

## HIV Testing and Associated Characteristics Among Black Cisgender and Transgender Women in the United States

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This study received approval from the Institutional Review Board at Michigan State University (MSU STUDY ID: STUDY00003157). I would like to thank my committee members Drs. Kaston Anderson-Carpenter, William Chopik, Ignacio Acevedo Polakovich, and Jae Puckett for their support and guidance on this project. I have no conflicts of interest to declare.

### Abstract

Black women in the United States continue to be disproportionately affected by HIV. HIV testing is an important preventative step in the HIV continuum of care, however there is little known about HIV testing among these groups. Therefore, the purpose of this study is to examine the HIV testing behaviors of Black transgender women and explore differences in predictors of HIV testing among Black cisgender and transgender women. This study uses secondary data from the 2014-2017 modules of the Behavioral Risk Factor Surveillance System. Analyses included multiple hierarchical regression. There are no major differences in HIV testing between Black cisgender and transgender women. A number of sociodemographic characteristics have been shown to predict HIV testing among Black cisgender women, but only employment status and age were significant predictors of HIV testing among Black transgender women. A moderation analysis suggested that gender identity significantly moderates the association between employment status and HIV testing such that the relationship between employment status and receiving an HIV test differs by gender identity. The findings of this study highlight nuances in HIV testing among Black cisgender and transgender women that are useful for improving HIV testing as a mode of HIV prevention. Overall, the findings contribute to our understanding of HIV testing practices among Black cisgender and transgender women.

*Keywords:* HIV testing, Black women, transgender health

### Introduction

Current estimates suggest that one in seven transgender (hereafter, trans) women have HIV (Becasen et al., 2018); it is suspected that the rates are even higher among Black trans women (Bukowski et al., 2018), therefore, they are not receiving treatment and are likely to continue to engage in risky sexual behaviors that further contributes to the increased rates of HIV in the Black community. The prevalence of HIV/AIDS among Black women is particularly alarming with Black women comprising 11% of all new HIV diagnoses and 60% of HIV diagnoses among all American women (Centers for Disease Control and Prevention, 2018). In recent years, the rate of infection among Black women has declined but is still significantly higher than other ethnicities (Bradley, 2019).

Trans women, women who were assigned male at birth but currently identify as female, are considered to be high risk for HIV (Clements-Nolle et al., 2001) and are 34 times more likely to acquire HIV in the United States relative to the general population (Baral et al., 2013). Similar to trends among Black cisgender women—women who are assigned female at birth and currently identify as female (hereafter, cis), Black trans women are more susceptible to HIV infection. The literature suggests that of all racial, gender, and sexual minority groups, Black trans women are among the most susceptible to HIV infections and diagnosis (Denson et al., 2017; Herbst et al., 2008; Hwang & Nuttbrock, 2007). Research attributes the high rates of HIV among Black trans women to factors such as violence, limited access to care, stigma, high levels of engagement in sex work, riskier sexual behavior, substance abuse and intravenous drug use (De Santis, 2009; Wansom et al., n.d.).

The needs of trans communities are distinct and independent from those of other groups, and thus require a separate analysis from the typical, dichotomous understanding of gender (World Health Organization, 2014). Often times, research exploring HIV among trans women has not been distinguished from findings on HIV among men who have sex with men (MSM) (Frye et al., 2015; Golub & Gamarel, 2013; Muessig et al., 2014; Poteat et al., 2016). HIV research that presents trans women and MSM in the same analysis leaves unanswered whether trans women are at a uniquely higher risk of HIV. It is crucial to conduct HIV research that focuses explicitly on trans women, as studies have demonstrated that discrimination, stigma, and social oppression of individuals with marginalized identities may be a more significant determinant HIV testing and acquisition than the aforementioned risk behaviors (Peterson et al., 2014; Ransome et al., 2016).

HIV testing is an important step in prevention, yet there is a gap in the literature concerning HIV testing among Black trans women. In the current study, we aim to describe HIV testing behaviors among Black trans and cis women. Specifically, we examine whether rates of HIV testing vary between Black trans and cis women and whether HIV risk is a particularly strong predictor of HIV testing among these groups. The hypothesis that guides study is informed by an intersectional framework which suggests that multiple social and political identities overlap or intersect to create different forms of advantages or oppression (Crenshaw, 1990). Therefore, we hypothesize 1) Black trans women will be less likely to receive an HIV

test than Black cis women, 2) both cis and trans women who engage in high risk behaviors will be less likely to receive an HIV test, and 3) the relationship between the statistically significant sociodemographic predictors and HIV testing will vary by gender identity.

## Methods

This study used secondary data from the Behavioral Risk Factor Surveillance System (BRFSS) to examine HIV testing behaviors, the association between sociodemographic factors and HIV testing, and the association between high-risk behaviors and HIV testing among Black cis and trans women. This study received approval from the Institutional Review Board at Michigan State University (MSU STUDY ID: STUDY00003157).

## Sample

The sample for this study was constructed from participants in the CDC's 2014-2017 BRFSS modules, a national telephone survey that assesses health risk in the United States. The 2014-2017 BRFSS modules were administered to non-institutionalized adults (i.e., age  $\geq 18$ ) in the United States. Across all four years, there were 1,842,439 participants in the BRFSS modules. Participants were contacted via cell phone and landlines. Disproportionate stratified sampling was used for landline samples and simple random sampling was used for cellular samples. The median response rate for cellphones and landlines 2014-2017 was 46.13% across all states. More information about the methodology of the BRFSS can be found on the BRFSS website (CDC, n.d.). Only self-identified Black women were selected for this study ( $n = 36,056$ ). A subpopulation of trans women ( $n = 170$ ) was drawn to examine the odds of a lifetime HIV test and associated sociodemographic factors among Black trans women alone.

## Measures and Variables

The data for this study focused on sociodemographic characteristics, gender identity, HIV risk, and HIV testing behaviors. Our outcome variable, HIV testing behaviors, is defined as whether or not one has ever received an HIV test. Receiving an HIV test was assessed by one item that assesses if the participant had ever been tested for HIV (yes/no). For gender identity, we created an indicator based on one's reported sex and gender identity. Participants who identified as female and not transgender received a 0 and participants who identified as female and transgender received a 1. Sociodemographic variables included age, education, income, marital status, employment status, having a primary care provider, receiving delayed healthcare, having health insurance, and metropolitan status. Age was categorized into three groups (i.e., 18-34 years, 35-49 years, 50 years or older).

Education was collapsed into two categories (high school or less, college or more). Income level was defined categorically as less than \$20,000, \$20,000-\$49,999, \$50,000-\$74,999, and \$75,000 or more. Categories for marital status included married/partnered, not married, and widowed. Employment status was measured by four categories: employed, unemployed,

retired, and other (i.e., students and home makers). Our indicator for having a primary care provider, receiving delayed healthcare, and having health insurance were each set to 1 if the participant responded yes and 0 if the participant responded no. Metropolitan status was categorized as metropolitan, suburban, and non-metropolitan. HIV risk was assessed only in 2016 and 2017 by one item for which participants responded “yes” certain high-risk behaviors and situations applied to them.

### *Data Analysis*

We summarized participant demographics using weighted proportion descriptive statistics. Hierarchical logistic regression analyses was used to identify the association between the sociodemographic variables and HIV testing and to determine if whether or not the statistically significant associations varied by gender identity. Results from the hierarchical logistic regression models are presented as exponentiated odds ratios and 95% confidence intervals. All analyses were completed using SPSS Version 25, and statistical significance was established at  $\alpha < .05$ .

## Results

### *Sociodemographic Characteristics*

Table 1 contains sociodemographic statistics of the analytic sample ( $N = 32,226$ ). Of that number, 99.5% ( $n = 36,056$ ) were cis women and 0.5% ( $n = 170$ ) identified as trans women. The sample ranged in age from 18 to 80 years ( $M = 55.36$ ,  $SD = 17.09$ ). The majority of the sample was married or partnered (56.3%). Approximately 35.1% of trans women had completed college or more compared to 59.1% of cis women. Among trans women, 47.5% of the sample had an income of \$20,000 or less, compared to 28.4% of cis women with an income level of \$20,000 or less. Approximately 45.8% of the sample was employed, and 70.9% lived in a metropolitan area.

### *Differences in HIV Testing Behaviors among Black Trans and Cis Women*

The results indicated that 50% of trans women reported lifetime HIV testing compared to 51.2% of cis women. There was no statistically significant difference in odds of lifetime HIV testing between cis and trans women (see Table 2). Although Black trans women had relatively higher odds of being tested for HIV compared to Black cis women (AOR= 1.01, 95% CI= 0.69-1.47), this finding was not statistically significant.

Table 1. Sociodemographic characteristics of Black women by gender identity.

Sociodemographic characteristic	Cis women <i>n</i> (%)	Trans women <i>n</i> (%)	Total sample <i>n</i> (%)
<b>Age</b>			
18-34 years	6,109 (16.9)	37 (0.1)	6,146 (17.0)
35-49 years	7,517 (20.8)	24 (0.07)	7,551 (20.8)
50+ years	22,420 (61.9)	109 (0.30)	22,529 (62.2%)
<b>Income</b>			
less than \$20,000	10,249 (28.3)	66 (0.18)	10,315 (33.1)
\$20,000-\$49,999	11,964 (33)	50 (0.14)	12,014 (38.5)
\$50,000-\$74,999	3,732 (10.3)	9 (0.02)	3,741 (12.0)
\$75,000+	5,123 (14.1)	14 (0.04)	5,137 (16.5)
<b>Education Level</b>			
High School or Less	14,698 (40.6)	109 (0.30)	14,807 (40.9)
College or More	21,256 (58.7)	59 (0.16)	21,315 (58.8)
<b>Employment Status</b>			
Employed	16,402 (45.3)	71 (0.20)	16,473 (45.8)
Unemployed	7,304 (20.2)	49 (0.14)	7,353 (20.5)
Retired	9,431 (26.0)	38 (0.10)	9,469 (26.3)
Other	2,646 (7.3)	12 (0.03)	2,658 (7.4%)
<b>Marital Status</b>			
Married/Partnered	10,635 (28.6)	51 (0.14)	10,686 (29.7)
Not Married	19,320 (53.3)	93 (0.26)	19,413 (54.0)
Widowed	5,855 (16.2)	24 (0.07)	5,879 (16.3)
<b>Metropolitan Status</b>			
Metropolitan	15,367 (42.4)	54 (0.15)	15,691 (70.9)
Suburban	3,122(8.6)	10 (0.03)	3,132 (14.1)
Non-metropolitan	3,301 (9.1)	19 (0.05)	3,320 (15.0)

### *Factors Associated with HIV Testing among Black Trans Women vs Black Cis Women*

Table 2 shows adjusted odds ratios and 95% confidence intervals for predictors of HIV testing in the overall sample and stratified by gender identity. All variables except gender identity, income, unemployment, and health plan were statistically significant predictors of HIV testing in the overall sample. For example, among Black women, those between the ages of 35 and 49 were almost one and one quarter times more likely to receive an HIV test compared to those in the 18-34 age group (AOR: 1.24, 95% CI: 1.13, 1.35). However, Black women 50 years or older were significantly less likely to receive an HIV test (AOR: 0.30, 95% CI: 0.28, 0.33). Additionally, those who had a college education or more showed significantly differential odds of receiving an HIV test (AOR: 1.38, 95% CI: 1.30, 1.46). Black women who were retired

Table 2. Regression results for sociodemographic covariates by gender.

Predictor	Black Cisgender Women		Black Transgender Women		Total	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Gender Identity					1.01	(0.69, 1.47)
Age						
18-34 years old	--	--	--	--	--	--
35-49 years old	1.23***	(1.13, 1.35)	1.80	(0.41, 7.99)	1.24***	(1.13, 1.35)
50 years or older	0.30***	(0.28, 0.33)	0.30	(0.09, 1.05)	0.30***	(0.28, 0.33)
Income	0.98	(0.95, 1.01)	0.93	(0.56, 1.55)	0.98	(0.95, 1.01)
Education	1.38***	(1.30, 1.46)	2.44	(0.94, 6.37)	1.38***	(1.30, 1.46)
Employment Status						
Employed	--	--	--	--	--	--
Unemployed	1.06	(0.98, 1.14)	5.71**	(1.71, 19.07)	1.06	(0.99, 1.14)
Retired	0.37***	(0.35, 0.40)	1.74	(0.52, 5.87)	0.38***	(0.35, 0.40)
Other	0.65***	(0.59, 0.73)	4.50	(0.63, 32.00)	0.66***	(0.59, 0.73)
Marital Status						
Married/Partnered	--	--	--	--	--	--
Not Married	1.30***	(1.22, 1.38)	0.98	(0.34, 2.83)	1.30***	(1.22, 1.38)
Widowed	0.76***	(0.70, 0.83)	0.61	(0.15, 2.46)	0.76***	(0.70, 0.83)
Metropolitan Status						
Metropolitan	--	--	--	--	--	--
Suburban	0.89**	(0.81, 0.97)	3.54	(0.68, 18.47)	0.89*	(0.81, 0.97)
Not Metropolitan	0.61***	(0.56, 0.67)	0.91	(0.25, 3.33)	0.61***	(0.55, 0.67)
Healthcare	1.03	(0.94, 1.14)	1.55	(0.39, 6.21)	1.03	(0.94, 1.14)
Primary Care Provider	1.26***	(1.15, 1.37)	2.21	(0.61, 7.99)	1.26***	(1.16, 1.38)
Delayed Care	1.33***	(1.19, 1.48)	1.13	(0.25, 5.21)	1.33***	(1.19, 1.48)
HIV Risk	2.01***	(1.65, 2.45)	15.09*	(1.50, 151.82)	2.05***	(1.69, 2.50)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

(AOR: 0.38 95% CI: 0.35, 0.40), students or homemakers (AOR:0.66, 95% CI: 0.59, 0.73) reported a significantly lower odds of receiving an HIV test compared to Black women who were employed. Compared to Black women who were married or partnered, Black women who were widowed were significantly less likely to receive an HIV test (AOR: 0.76, 95 %CI: 0.70, 0.83) while those who were not married were reported significantly greater odds of receiving an HIV test (AOR: 1.30, 95% CI: 1.22, 1.38) relative to married or partnered Black women. Metropolitan status was a significant predictor in the overall sample such that those in suburban (AOR:0.89, 95% CI: 0.81, 0.97) and other types of non-metropolitan areas (AOR: 0.61, 95% CI: 0.55, 0.67) are significantly less likely to receive an HIV test compared to those in metropolitan areas. Having a primary care provider (AOR: 1.26, 95% CI: 1.16, 1.38), delaying medical care (AOR: 1.33, 95% CI: 1.19, 1.48), and engaging in HIV risk behaviors (AOR: 2.05, 95% CI: 1.69, 2.50) were all associated with having a significantly higher odds of receiving an HIV test.

Stratified analyses showed that predictors of HIV testing among Black cis women were nearly identical to those reported in the overall sample. Compared to employed Black trans women, unemployed Black trans women had a significantly greater odds of having ever received an HIV test (AOR = 4.72; 95% CI = 1.52,14.66). However, unemployment status was not a significant predictor of HIV testing among Black cis women (AOR = 1.06; 95% CI = 0.98,1.14). The significant relationship between HIV risk and HIV testing among Black trans women suggests that Black trans women who are at risk for HIV are significantly more likely to receive an HIV test compared to Black trans women who are not at risk for HIV (AOR = 15.09; 95% CI = 1.50,151.82).

### *A Moderation Analysis of Sociodemographic Predictors, Gender Identity, and HIV Testing*

In addition to examining main effects of sociodemographic characteristics, we also investigated whether gender identity (e.g., cis or trans) moderated the relationship between the statistically significant sociodemographic These results are shown in the second block of Table 3. The model revealed a significant interaction between HIV testing and employment status (retired [AOR: 5.43, 95% CI: 1.73, 17.01] and unemployed [AOR: 4.68, 95% CI: 1.42, 15.46]). A simple slope analysis revealed that employed Black cis women had greater odds of receiving an HIV test than their trans peers, while trans women who were unemployed and retired were significantly more likely to receive an HIV test compared to cis women with similar occupations. It is important to note that this interaction effect only included the employment status of 49 Black trans women.

Table 3. Hierarchical regression results with interactions.

Predictor	Block 1		Block 2	
	AOR	95% CI	AOR	95% CI
Gender Identity	1.01	(0.69, 1.47)	0.10*	(0.01, 0.70)
Age				
18-24 years old	--	--	--	--
35-49 years old	1.24***	(1.13, 1.35)	0.86	(0.19, 3.86)
50 years or older	0.30***	(0.28, 0.33)	0.30	(0.09, 1.06)
Income	0.98	(0.95, 1.01)	0.98	(0.95, 1.01)
Education	1.38***	(1.30, 1.46)	0.79	(0.31, 2.00)
Employment Status				
Employed	--	--	--	--
Unemployed	1.06	(0.99, 1.14)	1.06	(0.98, 1.14)
Retired	0.38***	(0.35, 0.40)	0.37***	(0.35, 0.40)
Other	0.66***	(0.59, 0.73)	0.65***	(0.59, 0.73)
Marital Status				
Married/Partnered	--	--	--	--
Not Married	1.30***	(1.22, 1.38)	1.73	(0.65, 4.59)
Widowed	0.76***	(0.70, 0.83)	0.92	(0.23, 3.64)
Metropolitan Status				
Metropolitan	--	--	--	--
Suburban	0.89*	(0.81, 0.97)	0.22	(0.04, 1.13)
Not Metropolitan	0.61***	(0.55, 0.67)	0.42	(0.11, 1.53)
Healthcare	1.03	(0.94, 1.14)	1.03	(0.94, 1.14)
Primary Care Provider	1.26***	(1.16, 1.38)	0.61	(0.19, 2.01)
Delay Care	1.33***	(1.19, 1.48)	1.55	(0.33, 7.24)
Risk	2.05***	(1.69, 2.50)	0.27	(0.03, 2.87)
Gender Identity x Age				
18-34 years old	--	--	--	--
35-49 years old			1.43	(0.32, 6.32)
50 years or older			1.00	(0.29, 3.51)
Gender Identity x Education			1.74	(0.69, 4.39)
Gender Identity x Employment Status				
Employed	--	--	--	--
Unemployed			5.43**	(1.73, 17.01)
Retired			4.68*	(1.42, 15.46)
Other			6.52	(0.97, 44.03)
Group x Marital Status				
Married	--	--	--	--
Not Married			0.75	(0.29, 2.00)
Widowed			0.83	(0.21, 3.25)
Gender Identity x Metropolitan Status				
Metropolitan	--	--	--	--
Suburban			4.08	(0.79, 21.11)
Not Metropolitan			1.46	(0.40, 5.28)
Gender Identity x Delay Care			0.86	(0.19, 3.96)
Gender Identity x Risk			7.33	(0.72, 74.78)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$



## Discussion

Guided by an intersectional approach, this study explored HIV testing behaviors of Black trans women and compared them to testing behaviors among Black cis women. For this study, HIV testing behaviors were defined as a person having received an HIV test at least once in their life. Furthermore, the study examined HIV risk as a predictor of HIV testing, while also identifying sociodemographic factors associated with HIV testing behaviors and if they were moderated by gender identity. Our findings generally do not support our hypotheses. Although prior studies suggest that Black trans women are disproportionately affected by a number of structural factors that contribute to increased HIV vulnerability and HIV diagnosis (Clements-Nolle et al., 2001; Herbst et al., 2008), results of this study contradict previous reports on correlates of HIV testing among trans women (Logie et al., 2016; Rutledge et al., 2018). Our identification of HIV risk as a significant predictor of HIV testing is also inconsistent with prior literature on the association between HIV risk and HIV testing which identify HIV risk as a barrier to HIV testing (Dailey et al., 2017; Mills et al., 2011).

The results revealed some interesting information regarding the association between age and HIV testing. The multivariable logistic regression models suggest that older Black trans women and Black cis women were less likely to receive an HIV test compared to Black cis and trans women within the 18-34 year old age range. This result is consistent with previous literature that suggests that older adults are less likely to receive an HIV test (Akers et al., 2008; Wigfall et al., 2011). Findings by other researchers attributed low testing rates among older adults to factors such as limited knowledge, and low self-perceived risk (Guo & Sims, 2017).

Gender identity was not shown as a predictor or moderator of HIV testing, which was anticipated based off of trans women's disproportionate burden of HIV (Baral et al., 2013; Herbst et al., 2008) and their unique vulnerability to HIV (Hwahng & Nuttbrock, 2007; Poteat et al., 2014). Besides HIV risk, unemployment was the only covariate that emerged as a significant predictor of HIV testing among Black trans women. Consistent with previous literature on unemployment and HIV testing (Brown et al., 2007), Black trans women who were unemployed were almost five times more likely to have received an HIV test in their lifetime compared to Black trans women who were employed. The relationship between employment status and receiving an HIV test among cis women indicated that cis women who were retired or had other types of employment (e.g., homemakers or students) were significantly less likely to receive an HIV test relative to employed cis women. It is also worthwhile to note that because some types of self-employment are nontraditional (e.g., sex work), there could be variation in how respondents classified their own employment status. Overall, the association between HIV testing and employment status has been inconsistent in previous literature. On one hand, employment status has not been shown to be a significant predictor among Black people (Benavides-Torres et al., 2012), while other studies suggest that Black people who were employed were more likely to have ever received an HIV test compared to those who were unemployed (Funk et al., 2018).

### *Limitations*

There are several limitations to consider for this study. One major limitation is that all data in this study was self-reported. While the BRFSS has been shown to be a reliable and useful dataset for HIV testing research (Rountree et al., 2009), participants may have reported inaccurate responses due to issues such as recall bias or social desirability. It is also important to note that because the BRFSS collects data via landline and cellular phones, those who do not have access to a landline or cellular phone are not represented in this data (e.g., those who are institutionalized). As previously mentioned, the way that the BRFSS measured HIV risk is also a major limitation. The BRFSS used one item to assess HIV risk, which only asked participants to respond yes or no if they participated in any of the risk behaviors that were stated. This item may not have adequately captured the complex nature of risk. Other studies have found variability in the ways that different types of risk behaviors are associated with HIV risk (Emmanuel & Link to external site, 2019).

Because this was a secondary data analysis, the analysis was limited to the questions that were assessed by BRFSS. Given this, some of the important perspectives that have been shown to greatly influence the well-being of Black women were not captured in this study. For example, the BRFSS did not gather any information on experiences of discrimination in healthcare settings. In addition to conducting bivariate analyses of health outcomes of intersectional groups, gathering information on discrimination has been shown to be an important component of taking an intersectional approach (Bauer & Scheim, 2019). Having information on experiences of discrimination would have been useful for further developing the intersectional grounding of this study.

### **Conclusion**

The results of this study provide information that can help public health practitioners with the development of HIV testing initiatives that address the needs of two historically marginalized populations. The varied number of sociodemographic predictors that emerged as statistically significant predictors of HIV testing suggest that HIV testing interventions should not be “one-size-fits-all”. Public health professionals should consider developing testing interventions that are tailored to the specific needs of Black cis and trans women. These interventions should be guided by an understanding of how different sociodemographic factors are associated with HIV testing. The information provided in this study may help public health professionals in terms of developing resources and providing guidance for vulnerable and diverse populations concerning HIV testing. Furthermore, knowing which sociodemographic groups are not getting tested increases the ability of public health professionals to be able to target these groups. For example, knowing that Black trans women who are employed have lower odds of getting tested compared to those who are unemployed, retired, students, or homemakers may motivate public health practitioners to begin exploring ways to increase testing among employed Black trans women. More research is needed to better understand the interaction between employment, gender identity, and HIV testing.

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