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## Characterizing the HIV Care Continuum and Identifying Barriers and Facilitators to HIV Diagnosis and Viral Suppression among Black Transgender Women in the United States

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### Abstract

**Background:** Although Black transgender women (BTW) experience high prevalence of HIV in the United States, no characterization of the HIV care continuum exists for this population. This study addresses this gap by (1) characterizing the HIV care continuum, and (2) exploring correlates of HIV diagnosis and viral suppression among a community based sample of BTW.

**Methods:** Data came from *Promoting Our Worth, Equality, and Resilience* (POWER). From 2014 to 2017, POWER recruited BTW who attended Black Pride events in six U.S. cities.

**Participants completed a behavioral health survey and were offered onsite HIV testing. Simple frequencies were used to characterize the HIV care continuum, and multivariable logistic regression analysis was used to identify correlates of HIV diagnosis and viral suppression.**

**Results:** A total of 422 BTW provided completed data for our analysis, 45.0% of whom were living with HIV. Over half of the HIV-positive BTW (51.4%) reported being undiagnosed at the time of survey, and 24.5% reported viral suppression. Incarceration and a lack of access to medical care were significantly and positively associated with an undiagnosed HIV-positive status in multivariable models. Incarceration, homelessness, polydrug use, physical assault, intimate partner violence, and current hormone use were significantly and negatively associated with viral suppression in multivariable models.

**Conclusion:** Developing and implementing interventions that address timely HIV diagnosis may assist in informing the HIV disparity among BTW in the U.S. Interventions should address the fundamental causes of poor health in this population.

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## Keywords

transgender; HIV diagnosis; HIV care; Black; “African American”

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## Background

Black transgender women (BTW) experience a **high burden** of HIV in the United States. A 2008 meta-analysis reported HIV prevalence of 56% in this population,<sup>1</sup> with a **more recent study reporting HIV prevalence of 29.0% among Black and Latina transgender women in three U.S. metropolitan areas.**<sup>2</sup> Given the high prevalence of HIV, **advancing the test and treat strategy among BTW could effectively prevent additional HIV infections among BTW’s sexual partners while improving the health of BTW.** Viral suppression is supported as a means to lower HIV incidence,<sup>3–5</sup> and the personal health benefits to early treatment are understood.<sup>6</sup> Before test and treat interventions are implemented among BTW, the HIV care continuum should be characterized in this population. As the HIV care continuum represents the steps required for an individual to achieve viral suppression, identifying the prevalence of HIV-positive BTW at each stage of the continuum (i.e., HIV diagnosis, linkage to HIV care, retention in HIV care, adherence to antiretroviral medications, viral suppression) can elucidate where interventions should be targeted. While several characterizations of the HIV care continuum combine transgender women with men who have sex with men (MSM),<sup>7</sup> few examine these outcomes among transgender women exclusively.<sup>8</sup> Moreover, no characterizations of the HIV care continuum among exclusively BTW exist.

While characterizing the HIV care continuum will explicate where along the continuum interventions should be targeted, it alone will not illustrate what such interventions should address in order to attenuate disparities. Disparity reduction requires identifying correlates of care continuum outcomes. Currently, limited research identifying correlates of these outcomes among BTW exists. However, general health research among transgender women, as well as HIV research in other populations (e.g., MSM), point to potential correlates that should be examined.<sup>9,10</sup> Transgender women experience limited access to education, housing, and health care.<sup>1</sup> Transgender women achieve fewer years of education and experience higher rates of homelessness than the general population.<sup>1</sup> Additionally, BTW experience high rates of incarceration, engagement in sex work, experiences of physical assault, intimate partner violence (IPV), depression and substance use.<sup>1</sup> As these factors are associated with HIV care continuum outcomes in other populations,<sup>11–15</sup> and because formative qualitative research among transgender women identified these outcomes as potential barriers to HIV care,<sup>9</sup> they warrant examination. Finally, social support, hormone use, and gender identity and racial discrimination should be explored as transgender women and BTW identify these as potential factors associated with HIV care.<sup>9</sup>

Using a community-based sample of BTW, this exploratory study seeks to fill aforementioned gaps in the literature by: (1) characterizing the distribution of BTW along the HIV care continuum and, based on where prevalence disparities exist along the continuum, (2) exploring possible correlates of HIV care continuum outcomes.

## Methods

### Participants

Data came from the Promoting, Our Worth, Equality, and Resilience (POWER), a study of delayed access to HIV testing and care among Black MSM and BTW. From 2014–2017, POWER recruited MSM and transgender women at Black Pride events in six cities: Atlanta, GA; Detroit, MI; Houston, TX; Memphis, TN; Philadelphia, PA; and Washington, DC.<sup>16</sup> Individuals were eligible to participate if they: (1) were assigned male sex at birth; (2) reported having a male sexual partner in their lifetime; and (3) were 18 years or older. This study only includes those who: (1) identified as “Black” or “African American”; and (2) identified as female, transgender, or reported having transitioned from male to female gender.<sup>17</sup>

### Data Collection Procedures

POWER employed time-location sampling recruit Black MSM and BTW attending Black Pride events. In each city, recruitment events were randomly selected in two-hour time blocks from all official Black Pride events. At each event, an intercept zone was established, and individuals entering the intercept zone were counted, approached, and invited to participate in the study.

In total, 50,418 individuals were counted at selected events, 13,396 were approached, and 44.9% agreed to screening. Once screened for eligibility, participants completed an anonymous self-administered, computer-assisted, behavioral health questionnaire designed to take approximately 20 minutes to complete. Ninety-seven percent of screened participants completed a questionnaire (n=5,857). To prevent duplication of participants, we asked participants a series of questions to create a unique identifier code.<sup>18</sup> 301 surveys were removed due to duplication; the most recent survey was retained.

Upon completion of the questionnaire, POWER offered participants confidential HIV testing performed onsite by local community based organizations (CBOs) utilizing their own rapid HIV-testing protocol and either the OraQuick (OraSure Technologies, Inc., Bethlehem, PA) Clearview STAT-PAK (Alere Inc., Waltham, MA), or INSTI (bioLytical Laboratories, Richmond, BC) test. Confirmatory testing of preliminary positive results using Western Blot was performed offsite by respective CBO staff at a later date. Participants electing confidential HIV testing received their test result and \$20. If a participant declined confidential HIV testing, POWER staff offered participants the opportunity to provide an anonymous OraQuick mouth swab sample for surveillance purposes. Those electing anonymous testing did not receive their HIV test result but did receive \$20. Participants declining either form of HIV testing were paid \$10 for completion of the survey. **Among BTW who completed the survey, 32.7% accepted confidential HIV testing, 54.9% accepted anonymous HIV testing, and 12.4% declined HIV testing.** HIV test results were anonymously linked to survey files via a unique subject ID. All study procedures were approved by the Institutional Review Board at [blinded for review].

## Measures

### HIV status

HIV status was assessed with a combination of biological and self-report data. HIV-positive status was determined if participants had a preliminary HIV-positive test result, or responded “HIV-positive” to the following question: “What was the result of your most recent HIV test?” HIV-negative status was confirmed via HIV test result. HIV status was coded as missing for all participants who assayed biologically indeterminate, with the exception of those who self-identified as HIV-positive, and for those individuals whose self-report HIV-negative status was not confirmed via HIV test result.

### Knowledge of HIV-Positive Status

Self-report and biological data were used to assess knowledge of HIV-positive status. If participants identified themselves as HIV-positive in the questionnaire, they were coded as diagnosed HIV-positive. If participants received a HIV-positive test result and had never received a HIV test or responded “HIV-negative,” “Indeterminate,” “I did not get my results,” or “I don’t know,” when asked about the result of their most recent HIV test, they were coded as undiagnosed HIV-positive.

### HIV Care Continuum Outcomes

Assessment of *linkage to HIV medical care* used the following yes/no item: “Have you ever been seen by a doctor, nurse, or other health care provider for a medical evaluation or care related to your HIV infection?” *Retention in HIV medical care* was measured with the item: “Are you currently being seen by a doctor, nurse, or other health care provider for a medical evaluation or care related to your HIV infection?” *Prescription of anti-retroviral medications* (ARVs) was assessed with the question: “Are you currently taking antiretroviral medicines to treat your HIV infection? To determine *viral load* one item was used: “What were the results of your most recent HIV lab tests? (Viral load)” with four responses (1) undetectable; (2) detectable, but under 10,000; (3) 10,000 – 100,000; and (4) Higher than 100,000.” This variable was recoded as a dichotomous outcome: undetectable (response 1) or detectable (response 2, 3, or 4).

### Depression

The Center for Epidemiologic Studies Depression 10 (CES-D 10) measured past week depressive symptomatology.<sup>19</sup> The measure dichotomized using the scale’s validated cut point.<sup>19</sup>

### Polydrug Use

Past year polydrug use was operationalized as the use of three or more of the following substances in the last 12 months: poppers, crack cocaine, cocaine, methamphetamines, heroin, non-prescribed prescription opiates (e.g., Vicodin, OxyContin), or party drugs other than methamphetamine (e.g., MDMA, ecstasy, GHB).

**Physical Assault**

Measurement of physical assault used the following yes/no item: “In the past year, have you been physically assaulted (hit, kicked, beat up or in any other way physically harmed)?”

**IPV**

IPV was assessed with the following yes/no item: “In the past year, have you been in a relationship with a partner who has ever hit, kicked, slapped, beaten or in any other way physically assaulted you?”

**Social Support**

A composite, continuous, social support score was created from two questions that asked: “To what degree do you feel you receive support from your (1) family; and (2) friends?” with response options: (1) none; (2) a little; (3) somewhat; and (4) a lot.”

**Incarceration**

Assessment of incarceration used the following yes/no item: “In the past 2 years, have you been incarcerated (spent a night or more in jail or prison)?”

**Homelessness**

Homelessness was assessed with the following yes/no item: “In the past 12 months, have you been homeless at any time? By homeless, I mean you were living on the street, in a shelter, in a Single Room Occupancy hotel (SRO), or in a car.”

**Sex Work**

Two questions measured engagement in sex work. “In the past 12 months, did you ever give or take money, drugs or other goods for sex with a female partner? (Check all that apply);” the question was repeated for male partners. Response options included: “No;” “Yes, I received money, drugs or other goods for sex;” and “Yes, I gave money, drugs or other goods for sex.” Participants were considered to have engaged in sex work if they received money, drugs, or goods for sex.

**Health Insurance Coverage and Access to Medical Care**

The following yes/no item measured the presence of health insurance coverage: “Do you currently have health insurance or health care coverage?” Access to medical care was assessed with the yes/no item: “During the past 12 months, was there any time when you needed medical care but didn’t get it because you couldn’t afford it?”

**Current Hormone Use**

Current hormone use was only assessed in years 2015–2017 with one yes/no item: “Are you currently taking hormones (estrogen) for transgender-related purposes?”

**Discrimination**

*Gender-identity discrimination* was only measured from 2015–2017 with the following yes/no item: “In the past year, have you experienced discrimination, been prevented from

doing something, or been hassled or made to feel inferior while because of your gender identity/expression?” *Racial discrimination* was measured in all years with one yes/no item: “In the past year, have you experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior because of your race?”

## Demographics

Age, education, city, and year of data collection were also assessed. Age was measured in years. Four levels were used to measure education: less than high school, high school diploma, some college, and college diploma or more.

## Data Analysis

Based on our definition of HIV-negative status, 15.9% (n = 87) of the 548 BTW who completed the survey, were missing HIV status data. Bivariate analyses (i.e., chi-square tests for categorical variables and t-tests for continuous variables) compared age and education status of those with no HIV status data to those with HIV status data. There was no significant difference between the two groups (alpha = 0.05), and so those with missing HIV status data were removed from the dataset using listwise deletion, creating an analytic sample of 422 participants. For questions asked only in years 2015–2017 (i.e., gender identify discrimination and current hormone use), the analytic sample was 299.

**To access prevalence of HIV-positive BTW at each stage of the HIV care continuum, we used basic frequencies. Based on these findings, we identified disparities along the continuum. We performed bivariate analysis using chi-square tests for categorical variables and t-tests for continuous variables to determine what differentiates BTW at one stage from those at another. Bivariate analysis compared the following groups of BTW: 1) undiagnosed HIV-positive to HIV-negative; 2) undiagnosed HIV-positive to diagnosed HIV-positive; and 3) virally suppressed to virally unsuppressed on the following measures: depression, polydrug use, physical assault, IPV, social support, incarceration, sex work, homelessness, access to medical care, gender-identity discrimination, racial discrimination, age, education, and city. Significance was set at alpha = 0.10 for bivariate analysis. Multivariable logistic regression analyses adjusting for age, education, city, and year of data collection further explored the relationship of measures found to be significant in bivariate analysis with HIV diagnosis and viral suppression. Significance was set to alpha = 0.05 for multivariable logistic regression analysis. We conducted analyses in SAS version 9.4 (SAS Institute, Inc., Cary, NC).**

## Results

Table 1 shows sociodemographic characteristics of the 422 BTW in the sample. The mean age was 30.7 (range: 18–84), and 27.1% of the sample had not completed high school. Though 78.2% of the sample reported the presence of health insurance coverage, 44.3% of the sample indicated they were unable to access health care in the past year. In the past two years, 35.9% of BTW had been incarcerated, and in the past year 41.7% had been homeless, 19.1% engaged in sex work, and 43.9% experienced physical assault. HIV prevalence in the sample was 45.0% (n=190).

Figure 1 depicts the HIV care continuum among the HIV-positive BTW in our sample. Of the 190 HIV-positive BTW, 41.3% (n = 78) reported prior knowledge of their HIV-positive status. Of those with prior knowledge of their HIV-positive status, 96.2% (n = 75) reported linkage to HIV medical care, and 96.0% (n = 72) of HIV-positive BTW linked to care reported retention in care. Of reporting retention in care, 90% (n = 65) reported an ARV prescription. Finally, 69.2% (n = 45) of those prescribed ARVs, reported an undetectable viral load.

Table 2 shows a comparison of HIV-negative to undiagnosed HIV-positive BTW. Undiagnosed HIV-positive BTW were significantly more likely than HIV-negative BTW to have been incarcerated (42.3% versus 31.5%) and to report being unable to access health care (39.6% versus 51.4%). In our multivariable model shown in Table 3, **BTW with undiagnosed HIV-positive status** had increased odds of having been incarcerated (adjusted odds ratio [aOR] = 1.92, 95% CI: 1.15, 3.22) as well as increased odds of being unable to access health care (aOR = 1.71, 95% CI: 1.04, 2.82) **when compared to HIV-negative BTW**. When access to care and incarceration were included in a model, the effect of incarceration on undiagnosed HIV-positive status was attenuated but remained significant.

Table 2 also shows a comparison of diagnosed HIV-positive to undiagnosed HIV-positive BTW. Diagnosed HIV-positive BTW were significantly more likely than undiagnosed HIV-positive BTW were more likely to report current depression symptomology. Not shown in a table, diagnosed HIV-positive BTW had 2.80 (CI: 1.39, 5.66) times the odds of reporting depression symptomology in multivariable analysis.

Finally, Table 2 shows a comparison of virally suppressed to virally unsuppressed BTW. Virally suppressed BTW were significantly less likely to report past two-year incarceration (28.9% versus 59.1%), past year homelessness (38.6% versus 71.4%), past year poly-drug use (17.8% versus 50.0%), past year physical assault (46.7% versus 72.7%), and current hormone use (46.7% versus 85.7%) than virally unsuppressed BTW. Virally suppressed BTW were also less likely to have engaged in sex work (p = 0.09) and to report depression symptomology (p = 0.06) and IPV (p = 0.09). In multivariable models (Table 4), incarceration (aOR = 0.15, 95% CI: 0.03, 0.71), homelessness (aOR = 0.09, 95% CI: 0.01, 0.61), polydrug use (aOR = 0.11, 95% CI: 0.02, 0.62), physical assault (aOR = 0.20, 95% CI: 0.04, 0.95), IPV (aOR = 0.20, 95% CI: 0.04, 0.99), and current hormone use (aOR = 0.08, 95% CI: 0.01, 0.84), were significantly, negatively associated with viral suppression among BTW.

## Discussion

**Interventions aimed at advancing the test and treat strategy among BTW should target HIV diagnosis—51.4% of HIV-positive BTW reported being undiagnosed. This prevalence much higher than the 18.1% estimated for the general population.<sup>20</sup> Our results also suggest that once diagnosis occurs, the majority of diagnosed HIV-positive BTW advance to subsequent stages of the continuum. For example, 96.2% of diagnosed HIV-positive BTW report linkage to care. Fatalism and avoidance could help explain these findings.<sup>9,21,22,23</sup> BTW experience significant difficulties when**

attempting to access HIV testing and care services.<sup>21,22</sup> Qualitative research among BTW found that though BTW felt their HIV infection was inevitable, they were hesitant to obtain a HIV test fearing they might receive a stigmatized diagnosis that would require they access additional, possibly stigmatizing health care.<sup>9</sup> Considering this view, perhaps once BTW take action to access testing and learn of their HIV-positive status, they are ready to access HIV care.<sup>23</sup>

When we compared undiagnosed HIV-positive BTW to HIV-negative BTW to identify what future HIV diagnosis interventions might address, there was a significant difference in the prevalence of past two-year incarceration and access to care. However, there was no difference in the prevalence of homelessness, engagement in sex work, polysubstance use, depression, physical assault, IPV, experiences of discrimination, social support, and hormone use—factors associated with an undiagnosed HIV-positive status in other populations.<sup>11–15</sup> This could be due to high prevalence of these negative health outcomes among BTW in our sample. For example, 49.7% reported depression symptomology. Regardless of statistically significant differences between these groups, the prevalence of these health outcomes in our sample are startling and likely problematic to the advancement of test and treat efforts in this population. They underscore a need for trauma informed care and multicomponent interventions.<sup>24–26</sup>

Findings from our comparison of virally suppressed and virally unsuppressed BTW further underscores the need for trauma informed care. Incarceration, homelessness, polydrug use, physical assault, and IPV were all negatively associated with viral suppression among BTW, **pointing to the syndemic nature of health disparities production among BTW.** Additionally, though unexpected, the finding that current hormone use is negatively associated with viral suppression could also support the syndemic nature of health disparities production in this population. Given the number of co-occurring health disparities BTW face, perhaps HIV-positive BTW prescribed ARVs and hormones must prioritize one over the other for economic reasons. If this is the case, our findings suggest previous BTW prioritize their transition related health care over their HIV related care.<sup>9</sup> **Additionally, since 50% of participants with a detectable viral load report being unable to access medical care, it is possible that many of BTW reporting current hormone use were using hormones outside of the care of a medical provider. As unsupervised hormone use can cause health complications,<sup>27</sup> this could be a possible explanation for our finding that current hormone use is negatively associated with viral suppression.**

Finally, while we did find that diagnosed HIV-positive BTW did have a higher prevalence of depression symptomology than undiagnosed HIV-positive BTW, this finding is difficult to interpret. The frequency of major depressive disorders is higher among HIV-positive individuals compared to HIV-negative individuals. Therefore, having been diagnosed HIV-positive most likely explains this difference.<sup>28</sup>

The syndemic nature of health disparities production among BTW necessitates an approach that examines multiple health outcomes in relation to one another.<sup>29</sup> Examining factors associated with care continuum outcomes is an important step to understand HIV among BTW, but it is insufficient and incomplete. Even though care continuum outcomes have



unique contexts and determinants, a fundamental reason BTW experience multiple health disparities simultaneously is because of their shared causes. Notably, there are community and structural factors that influence multiple health conditions; their effect can appear to be less important when health outcomes are examined in isolation. A more formalized analysis of how multiple health outcomes cluster among BTW is an important next step.<sup>29</sup> Such an analysis could advance not only the test and treat strategy, but could do much to improve overall health.

## Limitations

Findings must be considered within the limitations of the study design. The most notable being the utilization of self-report data to characterize the HIV care continuum among BTW. Studies have shown a discrepancy between self-report and clinical evaluation of unknown HIV-positivity.<sup>30</sup> There may be social desirability bias related to self-report HIV status, linkage to and retention in care, ARV adherence, and viral suppression. Therefore, our data may overestimate the number of HIV-positive BTW at each point of the HIV care continuum. Additionally, our retention in HIV medical care measure is flawed. Though there is no gold standard for measuring retention in HIV care,<sup>31</sup> our measure of retention in care is not clearly defined. Asking participants if they are currently being seen for HIV medical care does not measure concrete aspects of retention in care (e.g. missed visits, appointment adherence, visit consistency or gaps in care) as the literature suggests.<sup>32</sup>

Our findings are not generalizable to all BTW. BTW who attend Black Pride events may be different than those who do not attend Black Pride events. Finally, the small sample of BTW at the stage of viral suppression limited our analysis. In order to explore associations with HIV care continuum outcomes, larger samples of diagnosed HIV-positive BTW are needed.

## Conclusion

Based on our findings, interventions aimed at advancing a test and treat strategy should target HIV diagnosis and viral suppression. The results also suggest such interventions should consider the multiplicity health and well-being challenges (e.g. the high prevalence of physical assault, homelessness, incarceration, and engagement in sex work) BTW face.<sup>1</sup> Future research should explore how HIV prevention and care outcomes cluster with other negative health outcomes in order to better understand how to alleviate health disparities in this population.<sup>29</sup>

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Houston: Avenue 360, Houston AIDS Foundation, Positive Efforts; Memphis: Friends for Life; Philadelphia: Access Matters, Philadelphia FIGHT; Washington, D.C.: Us Helping Us.

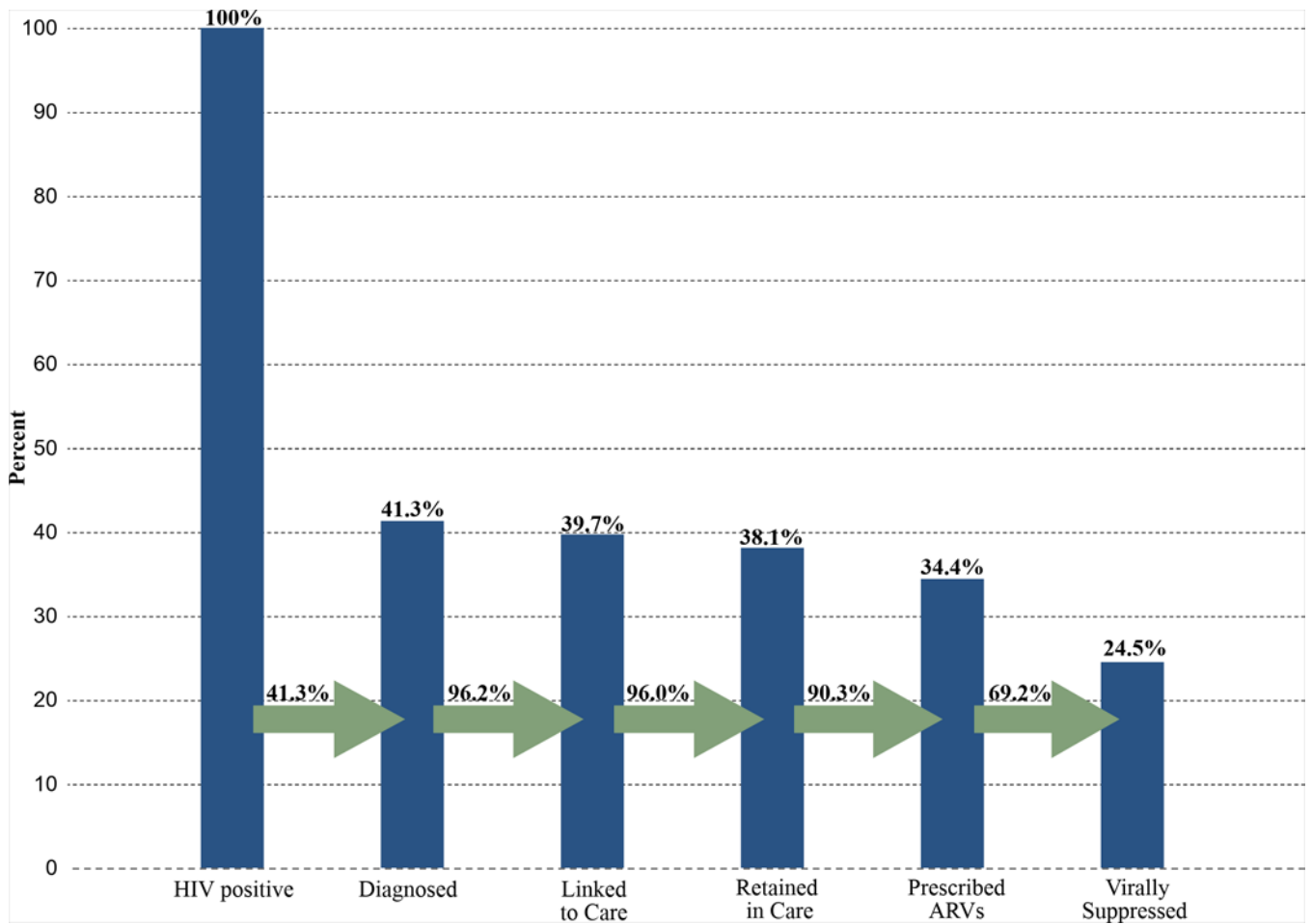
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**Figure 1:** HIV care continuum among HIV-positive Black transgender women in POWER: United States, 2014–2017.

**Table I:**

Characteristics of Black transgender women: United States, 2014–2017

	<b>n = 422</b> <b>% (n)</b>
<b>Education</b>	
Less than high school	27.1 (113)
High School diploma	31.4 (131)
Some college	22.5 (94)
College diploma or more	18.9 (79)
<b>City</b>	
Philadelphia, PA	9.0 (38)
Houston, TX	24.9 (105)
Washington, D.C.	15.6 (66)
Detroit, MI	28.0 (118)
Atlanta, GA	21.3 (90)
Memphis, TN	1.2 (5)
Age mean (standard deviation)	30.7 (10.8)
<b>Health care</b>	
Presence of health insurance coverage	78.2 (330)
Able to access care	44.3 (185)
Incarceration	35.9 (151)
Homelessness	41.7 (173)
Sex work	19.1 (80)
Poly-substance use	23.0 (97)
Depression	49.3 (204)
Physical Assault	43.9 (185)
Intimate Partner Violence	45.6 (192)
Social Support mean (standard deviation)	3.10 (2.1)
Racial Discrimination, lifetime	45.8 (193)
Gender Discrimination, lifetime	54.5 (163)
Currently Hormone Use	48.1 (136)
HIV Positivity	45.0 (190)

Correlates of HIV care continuum outcomes among Black transgender women in POWER: United States, 2014–2017

Table II:

	Undiagnosed HIV positive status			HIV diagnosis			Viral suppression		
	HIV negative n = 232 % (n)	Undiagnosed HIV positive n = 111 % (n)	p	Diagnosed HIV positive n = 70 % (n)	Undiagnosed HIV positive n = 111 % (n)	p	Undetectable viral load n = 45 % (n)	Detectable viral load n = 22 % (n)	p
Education									
Less than high school	30.6 (70)	23.4 (26)	0.30	22.1 (17)	23.4 (26)	0.05*	26.7 (12)	14.3 (3)	0.07 †
High School diploma	39.7 (68)	38.7 (43)		26.0 (20)	38.7 (43)		31.1 (14)	19.1 (4)	
Some college	22.3 (51)	23.4 (26)		22.1 (17)	23.4 (26)		22.2 (10)	14.3 (3)	
College diploma or more	17.5 (40)	14.4 (16)		29.9 (23)	14.4 (16)		20.0 (9)	52.4 (11)	
Age (mean (SD))	30.0 (10.5)	32.0 (11.7)	0.19	30.8 (10.0)	32.0 (11.7)	0.14	31.4 (10.2)	30.1 (10.2)	0.61
Health care									
Presence of health coverage	78.5 (182)	76.6 (85)	0.69	79.5 (62)	76.6 (85)	0.64	84.4 (38)	81.8 (18)	0.79
Unable to access care	39.6 (91)	51.4 (56)	0.04*	47.4 (37)	51.4 (56)	0.60	46.7 (21)	50.0 (11)	0.80
Incarceration	31.5 (73)	42.3 (47)	0.04*	39.7 (31)	42.3 (47)	0.72	28.9 (13)	59.1 (13)	0.01*
Homelessness	38.2 (87)	44.1 (49)	0.29	48.7 (37)	44.1 (49)	0.54	38.6 (17)	71.4 (15)	0.01*
Sex work	18.5 (43)	33.8 (22)	0.75	19.5 (15)	20.0 (22)	0.93	11.1 (5)	27.3 (6)	0.09 †
Poly-substance use	21.1 (49)	21.6 (24)	0.92	29.5 (23)	21.6 (24)	0.22	17.8 (8)	50.0 (11)	0.006*
Depression	47.4 (108)	41.3 (45)	0.29	66.2 (51)	41.3 (45)	<0.001*	59.1 (26)	81.8 (18)	0.06 †
Physical Assault	40.3 (93)	46.9 (52)	0.25	50.0 (39)	46.9 (52)	0.67	46.7 (21)	72.7 (16)	0.04*
Intimate Partner Violence	42.0 (97)	47.8 (53)	0.32	52.6 (41)	47.8 (53)	0.51	51.1 (23)	72.7 (16)	0.09 †
Social Support (mean (SD))	3.01 (2.08)	3.15 (2.27)	0.79	3.10 (2.11)	3.15 (2.27)	0.90	2.93 (2.26)	3.09 (2.37)	0.77
Racial Discrimination, lifetime	45.9 (106)	39.6 (44)	0.28	55.1 (43)	39.6 (44)	0.03*	57.8 (26)	63.6 (14)	0.65
Gender Discrimination, lifetime	50.6 (79)	53.9 (49)	0.63	68.6 (35)	53.9 (49)	0.08 †	67.7 (21)	84.6 (11)	0.25
Currently Taking Hormones	41.8 (61)	52.3 (45)	0.12	58.8 (30)	52.2 (45)	0.46	46.7 (14)	85.7 (12)	0.01*

Notes: Lifetime gender discrimination and current hormone use were measured from 2015–2017 yielding a sample of 299 for these questions.

\* p < 0.05;

$p < 0.01$

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Multivariable logistic regression comparison of undiagnosed HIV-positive status to HIV-negative status among Black transgender women in POWER: United States, 2014–2017

**Table III:**

	Undiagnosed HIV positive status		
	Model 1 aOR (95% CI)	Model 2 aOR (95% CI)	Model 3 aOR (95% CI)
Unable to Access Care	1.71 (1.04, 2.82)*	-	1.59 (0.96, 2.64)
Incarceration	-	1.92 (1.14, 3.22)*	1.77 (1.04, 3.00)*
Age	0.99 (0.97, 1.02)	1.00 (0.98, 1.03)	1.00 (0.98, 1.03)
Education			
Less than high school	1.06 (0.48, 2.32)	0.93 (0.42, 2.03)	0.88 (0.40, 1.95)
High school diploma	0.62 (0.29, 1.33)	1.52 (0.72, 3.25)	1.58 (0.73, 3.39)
Some college	0.71 (0.32, 1.58)	1.43 (0.65, 3.16)	1.43 (0.64, 3.23)
College diploma or more	referent	referent	referent

Note: CI = Confidence Interval; aOR = Adjusted Odds Ratio.

\* p<0.05.



**Table IV:**

Multivariable logistic regression comparisons of virally suppressed BTW to virally unsuppressed BTW: United States, 2014–2017

	Viral Suppression							
	Model 1 aOR (95% CI)	Model 2 aOR (95% CI)	Model 3 aOR (95% CI)	Model 4 aOR (95% CI)	Model 5 aOR (95% CI)	Model 6 aOR (95% CI)	Model 7 aOR (95% CI)	Model 8 aOR (95% CI)
Incarceration	0.15 (0.03, 0.71)*	-	-	-	-	-	-	-
Homelessness	-	0.09 (0.01, 0.61)*	-	-	-	-	-	-
Sex work	-	-	0.17 (0.03, 1.05)	-	-	-	-	-
Polydrug use	-	-	-	0.11 (0.02, 0.62)*	-	-	-	-
Depression	-	-	-	-	0.20 (0.04, 1.09)	-	-	-
Physical Assault	-	-	-	-	-	0.20 (0.04, 0.95)*	-	-
Intimate partner violence	-	-	-	-	-	-	0.20 (0.04, 0.99)*	-
Current hormone use	-	-	-	-	-	-	-	0.08 (0.01, 0.84)*
Age	0.99 (0.92, 1.06)	0.98 (0.91, 1.05)	0.99 (0.92, 1.06)	1.00 (0.93, 1.07)	0.99 (0.92, 1.06)	0.97 (0.91, 1.04)	0.97 (0.91, 1.04)	0.97 (0.89, 1.06)
Education								
Less than high school	9.44 (1.33, 66.93)*	5.88 (0.91, 38.18)	6.77 (1.15, 39.98)*	8.81 (1.29, 60.35)*	6.68 (1.12, 39.74)*	8.72 (1.37, 55.34)*	10.25 (1.52, 69.28)	12.97 (0.51, 327.27)
High school diploma	4.39 (0.75, 25.79)	1.76 (0.23, 13.55)	4.69 (0.82, 26.88)	3.35 (0.56, 20.10)	4.58 (0.74, 28.35)	3.52 (0.56, 22.23)	4.83 (0.83, 28.06)	10.42 (0.93, 117.19)
Some college	5.08 (0.74, 35.13)	1.26 (0.14, 11.13)	5.1 (0.79, 33.09)	2.54 (0.35, 18.19)	4.00 (0.65, 24.82)	4.23 (0.63, 28.25)	4.21 (0.64, 27.59)	24.38 (1.59, 373.98)
College diploma or more	referent	referent	referent	referent	referent	referent	referent	referent

Note: CI = Confidence Interval; aOR = Adjusted Odds Ratio.

\* p<0.05.