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# Who is Testing? Demographic and Sexual Risk Factors Associated with HIV Testing Among African American College Students

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Who is Testing? Demographic and Sexual Risk Factors Associated with HIV Testing Among  
African American College Students

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### Abstract

Despite significant progress made in reducing HIV diagnoses, many populations are still disproportionately affected. Although African American college students tend to engage in safer sex practices than their peers, they are still at an elevated risk for contracting HIV. Therefore, it is important that HIV prevention programs understand the unique needs and risk factors among African American college students. HIV testing is an essential component of HIV prevention. This study examined the relationship between HIV testing and demographic and behavioral factors among African American college students from two universities. The study found that older students (upperclassmen) are significantly more likely to have had HIV testing than younger students. Sexual risk factors associated with HIV testing included being sexually active in the past 90 days, having had a previous STI, and substance usage. The results of the study indicate some trends in HIV testing history among African American college students. Prevention efforts should focus on younger populations and students exhibiting certain risk behaviors.

*Keywords:* Disparity, Health Equity, Minority Health, Prevention, Sexually Transmitted Infections

Who is Testing? Demographic and Sexual Risk Factors Associated with HIV Testing  
Among African American College Students

While consistent gains have been made over the last 30 years to combat new cases of Human Immunodeficiency Virus (HIV), a disproportionate burden of the disease among communities of color has persisted. According to the Centers for Disease Control and Prevention (CDC, 2018a), African Americans accounted for 43% of HIV diagnoses in 2017, but only made up 13% of the U.S. population. New HIV diagnoses among African Americans in 2016 were more than eight times the rate of Whites and twice the rate of Hispanics/Latinos (CDC, 2018a; Laurencin, Murdock, Laurencin, & Christensen, 2018). The groups of African Americans most disproportionately affected by HIV are Black gay and bisexual men. Among gay and bisexual men, Black men comprised 38% of HIV diagnoses in 2016. Black gay and bisexual men made up 25% of all HIV diagnoses in 2016 (CDC, 2018b). African American youth also face a disproportionate burden of HIV. In 2016, African American youth between 13 and 24 years old comprised 60% of new HIV infections among young people (CDC, 2018a).

There are many risk factors associated with HIV including structural risk factors such as access to healthcare, employment, and access to affordable housing (Marshall, Kerr, Shoveller, Montaner, & Wood, 2009; Forsyth & Valdiserri, 2015; Young, Washington, Jerman, & Tak, 2007). Addressing these structural factors is a vital aspect of HIV prevention. It is important that populations at risk for HIV have access to appropriate resources and preventative services, especially young African American adults. The risk of HIV infection is higher among African American college students than their White counterparts (Hall, Peterson, & Johnson, 2014). Universities and colleges should offer a wide range of preventative services and resources to reduce HIV risk in this population. A major component of HIV prevention is HIV testing.

## **Purpose Statement**

The purpose of this study is to better understand HIV testing behavior among African American college students by investigating demographic and sexual risk factors associated with HIV testing.

## **Literature Review**

### **What is HIV?**

HIV is a virus that affects the immune system's ability to fight infections. HIV attacks the immune system by targeting CD4 cells. CD4 cells play an essential role in stimulating an immune response to pathogens that have entered the body. HIV weakens the immune system by destroying CD4 cells and decreasing the number of CD4 cells available in the blood. As an individual's CD4 levels decrease, they become more vulnerable to opportunistic infections and cancers (CDC, 2018c). Individuals are diagnosed with Acquired Immune Deficiency Syndrome (AIDS) when their CD4 levels drop below 200. AIDS or late stage HIV is the set of symptoms and illnesses that occur because of HIV's effect on the immune system. Without treatment, the expected survival of an individual with AIDS is three years (CDC, 2018c).

HIV is primarily spread through unprotected vaginal and anal sex. HIV can be transmitted through exposure to bodily fluids such as blood, semen, vaginal fluid, and rectal fluid. Anal sex poses the highest risk of transmission for the receptive partner. Injection drug use also poses a high transmission risk when a needle is shared between someone who is HIV negative and someone who is HIV positive. HIV can also be transmitted through breastfeeding. HIV cannot be transmitted through fluids such as saliva, sweat, or tears.

HIV can be treated with antiretroviral drugs but no effective cure for HIV currently exists. However, HIV positive individuals who take their antiretroviral medications consistently

are often able to lead long and productive lives. In fact, with the use of antiretroviral medications, people living with HIV can make their viral load undetectable and not transmissible (CDC, 2018c). Recently, other medications have been developed to prevent an individual exposed to HIV from acquiring the infection. Pre-Exposure Prophylaxis or PrEP is a medication for high risk HIV negative individuals that can protect them against exposure to the virus. When an individual who is taking PrEP is exposed to HIV through sex or injection drug use, PrEP can prevent the HIV infection from becoming permanent (CDC, 2018d). Post-exposure prophylaxis or PEP is another antiretroviral medication that works after an individual has been exposed to HIV. PEP can prevent an individual from becoming infected with HIV if it is taken within 72 hours of HIV exposure (CDC, 2018e). Despite advancements in HIV treatments and prevention, some populations continue to experience disproportionate rates of the infection.

### **Health Disparities in HIV in the U.S.**

HIV affects different populations disproportionately. Among those groups most at risk for HIV include young people, African Americans, Hispanics, and sexual minorities (CDC, 2017a). There are 1.1 million people living with HIV in the U.S. In 2016 alone, there were 39,876 new cases of HIV (CDC, 2017a). Although the overall number of new HIV diagnoses decreased from 2011 to 2015, some populations experienced an increase in new cases. There was a 4% increase in HIV among gay and bisexual African American men from 2011 to 2015 and there was a 14% increase in new cases among Hispanic men (HIV.gov, 2018). It is important to understand HIV disparities in race, ethnicity, age, and sexual orientation in order to tailor interventions to specific needs.

**HIV disparities and African Americans in the U.S.** In 2015, it was estimated that over 400,00 African Americans were living with HIV. Among the 400,000 African Americans living

with HIV, 67.4% were male and 32.6% were female (CDC, 2018a). The rate of HIV among Black men is 5.9 times higher than White men. The age group of Black men with highest rate of new HIV cases is between the ages of 25 and 29 with a rate of 112.4 cases per 100,000 people. In White males, within the same age group, the rate is much less at 13.9 cases per 100,000 people. Disparities between Black and White men are more pronounced for sexual minorities. In 2015, Black gay and bisexual men had a 28% higher number of new HIV diagnoses than White gay and bisexual men (CDC, 2018b). Black male-to-male sexual contact accounted for the most HIV transmissions in 2016 (CDC, 2017a).

#### African American Women

Although the number of new HIV diagnoses among Black women has decreased by 20% from 2011 to 2015, the rate of new HIV diagnoses is still much higher in Black women than other races. In 2016, the rate of new HIV diagnoses among Black women was almost five times higher than that of Hispanic women (CDC, 2018a). Among Black women and White women, the disparity in new HIV diagnoses is even larger. The rate of new HIV diagnoses among Black women was 15 times higher than White women in 2016. For Black women, the highest amount of HIV transmissions was through heterosexual contact. Black women engaging in heterosexual contact was the fourth highest cause of new HIV diagnoses in 2016 (CDC, 2018a).

**HIV disparities and Hispanics/Latinos in the U.S.** The Hispanic/Latino population in the U.S. also experiences a disproportionate burden of HIV diagnoses. Hispanics/Latinos comprised 26% of all HIV diagnoses in 2016, yet Hispanics/Latinos only represent 17% of the U.S. population (CDC, 2018f). The rate of new HIV diagnoses was three times higher among Hispanic/Latinos than Whites. Among the 10,292 Hispanics/Latinos that received an HIV diagnosis in 2016, 80% were men and 12% were female. In 2015, the estimated prevalence of

HIV infections among Hispanic/Latino men was more than twice as high as White men (CDC, 2018f). Hispanic/Latino gay and bisexual men made up about 22% of new HIV diagnoses in 2016. There was also an increase in new HIV diagnoses among gay and bisexual Hispanic/Latino men between 2011 and 2015. Between 2011 and 2015, the number of HIV diagnoses among Hispanic/Latino gay and bisexual men increased by 13% (CDC, 2018g).

HIV rate among Hispanic/Latina women is also disproportionately high. Despite a 14% decrease in new HIV diagnoses between 2011 and 2015, Hispanic/Latina women had a rate of new HIV diagnoses three times higher than White women. Eight-six percent of HIV diagnoses among Hispanic/Latina women was attributed to heterosexual contact. Hispanic/Latina women comprised 3% of HIV diagnose in 2016 (CDC 2018f).

**HIV disparities and young people in the U.S.** Youth in the age range of 13 to 24 made up 21% of new HIV infections in 2016. Individuals between the ages of 20 to 24 make up 79% of new diagnoses among the young people category (aged 13 to 24) (CDC, 2018h). Young men comprised 87% of new HIV diagnoses among young people. Among young men, male-to-male sexual contact made up 93% of new diagnoses. Among young women, heterosexual contact made up 86% of new HIV diagnoses. Youths with the highest incidence of HIV were Black and Hispanic males. Youths also have a high rate of undiagnosed cases of HIV. In 2015, the CDC estimated 51% of youths living with HIV were undiagnosed. Young people between the ages of 13 and 24 have the highest rate of undiagnosed HIV than any other age category (CDC, 2018h).

**HIV disparities and gay and bisexual men in the U.S.** The population most affected by HIV are gay and bisexual men. Men who have sex with men (MSM) only comprise 4% of the U.S. population but made 70% of HIV infections in 2014 (CDC, 2018i). There is a large disparity in new HIV diagnoses between heterosexual men and MSM. The rate of new HIV

diagnoses among MSM was 44 times higher than heterosexual men. Of individuals living with HIV in the U.S., 56% are gay and bisexual men. Despite the large percentage of gay and bisexual men affected by HIV, the rate of HIV diagnoses among the MSM population has stabilized in recent years. From 2008 to 2014, the rate of new HIV infections among MSM remained stable. However, for White MSM, there was 18% decrease in new HIV diagnoses between 2008 and 2014 (CDC, 2018i).

### **HIV in Ohio**

National trends in HIV disparities are consistent among populations most affected by HIV in Ohio. In 2017, there were 1,019 new diagnoses of HIV. Among those diagnosed with HIV, 19% were women and 81% were men (Ohio Department of Health [ODH], 2018a). Like national trends, African Americans also experience a disproportionate burden of HIV diagnoses. Despite only making up 12.5% of Ohio's populations, African Americans accounted for 51% of new HIV diagnoses in 2017 (ODH, 2018a). The disparity in HIV diagnoses between African Americans and Whites also remains high in Ohio. The rate of new HIV diagnoses among African Americans in 2017 was seven times higher than Whites. There was also a disparity in new HIV diagnoses among Hispanic/Latino populations. The rate of new HIV among Hispanic/Latinos was three times higher than Whites. Youth also comprised a majority of HIV infections. Adults between the ages of 20 and 34 made up 55% of new HIV diagnoses. In Ohio, MSM are also highly affected by HIV. In 2017, 69% of new HIV diagnoses resulted from male-to-male sexual contact. Minority MSM continue to face a heavy burden of disease. Among MSM, 51% of newly diagnosed HIV infections among MSM were Black males and 39 percent were Hispanic/Latino males (ODH, 2018a).

**HIV in Montgomery County.** According to a report conducted by Public Health - Dayton & Montgomery County, there were 77 new cases of HIV in Dayton in 2017 (ODH, 2018b). Like national and state trends, the majority of new cases were male (84%). Minorities also took on a heavy burden of disease. In 2017, 75% of new HIV cases in 2017 were among African Americans, much higher than the national average of 44%. Montgomery County does not differ from national trends in terms of wide racial disparities in infection rates. The rate of new HIV diagnoses among African Americans was more than twice that of Whites (ODH, 2018b). Young people also continue to take on a large majority of new HIV diagnoses. Young adults between the ages of 15 and 29 made up 56% of new HIV diagnoses (ODH, 2018b).

### **HIV Risk Behaviors**

Although many factors may be involved in an HIV diagnosis there are certain behaviors that can increase an individual's risk for acquiring HIV, defined as HIV sexual risk behaviors. Among the riskiest forms of HIV sexual risk behaviors are condomless anal and vaginal sex. Sex with multiple partners can also put one at greater risk for HIV. Age of first sexual activity, receptive anal intercourse, and substance use are also behavioral factors associated with an increased risk of HIV (Flannery & Ellingson, 2003).

**HIV risk behaviors and college students.** Both national and state trends suggest that young people have a high prevalence of sexually transmitted infections (STI), including HIV (ODH, 2011; CDC, 2018h). This higher prevalence can be partially explained by a higher instance of sexual risk behaviors. College students exhibit specific sexual risk behaviors that differ from other groups of young people. According to a study done by Lewis, Malow, and Ireland (1997), college students are more likely to use drugs and alcohol during sexual activity, have multiple partners and use condoms more inconsistently than non-students of the same age

group. Other studies support the prevalence of sexual risk behavior among college students. A study that surveyed 778 freshmen college students found that 31% of females and 42% of males used alcohol or drugs prior to sexual activity. The study also found that 39% of females and 51% of males had a one nightstand (Flannery & Ellingson, 2003).

Other studies support a high prevalence of sexual risk behavior in college students. According to a study conducted by the American College Health Association (ACHA, 2012), 9% of American college students reported having four or more sexual partners within 12 months. The study also found that only 51% of sexually active college students reported using a condom most of the time or always during vaginal intercourse within the last 30 days (ACHA, 2012). Frequency of condom use among college students during anal sex was even lower. According to the study, 28.2% of sexually active college students reported using a condom with anal intercourse most of the time or always within the last 30 days (ACHA, 2012).

**HIV risk behaviors among African American college students.** Like other college students, African American college students also engage in risky sexual behavior. However, African American college students who engage in sexual risk behaviors have a much higher risk of contracting HIV than White college students (Bazargan, Kelly, Stein, Huisaini & Bazargan, 2000). The higher risk of HIV is due to many factors including structural and institutional barriers such as discrimination (Millet, Wolitski, Stall, & Peterson, 2006). Other studies have examined specific barriers related to attitudes and beliefs towards sexual risk behaviors by African American college students. Duncan et al. (2002) conducted a study examining perceived barriers to safer sex in African American college students in which they surveyed students at a historically Black college/university (HBCU). Duncan et al. (2002) found that the most commonly reported perceived barrier to safe sex for male and female students was negative

views about condoms. Many students believed wearing condoms decreased levels of intimacy. Among female students, the largest barrier to safer sex was being under the influence of drugs or alcohol. For male students, the largest perceived barrier was access to condoms.

Another study examining condom usage among African American students identified sociodemographic factors associated with condom use. Bcheraoui, Sutton, Hardnett, and Jones (2013) found that students were more likely to use condoms if their mother graduated high school or college. The study also found that condom use was less likely among unemployed college students and students who worked less than 20 hours a week than students who were employed or worked greater than or equal to 20 hours a week. The study also found that students that lived off campus were less likely to use condoms than students that resided on campus premises.

In addition to sociodemographic factors, there are also factors such as knowledge, attitude, and beliefs that have a relationship with HIV risk behaviors in African American college students. Bcheraoui et al. (2013) found that students that who believed condoms were important in protection against disease were more likely to use condoms than students that did not have this belief. Interestingly, Bcheraoui et al. (2013) also found that students who perceived their risk of HIV as average/high were less likely to use condoms during their last sexual intercourse than students who had a low perceived risk. Reasons for not using condoms were significantly associated with beliefs that condoms would spoil the moment and that condom use in monogamous relationships would lower trust in the relationship.

### **HIV and Structural Factors**

Various structural factors such as employment opportunities, access to housing, access to healthcare, and experiences with the criminal justice system, can create barriers to HIV

prevention and increase an individual's risk of acquiring HIV. These factors are wide reaching and typically beyond an individual's control. Structural barriers may explain, in part, the wide disparities in HIV infection rates between Whites and populations of color. Many studies have suggested that sexual risk behavior alone is not the only cause for differences in rates of HIV diagnoses. A study by Millet et al. (2006) found that Black MSM were less likely than White MSM to engage in any type of substance use and no more likely to engage in sexual risk behavior than any other race or ethnicity. The findings from Millet et al. (2006) indicate that differences in HIV infection rates may not be fully explained just by sexual risk behavior.

**HIV and access to healthcare.** The inability to access appropriate healthcare services can serve as a barrier to HIV preventative services. There is a disparity between African Americans and Whites in terms of healthcare coverage, with 19% of African Americans reporting not having health insurance compared to 11% of Whites (DeNavas-Walt, Proctor, & Smith, 2013). Bond, Lauby, and Batson (2005) identified several structural factors associated with HIV testing. Bond et al. (2005) found that access to healthcare was significantly associated with ever having undergone HIV testing. Men who visited the doctor one to three times a year were four times as likely to have had an HIV test than men who did not see a doctor. Men who had health insurance were almost twice as likely to have had HIV testing than men without health insurance. Having a regular doctor was also significantly associated with HIV testing (Bond, Lauby, & Batson, 2005). Other structural factors investigated by Bond et al. (2005) included a history of drug treatment. Individuals who had access to drug treatment were almost three times as likely to have had HIV testing. Women who had completed a drug treatment program were more than twice as likely to have had HIV testing and men were three times as likely.

Access to healthcare can also be challenging among individuals who are already HIV-positive. A study by Millett et al. (2012) found that HIV-positive African American MSM were less likely to have health insurance than MSM of other races and ethnicities. Another study by Dorell et al. (2011) found that African American MSM were also less likely to have a primary healthcare provider. In some cases, the cultural competency of the healthcare provider can act as a barrier to getting preventative services. According to a study on African American MSM by Petroll and Mosak (2011), only 59% of healthcare providers recommended HIV testing upon knowing the sexual behavior of the patient. Other studies support the role of cultural competency from health professionals. A study by Hucks (2004) found that Black MSM were less likely to trust the quality and competency of outpatient care providers. Black MSM were also more likely to be dissatisfied with medical personnel in outpatient clinics.

**HIV and housing.** Having adequate housing can also act as a barrier to HIV prevention and HIV care. According to the U.S. Department of Housing and Urban Development, 12% of HIV positive individuals living in the U.S. have a current need for housing and 44% needed assistance to pay rent. Research has also shown that lack of stable housing can act as a barrier to reduction in HIV risk behaviors (Aidala et al., 2016). A study that examined housing status among low income HIV-positive individuals found that homeless individuals were more likely to have had sex with an HIV-positive partner and an intravenous drug user than HIV-positive individuals with stable housing (Smith et al., 2000). Other studies have found a relationship between housing and HIV risk behaviors. Widman, Noar, Golin, Willoughby, and Crosby (2014) found that unstable housing was significantly associated with a higher frequency of unprotected sex. Homelessness can also act as barrier to accessing care. Homeless HIV-positive individuals

were less likely to see a doctor regularly for monitoring and treatment than individuals with stable housing (Widman, Noar, Golin, Willoughby, and Crosby, 2014).

**HIV and incarceration.** An additional structural factor to consider when examining disparities in HIV rates is incarceration. The Bond et al. (2005) study found that African American men who had been incarcerated were twice as likely to have had HIV testing than men who had not been incarcerated. However, the Widman et al. (2014) study found that individuals without stable housing who had a history of incarceration were more likely to have more sexual partners and engage in a higher frequency of unprotected sex than individuals without a history of incarceration.

**HIV and poverty.** The relationship between poverty and negative health outcomes has been well-established. Many studies have shown there is a relationship between poverty and HIV. A study conducted by the CDC found that populations living at or below poverty level had a prevalence of HIV that was 2.1 times higher than populations living above the poverty line (CDC, 2017b). Relationships between HIV prevalence and poverty suggest that sexual risk behaviors alone do not explain HIV rate disparities. A study by Adimora et al. (2006) examined HIV rates among two groups, African Americans who indicated a high number of sexual risk behaviors and African Americans who indicated a low number of sexual risk behaviors. The study found that even among individuals who indicated fewer sexual risk behaviors, individuals that made an annual income of \$16,000 a year or less were 4.1 times as likely to have HIV than individuals with an annual income higher than \$16,000. Individuals with a lower number of sexual risk behaviors who had experienced food insecurity within the last six months, were still 2.8 times more likely to be HIV positive than low risk individuals who had not experienced food insecurity.

Other studies suggest that poverty and urbanization level may also have a relationship to HIV disparities. Vaughan, Rosenburg, Shouse, and Sullivan (2014) conducted a study analyzing HIV and poverty rates in 1,111 U.S. counties that varied in urbanization level, from a densely populated large central metropolitan to a less densely populated rural micropolitan. Vaughan et al. (2014) found that racial disparities in HIV rates were larger in more rural counties. In large metropolitan counties in which 30% of African Americans lived at or below the poverty level, Vaughan et al. (2014) found no significant difference in HIV rates among Whites and Blacks. However, for micropolitan counties, in which 30% of the Black population lived at or below the poverty level, HIV rates were 12.4 times higher in Blacks than Whites.

### **HIV Testing Behavior**

HIV testing is an essential component of HIV prevention. Individuals who are aware of their serostatus, the presence or absence of HIV antibodies in the bloodstream that indicate an HIV infection, can make informed decisions about their health and sexual partnerships. Knowing one's serostatus is the first step in maintaining a healthy life and reducing the spread of HIV. Limited research has examined the impact of various demographic and behavioral characteristics on HIV testing trends in the African American community. The relationship between HIV testing and age, gender, sexual orientation, and HIV/sexual health knowledge are discussed below.

**Age.** Age is strongly associated with both likeliness to test for HIV and past testing behavior. Among young African American adults, older ages tend to predict the likeliness of HIV testing in the past. According to a study by Boyd, Lea, Gilbert, and Butler-Barnes (2018) in which testing behavior was examined in young African American adults between the ages of 15 and 24, with every year increase in age, the likeliness of HIV testing increased by 32%. Another study by Funk, Inungu, Leveille, and Minelli (2018) also suggests age is an important factor in

HIV testing. According to Funk et al. (2018), African Americans between 25 and 34 were 2.39 times more likely to have tested for HIV than those under the age of 25. History of HIV testing was also 2.94 times more likely between the ages of 35 and 44 than any other age group. The only age group in the study that was less likely to have experienced HIV testing than those under the age of 25 were African Americans who were 55 and older (Funk Inungu, Leveille, & Minelli, 2018).

Among African American college students specifically, there is also a relationship between older age and HIV testing. In a study which surveyed seven historically Black colleges, Thomas et al. (2008) found that college students between the ages of 19 and 20 were the least likely to have tested for HIV. Students between 21 and 22 years old were more likely to have had HIV testing than 19 to 20-year olds by a factor of 1.4 and students in the 23 to 24 age group were more likely to have had HIV testing by a factor of 1.9. However, the age group of college students that were most likely of having undergone HIV testing was in the 25 to 29 age range. African American students between the ages of 25 and 29 were 2.8 times more likely to have had HIV testing than any other age group.

**Gender.** Past studies have also found an association between gender and HIV testing among African Americans. A study by Lo, Runnels, and Cheng (2018) that examined lifetime HIV testing, found that African American women were more likely to have had HIV testing than African American men. Similarly, Bogart et al. (2014) found that African American women were significantly more likely to have had HIV testing than African American men by 51%. Although higher rates of HIV testing are observed in African American women than men, there are some interesting gender differences when attitudes toward HIV are considered. According to Boyd et al. (2018), African American males who were comfortable discussing HIV with a partner were

4.2 times as likely to have had HIV testing than males who were not. However, African American women who were comfortable discussing HIV with a partner were 3.7 times more likely to have had HIV testing than women who were not. Among African American college students specifically, Thomas et al. (2008) found that African American women were slightly more likely to have had HIV testing than African American men.

**Sexual minority status.** There is a relationship between sexual minority status and HIV testing behavior in African Americans. A study by Lo et al. (2018) comparing predictors associated with HIV testing across racial groups found that among Black, White, and Asian American participants, sexual minorities have an increased likeliness to have received HIV testing compared to non-sexual minorities. Among African Americans specifically, Lo et al. (2018) found that African American sexual minorities were more 1.83 times more likely to have received HIV testing than non-sexual minorities. Sexual minority status also predicted history of HIV testing in African American college students. In a sample of over 5,000 African American college students, Thomas et al. (2008) found that bisexual students were twice as likely to have tested for HIV than heterosexual students. Additionally, Thomas et al. (2008) found that students who identified as gay, homosexual, or lesbian were 1.2 times more likely to have received HIV testing than heterosexual students.

**Knowledge.** HIV knowledge and HIV testing have a significant relationship among African Americans. A study by Boyd et al. (2018) found that among young African Americans in the age range of 15 to 24, HIV knowledge was associated with HIV testing. Participants in the study with a general HIV knowledge were more likely to have also had HIV testing than participants without general HIV knowledge by a factor of 1.65. Interestingly, knowledge of HIV prevention decreased the likelihood of having had HIV testing by 42% in the study. A study by

Washington, Robles, and Malotte (2013) that examined HIV testing behavior among African American MSM, found a relationship between HIV knowledge and HIV testing. The study categorized HIV knowledge into two levels, high and low. A high level of HIV knowledge was positively associated with HIV testing while a low level of knowledge was not.

### **Methods**

Survey data for this study was acquired from the Substance Abuse Resources and Disability Issues (SARDI) research program of Wright State University as part of a Substance Abuse and Mental Health Services Administration (SAMHSA) grant. The grant was funded in order to better understand the sexual health needs of African American college students. The SARDI research team collected data from 325 African American students from two universities, between the ages of 18 and 24. Self-reported data were collected from 2017 to 2018 and included student demographic information, sexual risk behaviors, perceived risk, substance usage, and campus resource awareness. Since the data used for this study were de-identified, an ethical review was not required (see Appendix A).

### **Eligibility Criteria**

Since the purpose of the original study was to assess the unique risk and protective factors of African American college students, participants had to meet certain demographic criteria in order to be eligible for the study. To be eligible for the study, students had to identify as Black or African American and be between the ages of 18 and 24. Ethnicity or identifying with other races in addition to African American/Black were not disqualifying factors. Participants also had to be enrolled at one of the two universities included in this study.

## Study Measures

**Demographics.** Demographic measures examined in the study were gender identity, sexual orientation, residential status, and student classification. For gender identity, students were given the option to identify as female, male, transgender or other. Sexual orientation categories included heterosexual, homosexual, bisexual, or other. For student classification, students had the option of selecting Freshman, Sophomore, Junior, or Senior. Students could select two options for student residential status, on-campus or off-campus.

**Sexual risk behaviors.** Several questions on the survey collected information on student sexual risk behaviors. Students were asked about several items including, if they had ever had a sexually transmitted infection (STI), if they had ever been tested for HIV, and if they had vaginal, anal, or oral sex within the past 90 days. Available responses included yes, no, or refused. Students were also asked how many sexual partners they had within the past 90 days. Additionally, a Likert scale response system was used to collect information on frequency of condom use among students. When students were asked how often they use a condom during vaginal or anal sex, students could indicate the following responses: never had vaginal or anal sex, every time, almost every time, sometimes, almost never, never or refused.

**Substance use.** The survey also collected information on student substance use. Questions primarily focused on alcohol and marijuana use. Students indicated the number of days they drank an alcoholic beverage or used marijuana within the past 90 days.

## Analysis

**Descriptive analysis.** To describe survey participants, a descriptive analysis was conducted using Microsoft Excel. Frequencies and percentages were calculated for all

categorical variables. Means and standard deviations were calculated for all continuous variables.

**Statistical analysis.** A chi-square test of independence was conducted using IBM SPSS statistical software, to investigate the relationship between HIV testing (have you ever tested for HIV: yes/no) and demographic factors, sexual risk behaviors, and substance use variables. A  $p < .05$  was regarded as statistically significant. All missing data and refused responses were excluded from analysis. For the category of gender identity, only males and females were included in analysis due to the very small sample size of students who identified as other or transgender ( $N = 1$ ). Due to a small sample size of sexual minorities, sexual orientation responses were grouped and analyzed as either heterosexual or non-heterosexual. The non-heterosexual category included students who identified as gay/lesbian, bisexual, or other. For number of sexual partners, responses were dichotomized into either one partner or more than one partner. For condom use frequency, categories were grouped as always, sometimes, or never. Students who reported using condoms almost every time, or almost never were grouped into the sometimes category

## Results

### Description of Participant Sample

**Demographics.** Of the participants included in analysis, the majority were female (56%). There were more heterosexual students (89%) than non-heterosexual students (11%). Most of the students were lowerclassmen (76%) and lived on-campus (79%). Frequencies and percentages of the demographic characteristics of the study sample are represented in Table 1.

Table 1

*Demographic Descriptive Characteristics of Sample*

Variable	Frequency	Percent (%)
<b>Gender Identity</b>		
Male	141	44
Female	182	56
Total	323	100
<b>Sexual Orientation</b>		
Heterosexual	281	89
Non-Heterosexual	35	11
Total	316	100
<b>Student Classification</b>		
Lowerclassmen		
Upperclassmen	244	76
Total	77	24
	312	100
<b>Residential Status</b>		
On-Campus	255	79
Off-Campus	68	21
Total	323	100

**Sexual Risk Behavior**

The percentage of students that were sexually active within the past 90 days was 70%. Percentage of condom use was varied with 32% of participants reporting condom usage every time within the past 90 days followed by almost every time (25%), sometimes (22%), almost never (8%), and never (13%). Most of the participants had never had an STI (90%). For HIV testing, 49% reported having ever been tested. The mean number of sexual partners reported within the past 90 days was 2.82 (standard deviation = 2.36). Of the students who were sexually active, the percentage of students that reported having more than one sexual partner in the past 90 days was 49%. Frequencies and percentages of the behavioral characteristics of the study sample are represented in Table 2.

Table 2

*Behavioral Descriptive Characteristics of Sample*

Variable	Frequency	Percent (%)
Sexual Activity		
Yes	225	70
No	98	30
Total	323	100
Had STI <sup>b</sup>		
Yes	32	10
No	290	90
Total	322	100
Numb. of Sex Partners		
1	117	51
>1	111	49
Total	228	100
Condom Usage		
Everytime	89	32
Almost Everytime	69	25
Sometimes	62	22
Almost Never	23	8
Never	33	13
Total	276	100

**Substance Use**

The percentage of students who reported using alcohol within the past 90 days was 50.8%. The percentage of students who used marijuana within the last 90 days was 44%.

Frequencies and percentages of substance use behavior of the study sample are represented in Table 3.

Table 3

*Description of Substance Usage among Sample*

Variable	Frequency	Percent (%)
Alcohol Use		
Yes	161	51
No	154	49
Total	315	100
Marijuana Use		
Yes	139	44
No	176	56
Total	315	100

**Relationships to HIV testing**

The chi-square analyses below examined the relationship between lifetime HIV testing behavior and various demographic and behavioral characteristics.

**Demographics.** A slightly higher percentage of male students tested for HIV (51.1%) than female students (48%). However, this study did not observe a statistically significant difference between females and males for never testing for HIV,  $X^2(1, N = 316) = .289, p = 0.591$ . There was also no significant relationship identified between sexual orientation and ever testing for HIV,  $X^2(1, N = 318) = 1.98, p = 0.287$ . However, a larger percentage of students who identified as sexual minorities reported having had an HIV test (56.8%) compared to their heterosexual counterparts (48.2%).

Unlike gender identity and sexual orientation, there was a relationship between HIV testing and student classification. Upperclassmen were more likely to test for HIV than lowerclassmen,  $X^2(1, N = 314) = 5.36, p = .021$ . Conversely, student residential status was not associated with HIV testing. There was no difference in HIV testing between students who lived on campus and students who lived off campus  $X^2(1, N = 316) = .014, p = 0.406$ . The relationship between demographic factors and HIV testing behavior are depicted in Table 4.

Table 4

*Relationship to HIV Testing among Four Demographic Characteristics*

Variable	Pearson Chi-Square	df	%	p
Gender Identity	.289	1		.591
Male			51.1	
Female			48.0	
Sexual Orientation	1.98	1		.287
Heterosexual			48.2	
Non-Heterosexual			56.8	
Student Classification	5.36	1		.021*
Lowerclassmen			45.4	
Upperclassmen			60.8	
Residential Status	0.14	1		.906
On-Campus			49.2	
Off-Campus			50.0	

**Sexual Risk Behavior.** Relationships between sexual risk behaviors and HIV testing varied, depending on the study measure. There was a significant relationship between recent sexual activity and HIV testing. Students who reported being sexually active within the last 90 days were more likely to have tested for HIV (60%) than students who were not sexually active within this time range (25%),  $X^2(1, N = 316) = 32.76, p \leq .0001$ . STI status was also associated with HIV testing. Students who reported having an STI were more likely to test for HIV (86.5%) than students who reported never having an STI (46.5%),  $X^2(1, N=315) = 13.05, p \leq .0001$ .

There was no relationship between HIV testing and the number of sexual partners or frequency of condom usage. Students who had more than one sexual partner (62%) were no more likely to have tested for HIV than students who had only one sexual partner (57.9%),  $X^2(1, N = 222) = .396, p = 0.529$ . Similarly, there was no significant difference in HIV testing behavior between students who reported condom use frequencies of never, sometimes, or

always,  $X^2(1, N = 270) = 4.71, p = .095$ . However, students who reported never using a condom were less likely to test (37.5%) compared to students who reported sometimes (58.4%) or always (52.8%) using condoms. Relationships between HIV testing and sexual risk factors are represented in Table 5.

Table 5

*Relationship to HIV Testing among Four Sexual Risk Behaviors*

Variable	Pearson Chi-Square	df	%	p
Sexual Activity <sup>a</sup>	32.76	1		$\leq .0001^*$
Yes			60	
No			25	
Had STI <sup>b</sup>	13.05	1		$\leq .0001^*$
Yes			80.6	
No			46.5	
Num.of Sex Partners <sup>c</sup>	5.36	1		.529
1			57.9	
>1			62	
Condom Usage <sup>d</sup>	0.14	2		.095
Always			52.8	
Sometimes			58.4	
Never			37.5	

**Substance use.** There was a significant relationship between HIV testing and substance use. Students who reported drinking alcohol in the past 90 days (54.7%) were more likely to have tested for HIV than students who did not drink (43.6%),  $X^2, (1, N=315) = 3.9, p = .048$ . Students who used marijuana in the past 90 days were also more likely to have tested for HIV (60%) than students who did not use marijuana (40.6%),  $X^2, (1, N = 315) = 11.75, p \leq .0001$ . The relationship between substance use and HIV testing behavior is depicted in Table 6.

Table 6

*Relationship between HIV Testing and Substance Use*

Variable	Pearson Chi-Square	df	%	p
Alcohol Use	3.90	1		.048*
Yes			54.7	
No			43.6	
Marijuana Use	11.75	1		≤.0001*
Yes			60	
No			40.6	

### Discussion

The results of this study were consistent with past studies that have observed variation in testing behavior based on demographic and sexual risk factors. Descriptive analysis of this sample indicated that the majority of participants are young, heterosexual and live on campus. The majority of students were also sexually active, with many students reporting more than one sexual partner. However, very few students reported ever having an STI. Trends in sexual risk behavior did not differ substantially from other college students nationally (ACHA).

Relationships to HIV testing were observed between student classification, recent sexual activity, and ever having an STI. Although, a relationship with HIV testing was not observed among all study measures, the results of the study indicate some trends in HIV testing history among African American college students.

### Demographic Factors and HIV Testing

Among the demographic factors analyzed in this study, student classification had a significant relationship with HIV testing. Upperclassmen were more likely to have had HIV testing than underclassmen. The relationship of student classification and HIV testing has been supported by other studies (Boyd, Lea, Gilbert, & Butler-Barnes, 2018; Thomas et al., 2008),

including one conducted by Dennison, Wu, and Ickes (2014). After surveying 7,183 college students from a large southern university, Dennison et al. (2014) found that older students were more likely to have ever tested for HIV than younger students. Although Dennison et al. (2014) did not specifically analyze student classification, there is a well-defined correlation between age and upper- or lowerclassmen status (Navarro, Garcia-Rubio, & Olivares, 2015).

Past literature suggests that female college students tend to test more for HIV than males (Caldeira, Singer, O'Grady, Vincent & Arrira, 2012; MacQueen et al., 2015; Thomas et al., 2008). However, this study did not find that females were any more likely to test than males. In fact, there was a slightly higher percentage of males who had tested for HIV than females. This result may be due to several reasons. It is possible that there are far fewer sexually active females in this sample than males. Also, there is a possibility that more females than males in this sample are engaged in long-term monogamous sexual partnerships. In that case, females in this sample would have fewer sexual risk factors than males and would not be expected to have a higher prevalence of HIV testing. This explanation is supported by past findings that suggest males tend to participate in more sexual risk behaviors than females, such as multiple sex partners (Crosby, Miller, Staten, & Noland, 2005; Dennison, Wu, & Ickes, 2014; Thomas et al., 2008).

Interestingly, sexual orientation was not associated with HIV testing in this study. This finding is contrary to evidence provided from prior literature which suggests that college students who identify as sexual minorities tend to test significantly more than their heterosexual counterparts (Caldeira et al., 2012; Crosby et al., 2005; Thomas et al., 2008). The discordance in results between this study and prior studies referenced could be due to the small percentage of sexual minorities in the study sample. Although there was no relationship between sexual orientation and HIV testing, this study did observe a higher percentage of non-heterosexual

students reporting having had HIV testing than heterosexual students. This result might indicate that a larger sample size may have resulted in a more statistically significant relationship between sexual orientation and HIV testing. Fewer students in this study sample may have self-identified as homosexual or bisexual due to stigma associated with homosexuality in African American communities (Fullilove & Fullilove III, 1999). A larger sample size of students may have mitigated the effect of stigma. Thomas et al. (2008) found that bisexual and homosexual African American students were more likely to test for HIV than their heterosexual counterparts. However, Thomas et al. (2008) had a much larger sample size than this study.

### **Sexual Risk Behaviors Associated with HIV Testing**

Among the sexual risk behaviors assessed, a relationship with ever having an STI and HIV testing was identified. Students who reported having an STI were more likely to have had HIV testing than students who did report having an STI. This result is supported by prior studies, including one by Tolou-Shams et al. (2007) who surveyed 1,400 African American adolescents and young adults between the ages of 15 and 21 about their sexual health history. Participants of the study who had a previous history of an STI were 2.19 times more likely to have had HIV testing than participants with no prior history of STIs.

A relationship between HIV testing and recent sexual activity was also observed in this study. Results from this study suggest that students who engaged in sexual activity in the past 90 days, were more likely to have tested for HIV than students who had not engaged in sexual activity within this time period. The findings from this study are supported by previous literature (Caldeira et al., 2012; Crosby et al., 2005; Dennison et al., 2014). The Thomas et al. (2008) study found that African American college students who were not sexually active within the past 12 months were less likely to have tested for HIV than students who reported being sexually activity

within the same time period. This result is not surprising as one would expect an individual who has not been sexually active to have zero to no risk of HIV infection.

Interestingly, a relationship between the number of sexual partners and having had HIV testing was not identified in this study. There was no significant difference in testing behavior between students who had one sexual partner and students who had more than one sexual partner. This finding is contrary to an abundance of prior literature which found that students with multiple sexual partners are more likely to have had HIV testing than students with only one partner (Caldeira et al., 2012; Dennison et al., 2014; MacQueen et al., 2015; Thomas et al., 2008). One would expect a student who engages in riskier sexual behavior to have a greater motivation to test for HIV than students who engage in less risky behaviors.

A study by Payne et al. (2006) suggests a possible reason for the decision not to test, even when sexual risk is high. Payne et al. (2006) investigated acceptance of HIV testing among African American college students attending an HBCU and found that students were more likely to test for HIV if they perceived themselves as high risk. It is possible students in this study did not have an accurate perception of their HIV risk based on their sexual behavior. This reasoning is consistent with a study by Sutton et al. (2011). After surveying 161 students enrolled in an HBCU, Sutton et al. (2011) found that the majority participants considered themselves at low risk for HIV despite half of this sample reporting having two or more sexual partners within the past 12 months with infrequent condom usage. Sutton et al.'s (2011) study suggests that some African American students may not have an accurate depiction of their individual sexual risk. Consequently, this underestimation of risk may cause students to feel less motivated to get HIV testing even when they are engaging in high risk sexual behaviors.

Frequency of condom use was another HIV risk behavior in this study that was not associated with HIV testing. There was no significant relationship observed between HIV testing behavior and condom frequency. However, the trend suggested that students who never used condoms were less likely to have tested for HIV than students who used condoms sometimes or always. The literature on the relationship of condom use frequency and HIV testing varies. The results of analyzing the relationship between frequency of condom use and HIV testing in this study was not consistent with research conducted by Caldeira, Singer, O'Grady, Vincent, and Arrira, (2012), which found a relationship between the number of a student's unprotected sexual activities in the past 30 days and HIV testing. According to Caldeira et al. (2012), students who reported a higher frequency of unprotected sexual activity, were also more likely to get tested for HIV than students who reported lower frequencies of sexual activity. Constantly, Dennison et al.'s (2014) study did not find a significant relationship between condom use frequency and HIV testing among college students.

The lack of a relationship between frequency of condom use and HIV testing in this study could be due to several reasons. One explanation is fear of knowing one's status. In this instance, students may be aware of their increased risk from certain sexual behaviors but exhibit HIV testing avoidance due to the fear of a positive result. Evidence of HIV testing avoidance behavior was identified in a study by Hall, Peterson, and Johnson (2014) that examined barriers to HIV testing. After interviewing 57 African American undergraduate students, Hall et al. (2014) found that fear of knowing status was one of the major barriers to HIV testing among the sample. Hall et al. (2014) proposes that this fear could be explained by lingering stigma associated with HIV, especially in communities of color.

Alternatively, the absence of a relationship found between frequency of condom use and HIV testing could be explained by the type of sexual partnership. Several studies suggest that students who reported being in monogamous relationships tend to use condoms far less frequently than students with non-monogamous sexual partnerships (Whaley & Winfield, 2003; Norwood & Zhang, 2015). A study by Whaley and Winfield (2003) suggests that infrequent condom use among monogamous partnerships is due to increased attitudes of trust and a low perception of sexual risk. As referenced earlier, HIV testing among African American college students is less likely to occur when individual perception of risk is low (Payne et al., 2006). For this study, students who reported having only one sexual partner in the past 90 days comprised a larger percentage of the sample than students who reported having two or more sexual partners. It is possible that the reason this study did not find that students who reported never using condoms to be more likely to test for HIV than students who reported using condoms sometimes or always, could be because the students who report never using condom are in monogamous partnerships and feel less motivated to test.

**Substance use and HIV testing.** Both marijuana and alcohol use were associated with having had HIV testing among African American college students. Although few studies have examined the association of substance use and HIV testing behavior, substance use among college students is related to riskier sexual behavior (Flannery & Ellingson, 2003). It possible that students who used substances of a high perception of risk than students who do not use substances. This explanation is supported by previous research that suggests non-injection drug users were more likely to have had HIV testing in the past year (Guimaraes et al., 2017).

**Limitations**

Although this study presented many interesting findings, there were some limitations. A major limitation of this study was that student responses were self-reported. Due to the sensitive nature of the questions asked, students may have responded in ways they perceived to be more socially acceptable. Also, since students were asked questions about past behaviors, there was also the potential for recall bias in the responses.

Another limitation to the study was sample size. Due to the small sample size of the study, the number of students in some subgroups in the sample may not have been reflective of the true number in the population. For example, the percentage of students in the sample who identified as gay/lesbian, bisexual, or other was relatively low. Also, students who identified with gender identities other than female or male were unfortunately not represented in the study due to their very small sample size. This is particularly disappointing as gay, lesbian, bisexual, and transgender young people are at an elevated risk for HIV. A larger sample size may have produced more informative results about HIV testing within these subgroups. Future studies on HIV testing behaviors among African American college students may want to consider focusing on sexual minorities and non-cis gendered students due to their very low representation in this study and overall research literature.

**Public Health Implications and Recommendations**

There are many reassuring results from this study. In many cases, African American students engaged in sexual risk behaviors are utilizing HIV testing services. Findings suggest that students who are sexually active and have previously had an STI in the past are likely to have also tested for HIV. However, there were some findings of concern. Results from this study indicated that students who reported not using condoms or using them inconsistently were not

more likely to test for HIV. This problematic has in infrequent condom usage is a well-established HIV risk factor. Similarly, students who had multiple partners, another HIV risk factor, were not more likely to have tested for HIV. Other groups that exhibited a low testing prevalence were males, heterosexual students, and younger students. Preventative intervention strategies may consider tailoring programs to target these groups.

It is possible that low HIV testing prevalence among students practicing risky sexual behaviors is due to a low perception of individual risk. Preventative Interventions strategies for African American students may consider providing knowledge on HIV risk behaviors as a component of a comprehensive initiative. Another major barrier to HIV testing for African American students is HIV stigma. Hall et al. (2014) recommends that offering a group testing environment may alleviate stigma. Students interviewed in the Hall et al. (2014) study said they would be more likely to test if they could go with a group of friends. Creating an HIV testing structure in which students can get tested in groups among their peers may alleviate some anxiety and place HIV testing within a context associated with more casual and routine wellness services. Having conversations about HIV are also known to reduce stigma. Hosting HIV discussions or integrating HIV discussions into student health forums may be particularly helpful in targeting stigma in this population.

Finally, student health centers may consider integrating sexual health services with mental health services as some sexual risk behaviors such as substance use are linked with mental health symptoms. There is a particularly high prevalence of marijuana use within this population compared to the national average usage of other college students. A high prevalence of marijuana use may be an indication of mental health concerns such as anxiety and depression. Minority groups are often more susceptible to stressors due to experiences of individual and

institutionalized racism. Additionally, subgroups of African American students such as students belonging to LGBTQ communities may face multiple layers of discrimination based on their sexual orientation and/or gender identity. Creating a campus environment in which students belonging to vulnerable groups feel safe and valued as members of the educational community is essential to maintaining student mental health and sexual health and the reduction of risk behaviors.

### **Conclusion**

African Americans are disproportionately affected by HIV in the U.S. Among the subgroups most affected are youth between the ages of 16 and 29. Although the literature has suggested that young people have a higher prevalence of sexual risk behaviors than other age groups, sexual risk behaviors alone do not explain the disparity in new HIV diagnoses between African Americans and Whites. The literature also suggests that many structural factors such as access to healthcare and poverty may also be risk factors for HIV. In order to address the needs of young African American adults, HIV prevention efforts must understand both the sexual risk behaviors and structural factors associated with HIV.

To better understand the sexual health needs of African American college students, this study will utilize behavioral health survey data collected as part of a community needs assessment to assess the self-reported sexual risk behaviors and the impact of demographic and behavioral characteristics on HIV testing behavior in this population. By understanding the unique risk factors of this population and the barriers to HIV prevention and testing, this study aims to identify gaps in service provision and provide recommendations for improved prevention efforts for this vulnerable population.

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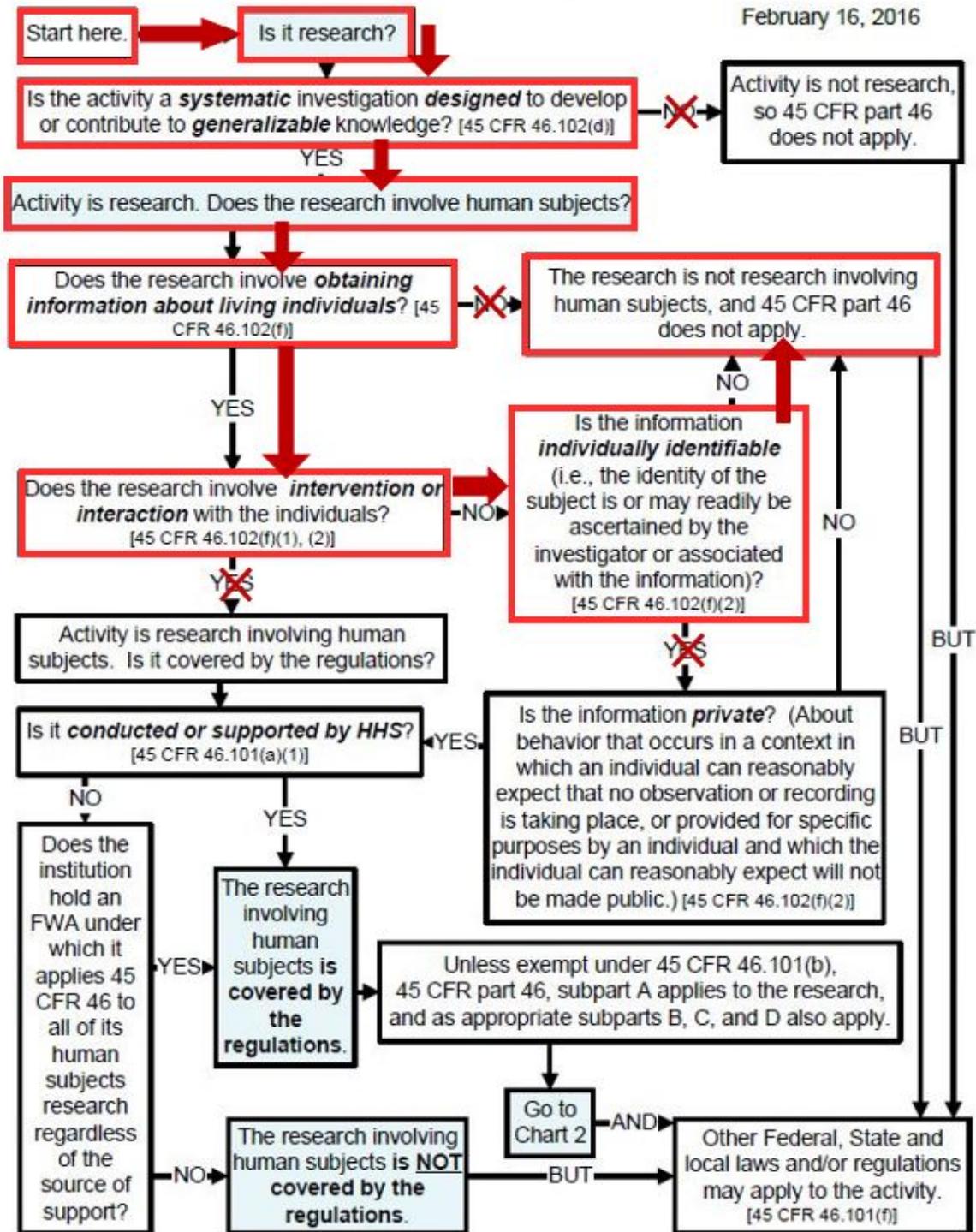
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Appendix A: Human Subjects Regulations Decision Chart

**Chart 1: Is an Activity Research Involving Human Subjects Covered by 45 CFR part 46?**



Appendix B: List of Competencies Met in Integrative Learning Experience

**CEPH Foundational Competencies**

<b>Evidence-based Approaches to Public Health</b>	
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	
4. Interpret results of data analysis for public health research, policy or practice	
<b>Public Health &amp; Health Care Systems</b>	
6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels	
<b>Planning &amp; Management to Promote Health</b>	
7. Assess population needs, assets and capacities that affect communities' health	
11. Select methods to evaluate public health programs	
<b>Communication</b>	
19. Communicate audience-appropriate public health content, both in writing and through oral presentation	

**WSU MPH Health Promotion & Education Concentration Competencies**

5. Demonstrate the ability to conduct process, impact, and outcome evaluations of health promotion programs and policies.
6. Critique basic behavioral and evaluation research.