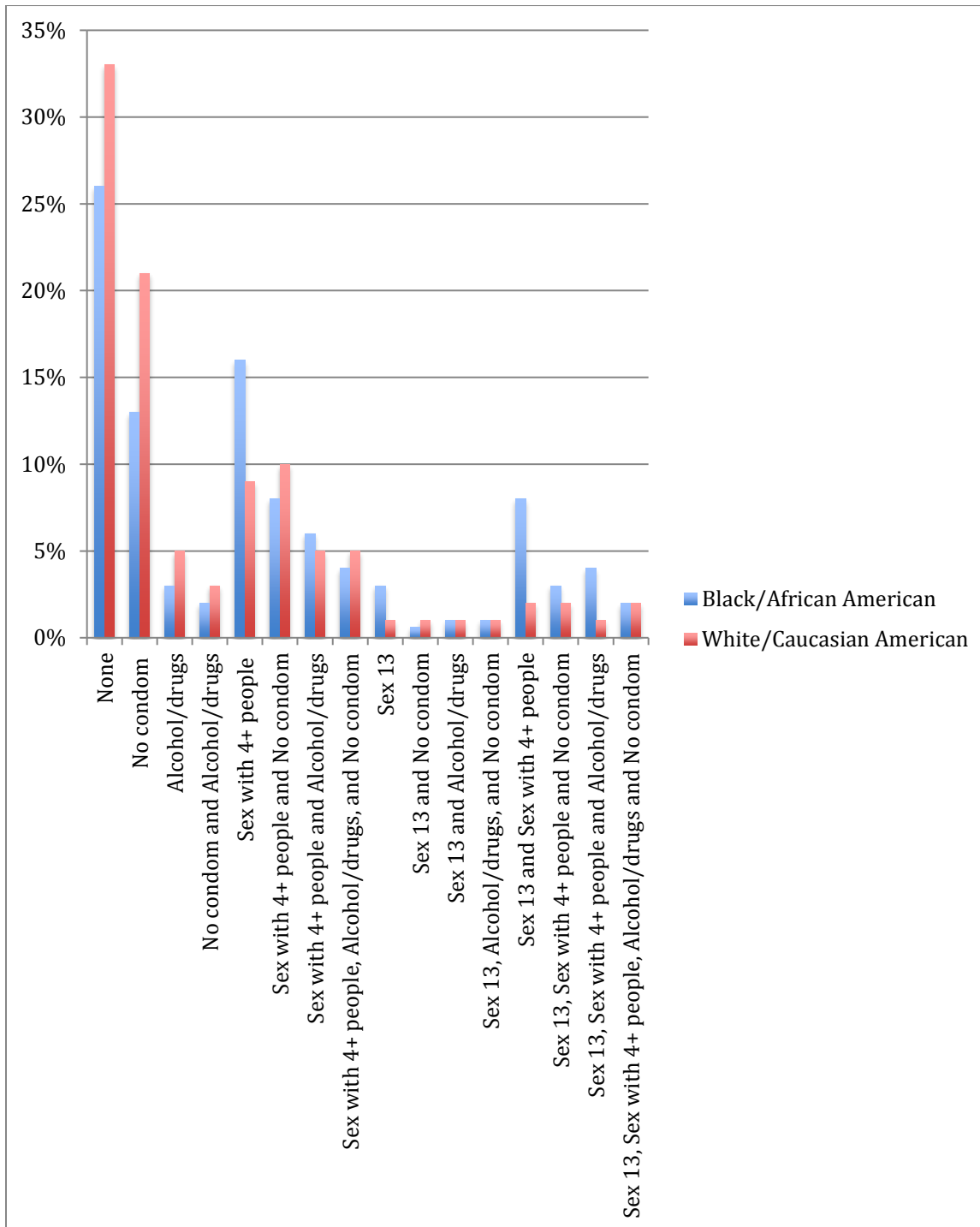
**Chart 2: Comparison of Risky Sexual Behavior amongst African American vs. White American Adolescents**



Excludes those with missing data for risky sexual behaviors



**Chart 3: Comparison of Individual Risky Sexual Behaviors amongst African American vs. White American Adolescents**



Excludes those with missing data for any risky sexual behavior

**Chart Key:**

- No condom= No condom last time had sex
- Alcohol/drugs = Used alcohol/drugs last time had sex
- Sex with 4+ people = Had Sex with 4+ people in life
- Sex 13= Had sex before 13

**Table 3: Multivariable Model for the Association between Risky Sexual behaviors and other Participant Characteristics for African American Adolescents**

| <b>Participant Characteristics</b>                             | <b>Had Sex Before 13<br/>AOR (95% CI)</b> | <b>Had Sex with 4 or more<br/>People in Life<br/>AOR (95% CI)</b> | <b>Used Alcohol/Drugs<br/>Last Time Had Sex<br/>AOR (95% CI)</b> | <b>Used Condom<br/>Last Time Had Sex<br/>AOR (95% CI)</b> | <b>Risky Sexual Behavior<br/>AOR (95% CI)</b> |
|--|---|---|--|---|---|
| Age<br>≥15 years <sup>R</sup><br>16 years ≤                    | 1.00<br>0.76(0.59, 0.98)                  | 1.00<br>2.73 (2.15, 3.47)   | 1.00<br>1.26 (0.83, 1.91)  | 1.00<br>1.23 (0.89, 1.71)                                 | 1.00<br>1.02 (0.64, 1.63)                     |
| Gender:<br>Male <sup>R</sup><br>Female                         | 1.00<br>0.17 (0.13, 0.23)                 | 1.00<br>0.27 (0.22, 0.33)   | 1.00<br>0.76 (0.55, 1.05)  | 1.00<br>2.11 (1.63, 2.73)                                 | 1.00<br>0.38 (0.25, 0.56)                     |
| Had 5+ drinks last 30 days<br>Yes<br>No <sup>R</sup>           | 1.43 (1.02, 2.00)<br>1.00                 | 1.73 (1.30, 2.30)<br>1.00   | 3.56 (2.51, 5.04)<br>1.00  | 1.15 (0.82, 1.61)<br>1.00                                 | 2.27 (1.51, 3.40)<br>1.00                     |
| Used Marijuana 1+ times last 30 days<br>Yes<br>No <sup>R</sup> | 2.34 (1.80, 3.04)<br>1.00                 | 4.23 (3.41, 5.24)<br>1.00   | 7.54 (5.09, 11.20)<br>1.00                                       | 1.23 (0.94, 1.61)<br>1.00                                 | 4.46 (2.83, 7.03)<br>1.00                     |
| Ever taught about HIV/AIDS at School<br>Yes <sup>R</sup><br>No | 1.00<br>1.12 (0.82, 1.54)                 | 1.00<br>1.12 (0.86, 1.47)   | 1.00<br>0.95 (0.61, 1.48)  | 1.00<br>1.22 (0.86, 1.72)                                 | 1.00<br>1.01 (0.61, 1.72)                     |

The table excludes those with missing data for any risky sexual behavior  
The subscript R indicates the referent group.

**Table 4: Multivariable Model for the Association between Risky Sexual behaviors and other Participant Characteristics for White American Adolescents**

| Participant Characteristics                                    | Had Sex Before 13<br>AOR (95% CI) | Had Sex with 4 or more People in Life<br>AOR (95% CI) | Used Alcohol/Drugs Last Time Had Sex<br>AOR (95% CI) | Used Condom Last Time Had Sex<br>AOR (95% CI) | Risky Sexual Behavior<br>AOR (95% CI) |
|--|-----------------------------------|---|--|---|---------------------------------------|
| Age<br>≥15 years <sup>R</sup><br>16 years ≤                    | 1.00<br>0.86 (0.60, 1.22)         | 1.00<br>3.20 (2.48, 4.13)                             | 1.00<br>1.04 (0.73, 1.50)                            | 1.00<br>1.49 (1.13, 1.96)                     | 1.00<br>1.12 (0.71, 1.79)             |
| Gender:<br>Male <sup>R</sup><br>Female                         | 1.00<br>0.59 (0.43, 0.83)         | 1.00<br>1.28 (1.07, 1.53)                             | 1.00<br>0.84 (0.65, 1.09)                            | 1.00<br>1.57 (1.29, 1.91)                     | 1.00<br>0.87 (0.63, 1.21)             |
| Had 5+ drinks last 30 days<br>Yes<br>No <sup>R</sup>           | 2.14 (1.48, 3.11)<br>1.00         | 3.38 (2.78, 4.10)<br>1.00                             | 5.96 (4.41, 8.06)<br>1.00                            | 1.22 (0.99, 1.50)<br>1.00                     | 2.82 (1.92, 4.15)<br>1.00             |
| Used Marijuana 1+ times last 30 days<br>Yes<br>No <sup>R</sup> | 3.13 (2.16, 4.53)<br>1.00         | 3.31 (2.72, 4.02)<br>1.00                             | 3.22 (2.45, 4.25)<br>1.00                            | 1.29 (1.04, 1.60)<br>1.00                     | 3.10 (2.13, 4.52)<br>1.00             |
| Ever taught about HIV/AIDS at School<br>Yes <sup>R</sup><br>No | 1.00<br>1.95 (1.31, 2.88)         | 1.00<br>1.13 (0.87, 1.48)                             | 1.00<br>1.28 (0.87, 1.87)                            | 1.00<br>1.10 (0.82, 1.50)                     | 1.00<br>1.43 (0.91, 2.27)             |

The table excludes those with missing data for any risky sexual behavior  
The subscript R indicates the referent group.

**Table 5: Multivariable Model for the Association between Risky Sexual Behavior and other Participant Characteristics for African American Adolescents and White American Adolescents**

| <b>Participant Characteristics</b>   | <b>Adjusted OR (95%CI)*</b> |
|--------------------------------------|-----------------------------|
| Age                                  |                             |
| 15 years or younger <sup>R</sup>     | 1.00                        |
| 16 years or older                    | 1.07 (0.77, 1.48)           |
| Gender                               |                             |
| Male <sup>R</sup>                    | 1.00                        |
| Female                               | 0.62 (0.48, 0.79)           |
| Race                                 |                             |
| African American                     | 1.63 (1.28, 2.18)           |
| White American <sup>R</sup>          | 1.00                        |
| Had 5+ drinks last 30 days           |                             |
| Yes                                  | 2.52 (1.91, 3.33)           |
| No <sup>R</sup>                      | 1.00                        |
| Used Marijuana 1+ times last 30 days |                             |
| Yes                                  | 3.58 (2.68, 4.77)           |
| No <sup>R</sup>                      | 1.00                        |
| Ever taught about AIDS/HIV at School |                             |
| Yes <sup>R</sup>                     | 1.00                        |
| No                                   | 1.23 (0.87, 1.73)           |

\*Excludes those with missing data for risky sexual behaviors  
The subscript R indicates the referent group.