JAIDS Journal of Acquired Immune Deficiency Syndromes Publish Ahead of Print
DOI: 10.1097/QAI.0000000000003214

Running head: Disparities in Adherence & Viral Suppression

Understanding Disparities in Antiretroviral Therapy Adherence and Sustained Viral Suppression among Black, Hispanic/Latina, and White Women in the United States – Medical Monitoring Project, United States, 2015-2019

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Sources of support: Funding for the Medical Monitoring Project is provided by a cooperative agreement (PS15-1503) from the Centers for Disease Control and Prevention.

Disclosure of relationship: The authors have no funding or conflicts of interest to disclose.

CDC Disclaimer: The findings and conclusions in this report are those of the authors and do not represent the official position of the Centers for Disease Control and Prevention.

Conference Presentation: Raiford JL, Beer L, Carree T, Yuan X. *Understanding Disparities in Antiretroviral Therapy Adherence and Sustained Viral Suppression among Black, Hispanic/Latina, and White Women in the United States – Medical Monitoring Project, United States, 2015-2019*. Roundtable Discussion at the American Public Health Association Conference, 2022: Boston, MA.

Word count for main text: 3579/3500 limit

Word count for abstract: 250/250 limit

References: 37 (no limit)

Tables: 2/5 limit

INTRODUCTION

While anyone can acquire HIV, infections disproportionately affect certain populations due to inequities in social and structural determinants of health (SDOH), e.g., racism, stigma, discrimination and barriers to services.[1] In the U.S. and abroad, men outpace women in ART adherence and sustained viral suppression.[2] Gender norms are often used to explain these sex differences , as women tend to have more responsibilities than men (e.g., primary caretaker of dependent children).[3]

Compared with women of other races and ethnicities, Black or African American (hereafter referred to as Black) women are disproportionately affected by HIV in the United States, with the rate of new HIV infections among Black women estimated to be 13 times that of White women and 4 times that of Hispanic/Latina women.[4]

In the modern era of HIV prevention, use of antiretroviral therapies (ART) to maintain viral suppression is integral to reaching United States (U.S.) HIV prevention goals. By achieving and sustaining viral suppression, people can have near normal life expectancy and will not transmit HIV to others through sex.[5] Achieving the Ending the HIV Epidemic in the U. S. (EHE)[6] goal to have 90% of people with diagnosed HIV virally suppressed by 2030 necessitates increasing adherence to ART for people with HIV (PWH). However, Black and Hispanic/Latina cis-gender women may disproportionately struggle with medication adherence due to SDOH.

Previous research has identified numerous barriers to ART adherence and viral suppression, including stigma, limited access to healthcare, transportation needs, and poverty.[7,8] SDOH have also been shown to affect HIV care engagement,[9-13] and may account for racial/ethnic disparities in ART adherence and viral suppression among women.[14] Using data from the 2010-2014 cycles of the Medical Monitoring Project (MMP), Nwangwu-Ike et al.[14] examined racial and ethnic differences in viral suppression among Black, Hispanic/Latina and

White women with HIV in care and found differences in recent viral suppression between Black and White women and Hispanic/Latina and White women that persisted even when controlling for ART adherence, HIV disease stage, age, and SDOH (e.g., homelessness, poverty and education).[14] Additional unexamined variables like health literacy and intimate partner violence may have further explained the observed racial/ethnic differences. While studies suggests that viral suppression increased among U.S. women between 2010 and 2015, racial/ethnic disparities persisted.[14,15] Given that adherence is a primary determinant of viral suppression, the current study explores factors that may decrease racial/ethnic disparities in ART adherence. The current study also explores factors beyond adherence that may further explain racial/ethnic disparities in sustained viral suppression (SVS).[14]

METHODS

Detailed MMP methods have been described,[16,17] but briefly, MMP first sampled 16 states (including 6 separately funded jurisdictions within these states) and Puerto Rico from all U.S. states, the District of Columbia, and Puerto Rico. Second, annual simple random samples of adults with diagnosed HIV were drawn from each participating state/territory from the National HIV Surveillance System (NHSS), a census of U.S. persons with diagnosed HIV. For this analysis, we used data from the 2015-2019 MMP data collection cycles spanning June 2015 through May 2020; data were collected via phone or face-to-face interviews and medical record abstractions during June through the following May of each cycle year. State/territory response rates were 100% and ranged annually from 40-46% at the person level. MMP is an ongoing public health surveillance activity and thus Institutional Review Board approval was not obtained, although two participating jurisdictions chose to obtain local approvals. Written or

verbal informed consent was provided by all participants. Data were weighted based on probabilities of selection, adjusted for non-response,[18] and post-stratified to NHSS population totals by sex, race/ethnicity, and age.

We limited this analysis to Black, Hispanic/Latina, and White adult cisgender women who reported currently taking ART (n=4,505). Cisgender women were categorized based on reporting female sex at birth and currently identifying as female. Black women were those reporting their race as Black or African American and their ethnicity as non-Hispanic/Latina; Hispanic/Latina women were those reporting their ethnicity as Hispanic/Latina and could be of any race; White women were those reporting their race as White and their ethnicity as non-Hispanic/Latina. Women taking ART were asked about their adherence to ART in the 30 days before the interview using questions from a 3-item scale[19]; responses were recoded with equal weighting to create a score that ranged from 0-100, with a score of 100 indicating perfect adherence, and dichotomized as perfect versus less than perfect adherence. SVS was based on medical record abstraction and defined as all viral load measurements in the past 12 months documented undetectable or <200 copies/mL. Women with no medical record abstraction and those with no viral loads documented were categorized as not having SVS.

All examined covariates were self-reported and measured over the 12 months prior to interview, except where otherwise noted. Homelessness was defined as living on the street, in a shelter, in a single room occupancy hotel, or in a car. Household poverty level was determined using Health and Human Services poverty guidelines.[20] History of forced sex was defined as ever being threatened with harm or physically forced to have unwanted vaginal, anal, or oral sex; physical violence was defined as ever having been slapped, punched, shoved, kicked, choked, or otherwise physically hurt by a romantic or sexual partner. Responses to the items on the Patient Health Questionnaire (PHQ-8) were used to define “major or other depression” according to

criteria from the DSM-IV.[21] The Generalized Anxiety Disorder Scale (GAD-7), a validated 7-item scale, was used to screen for and measure the severity of GAD symptoms over the past 2 weeks.[22] Unmet need for transportation assistance was defined as needing but not receiving transportation assistance. Binge drinking was defined as having ≥4 alcoholic beverages in a single sitting on at least 1 day during the 30 days before the interview. Receipt of outpatient HIV care was measured through medical record abstraction at the person's most frequent source of HIV care. HIV care engagement was defined as having received at least two of the following elements of outpatient HIV care at least 90 days apart: encounter with an HIV care provider (could also be self-reported), viral load test result, CD4 test result, HIV resistance test or tropism assay, ART prescription, prophylaxis against pneumocystis carinii pneumonia (PCP) or Mycobacterium avium Complex (MAC) disease.

For this analysis, we first estimated the weighted percentages and associated 95% confidence intervals (CIs) of the primary outcomes (ART adherence and SVS) and covariates of interest, overall and by race/ethnicity. Absolute differences in characteristics and outcomes between Black versus White women, and Hispanic/Latina versus White women, were assessed using prevalence differences. Covariates of interest included demographic characteristics, social determinants of health, behaviors, and clinical variables previously found to be associated with the outcomes of interest.

Next, we assessed whether prevalence differences in ART adherence and SVS by race/ethnicity (i.e., Black vs. White women, Hispanic/Latina vs. White women) might be explained by covariates of interest. We used multivariable modeling to determine whether prevalence differences were attenuated with the inclusion of certain covariates. Our modeling strategy involved several steps. First, we assessed which covariates were eligible for inclusion in the multivariable model. Eligible candidates included those that were associated with

race/ethnicity, based on results from Table 1, and were also associated bivariately with the outcomes of interest based on Rao-Scott chi-square tests (see supplemental appendix, http://links.lww.com/QAI/C61). Next, we used forward selection to build multivariable models assessing absolute disparities between race/ethnicity and the outcomes of interest, beginning with the variable with the strongest bivariate association with the outcome. At each step, results were compared with the base model (i.e., unadjusted associations between race/ethnicity and the outcome) and variables were added one at a time until all candidate variables were included. Models yielded from each step are presented in the results. Finally, percentages were calculated to assess relative differences in point estimates of prevalence differences between the adjusted and unadjusted models. These percentages represented the degree to which incorporating covariates accounted for racial/ethnic disparities in outcomes.

For all analyses, prevalence differences and corresponding 95% CIs were estimated using logistic regression with predicted marginal means. All analyses accounted for MMP's complex sample design and weights and were conducted using SAS survey procedures and SAS-callable SUDAAN.

RESULTS

Characteristics of Black, Hispanic/Latina, and White adult women with HIV taking ART

Among U.S. Black, Hispanic/Latina, and White adult women with HIV taking ART, 61.3% were Black, 21.0% Hispanic/Latina, and 17.8% White; more than half (52.1%) were age 50 years and older, 40.8% had more than high school education, 66.6% were covered by public health insurance only, and 71.1% had been living with HIV for 10 years or more (Table 1).

Overall, 42.2% of women were ART adherent over the past 30 days and 65.2% had SVS over the past 12 months.

Analyses demonstrated several racial/ethnic disparities by sociodemographic, behavioral, and clinical characteristics (Table 1). Black and Hispanic/Latina women were more likely than White women to report living in households below the federal poverty level, having less than a high school diploma or equivalent, having less confidence in completing health forms (health literacy), and having unmet need for transportation assistance. Compared to White women, Black and Hispanic/Latina women were less likely to report ART adherence during the past 30 days, being recently incarcerated, ever having a history of forced sex or physical intimate partner violence, any drug use, or experiencing symptoms of anxiety during the past 2 weeks. Compared to White women, Black women were more likely to report having Ryan White HIV/AIDS Program (RWHAP) coverage only or being uninsured or experiencing a gap in health coverage, and less likely to report symptoms of depression and to have SVS. Hispanic/Latina women were less likely than White women to report any private insurance and more likely to be engaged in HIV care.

Unadjusted and Adjusted Prevalence Differences in ART Adherence

The prevalence of ART adherence was 38.6% among Black women, 42.0% among Hispanic/Latina women, and 54.6% among White women.

The unadjusted PD in ART adherence between Black and White women taking ART was -16.0 (95% CI: -21.2 - -10.8, $p < .0001$) (Table 2). After adjusting for household poverty, unmet need for transportation assistance, health literacy, and any gap in health insurance or coverage,

the point estimate of the PD decreased by 11% to -14.2 (95% CI: -19.8 - -8.6, $p < .0001$), although the difference remained statistically significant.

The unadjusted prevalence difference in ART adherence between Hispanic/Latina and White women taking ART was -12.7 (95% CI: -18.8 - -6.5, $p = .0001$). After adjusting for household poverty, health literacy, and unmet need for transportation assistance, the PD decreased by 24% to -9.6 (95% CI: -16.3 - -3.0, $p = .005$) and remained significantly different.

Unadjusted and Adjusted Prevalence Differences in SVS

In crude analyses, the prevalence of SVS was 62.4% among Black women, 69.0% among Hispanic/Latina women and 70.4% among White women. The crude difference in SVS between Black and White women was -7.9 (CI: -12.9 - -3.0, $p = .0015$). After adjusting for ART adherence, household poverty, health insurance/coverage type, and any gap in health insurance/coverage, the PD decreased by 37% to -5.0 (CI=-10.3 - 0.3, p=.07). The crude PD for SVS comparing White and Hispanic/Latina women was -1.4 (CI=-6.9 - 4.1), p=.61); hence, no adjusted models were run.

DISCUSSION

The overall percentage of women taking ART and maintaining SVS in the 2015-2019 MMP cycles was below the goal outlined in the 2030 National HIV/AIDS Strategy (NHAS) for the United States—to increase viral suppression among people with diagnosed HIV to at least 90%.[6] Moreover, compared with White women (54.6%), ART adherence was lower among Black (38.6%) and Hispanic/Latina women (42.0%) and compared to White women (70.4%), SVS was lower among Black women (62.4%). While this study assessed 100% ART adherence during the past 30 days, the finding that more women reached SVS during the year than reported

past-month 100% ART adherence aligns, given viral suppression only requires initial adherence of 95% for many ART combinations[23] and requires only 80% of doses taken as prescribed for protease inhibitor-boosted regimens.[24,25]

In this study, race- and ethnicity-specific models were developed to identify which socio-demographic, clinical, behavioral, and structural factors reduced racial/ethnic disparities in ART adherence and SVS for Black and Hispanic/Latina women with HIV. We found that prevalence differences in these outcomes differ when comparing Black women to White women and Hispanic/Latina women to White women, implying that some factors may affect Black and Hispanic/Latina women differently and may explain disparities observed in this study. For example, this study did not observe a significant difference in SVS between Hispanic/Latina and white women, but we did observe a significant difference in SVS between Black and White women. The observed Black-White difference in prevalence of SVS was no longer significant after controlling for ART adherence, poverty, health insurance/coverage and gap in health insurance/coverage. These findings are similar to prior research that demonstrated the contribution of SDOH to racial/ethnic disparities in viral suppression among women with HIV.[14] However, even after controlling for poverty, unmet need for transportation help, low health literacy (and for the Black-White comparison, gap in health coverage), differences in ART adherence remained significant for both racial/ethnic comparisons. However, prevalence differences in ART adherence between Hispanic/Latina and White women, both unadjusted and adjusted, were lower than the prevalence differences between Black and White women.[14]

To improve equity in HIV treatment and care outcomes among women with HIV, our findings suggest the need to address racial and ethnic disparities in poverty, need for transportation assistance, health literacy, and consistent health insurance coverage, and need for implementing related solutions that will reduce these inequities in American society. Poverty had

the biggest impact on Black-White disparities in ART adherence, unfortunately, the feasibility of reducing or eliminating poverty is beyond what can reasonably be expected in the short term. However, while more direct solutions (e.g., increasing the U.S. minimum wage to an affordable living wage, standing up educational and employment assistance programs and resources in needed communities, overhauling U.S. drug pricing to make medications more affordable, etc.) are not readily available to clinical and public health practitioners, there are mechanisms and practices that can be adopted by healthcare systems that either financially incentivize persons with HIV to attend appointments, fill ART prescriptions, and be medically adherent to ART (e.g., Financial Incentives for Viral Suppression[26] – a Centers for Disease Control and Prevention (CDC)-defined Best Evidence, structural intervention[27]), or at a minimum, subsidize these costs (e.g., paying for rideshare to transport patients to appointments). In addition, it is important to identify mediators of the poverty – HIV treatment and care relationship to identify factors that may be more readily addressed (e.g., depression, social support, etc).

With respect to transportation assistance, an estimated 3.6 million patients experience transportation barriers to healthcare each year.[28] Women with HIV who are engaged in HIV care can access transportation assistance via the Ryan White HIV/AIDS Program. Structural-level interventions for women needing transportation assistance can also include offering home delivery and 90-day prescriptions (as opposed to 30-day prescriptions)[29] and medication synchronization, or the practice of arranging all of a patient's medications to be refilled on the same date.[30]

Many racial/ethnic minority women in this study reported limited health literacy, which may translate into low self-efficacy to manage prescriptions—both of which can directly affect medication adherence, and subsequently, based on our findings, SVS. While an individual-level approach to increasing patient self-efficacy to understand and manage prescriptions might be to

increase health literacy, intervening at a structural level might involve, for example, providing medication in blister pill packs with the date and time on them for patients who take multiple medications. Identifying and implementing solutions for increasing medication adherence is critical for increasing SVS.

Previous research suggests that the factors associated with racial/ethnic disparities in ART adherence and SVS observed in this study are also barriers to HIV care engagement reported by PWH not in care.[31] Padilla and others[31] examined qualitative data to understand barriers and facilitators to HIV care engagement among PWH who participated in the MMP from June 2018 to May 2019 and were not engaged in HIV care. Several system- and structural-related facilitators to engaging in care were noted. System-related facilitators included positive attributes of patient-provider relationships (e.g., providers who are empathic, are nonjudgmental, engage patients in a conversation, and take time to listen) and flexible appointments (e.g., scheduled soon after requested or offered outside traditional work hours).[31] Structural-level facilitators of care included transportation (e.g., access to public and private transportation; having available public transportation routes close to home and health care facilities; and reducing, subsidizing or eliminating the cost of transportation); health insurance (e.g., reducing, subsidizing or eliminating cost associated with seeking care); and financial help (e.g., being employed and securing income is a precursor to seeking care).[31] If research suggests that PWH in care experience the same issues that those PWH who are of out of care report are barriers to engaging in care, then an argument can be made that those in care are susceptible or at risk of falling out of care if these issues are not addressed. Black and Hispanic/Latina women in this study were "in care" with respect to taking ART, yet disparities in ART adherence and SVS were still evident and associated with structural-level factors like transportation, health insurance, and financial need (i.e., poverty). Simply being "in care" is not enough to reduce these inequities.

Patient-provider relations and healthcare discrimination are two factors not included in the current analyses (due to changes across MMP cycles that precluded their inclusion) that may help answer the question as to why racial/ethnic disparities in some outcomes were reduced but not eliminated. An important caveat for successfully implementing financial-based structural-level interventions as proposed above is that, before a provider can direct a patient to financial resources that will aid in their ability to be medically adherent, they must first develop a rapport with patients, as a lack of trust can subvert the necessary step of identifying patients who need financial assistance. Negative clinical encounters by racial/ethnic minority women are well documented.[32,33] Increasing equitable access to HIV care and treatment services can be accomplished by developing social and structural interventions that address the patient-provider relationship as well as overcoming some of these challenges by providing a "One Stop Shop" (or all-inclusive) module of health-related service delivery.[34,35] The CDC's Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention[36] was developed to aid HIV prevention providers and planners in identifying and implementing the most effective HIV prevention within their communities and contains chapters on medication adherence[37] and structural-level interventions.[38] Any future development of interventions to address racial and ethnic disparities in medication adherence and viral suppression should be culturally tailored and co-developed by the population they purport to assist. Inclusive efforts are needed to improve communication and satisfaction with HIV care services among women of color.[32] In their systematic review of social and structural determinants of HIV treatment and care among black women living with HIV infection, Geter, McCree and Sutton,[39] suggested individual-level interventions that empower black women to address specific poverty-related topics (e.g., unmet needs like transportation, housing, and unemployment) with their providers (for resources) and peers (for support) is highly dependent on the development of structural-level interventions that

train medical staff and providers how to effectively engage patients through non-stigmatizing dialogue, thereby improving equity in HIV care and treatment outcomes.

This study was not without limitations. First, analyses were limited to women with HIV who were taking ART, not all women with HIV. While the proportion of PWH taking ART is high overall (i.e., 83%),[40] exploration of racial/ethnic disparities in ART use may yield useful information, as ART use is a primary driver of VS. Second, these data are cross-sectional, and causality could not be established. Third, nonresponse bias is possible given the response rates for data collected in this study; however, research has shown a reduced risk of bias in well-constructed probabilistic sampling frames with moderate response rates, like MMP.[41] Fourth, to strengthen analyses given the small sample sizes for women per year, each year of data for these serial cross-sectional surveys were combined. However, we have confidence in our findings given stable adherence and SVS rates among women during the time frame under study.[42] Lastly, although we controlled for several variables in our analyses, this study did not fully account for the disparities observed in ART adherence; thus, there may be unmeasured factors that explain these differences. Examples include racial discrimination[43] and social-cultural factors like religion/spirituality,[44] and social connectedness or cohesion.[45] Future research should include additional variables not examined here as well as qualitative data from patients and providers to inform the development of tailored interventions for racial and ethnic minority women with HIV.

CONCLUSION

Less than half of U.S. women with HIV who were taking ART were medication adherent. Furthermore, viral suppression was suboptimal overall, and significantly lower for Black women in comparison to White women. Racial and ethnic disparities in HIV care outcomes must be ameliorated if we are to meet the goals of the EHE and NHAS and realize a more equitable

landscape for HIV prevention and care. The recommendations outlined above align with the CDC's Division of HIV Prevention's priorities for the Treat pillar of the EHE.[6] Specifically, to consider provider-level or system-level strategies for improving ART adherence and SVS, as these strategies may have broader reach or be more sustainable, and develop interventions to address the social determinants (e.g., economic inequalities) that negatively affect ART use and adherence and viral suppression among PWH.

ACKNOWLEDGMENTS

The authors thank participating MMP patients, facilities, project areas, and Provider and Community Advisory Board members. They also acknowledge the contributions of the Clinical Outcomes Team and Behavioral and Clinical Surveillance Branch at CDC.

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doi:https://doi.org/10.1002/jcop.22862

Table 1. Prevalence and Prevalence Differences (PD) of Socio-demographic, Clinical, Behavioral, and Structural Characteristics among White, Black, and Hispanic/Latina Women with HIV taking ART – Medical Monitoring Project, United States, 2015-2019

	Overall		Black Women		Hispanic/Latina Women*		White Women		PD Black-White		PD Hispanic/Latina-White	
	n	Wt.%† (95% CI)	n	Wt.%† (95% CI)	n	Wt.%† (95% CI)	n	Wt.%† (95% CI)	Wt.%† (95% CI)	*p*	Wt.%† (95% CI)	*p*
Total	4505		2844	61.3 (56.4-66.1)	952	21.0 (16.2-25.7)	709	17.8 (15.6-19.9)				
HIV Study Outcomes												
Adherent to ART, past 30 days												
Yes	1893	42.2 (40.5-43.9)	1103	38.6 (36.2-41.0)	407	42.0 (38.0-45.9)	383	54.6 (50.1-59.1)	-16.0 (-21.2- -10.8)	<.001	-12.7 (-18.8- -6.5)	<.001
No	2593	57.8 (56.1-59.5)	1724	61.4 (59.0-63.8)	543	58.0 (54.1-62.0)	326	45.4 (40.9-49.9)	16.0 (10.8-21.2)	<.001	12.7 (6.5-18.8)	<.001
Sustained viral suppression‡												
Yes	3029	65.2 (63.5-66.9)	1853	62.4 (60.2-64.6)	666	69.0 (65.4-72.5)	510	70.4 (65.9-74.8)	-7.9 (-12.9- -3.0)	.002	-1.4 (-6.9-4.1)	0.614
No	1476	34.8 (33.1-36.5)	991	37.6 (35.4-39.8)	286	31.0 (27.5-34.6)	199	29.6 (25.2-34.1)	7.9 (3.0-12.9)	.002	1.4 (-4.1-6.9)	0.614
Socio-demographics												
Age at interview, years												
18-29	257	5.9 (5.1- 6.6)	171	6.1 (5.1- 7.1)	53	6.1 (4.3- 7.9)	33	4.6 (2.8- 6.4)	1.5 (-0.6-3.6)	0.159	1.5 (-1.1- 4.0)	0.254
30-39	623	15.1 (13.7-16.4)	408	15.4 (13.7-17.2)	112	14.5 (11.4-17.6)	103	14.5 (11.6-17.4)	0.9 (-2.2-4.1)	0.559	-0.0 (-4.2- 4.2)	0.994
40-49	1157	27.0 (25.6-28.4)	732	27.9 (25.9-29.8)	243	24.8 (21.9-27.8)	182	26.5 (22.6-30.4)	1.4 (-3.1-5.8)	0.549	-1.7 (-6.8-3.5)	0.530
>=50	2468	52.1 (50.5-53.7)	1533	50.6 (48.3-52.8)	544	54.6 (50.9-58.3)	391	54.4 (49.7-59.1)	-3.8 (-9.2-1.6)	0.165	0.2 (-5.9-6.3)	0.949
Educational Attainment												
<High school	1297	28.3	782	26.9	378	40.0	137	19.4	7.5	0.001	20.7	<.001

		(26.9-29.7)		(24.9-28.9)		(35.5-44.6)		(15.8-23.0)	(3.1-11.9)		(14.7-26.6)	
High school diploma or equivalent	1391	30.8 (29.1-32.5)	931	32.8 (30.4-35.2)	261	27.7 (24.3-31.1)	199	27.9 (24.3-31.5)	4.9 (0.3-9.5)	0.037	-0.2 (-5.2-4.8)	0.940
>High school	1813	40.8 (39.0-42.6)	1129	40.3 (38.0-42.6)	311	32.3 (28.0-36.5)	373	52.7 (48.1-57.3)	-12.4 (-17.8- -7.0)	<.001	-20.5 (-27.0--13.9)	<.001
Social Determinants of Health (SDOH)												
Household federal poverty level < 100%												
<100%	2560	61.1 (58.5-63.8)	1598	61.2 (58.5-63.8)	619	69.8 (65.0-74.7)	343	50.9 (46.5-55.2)	10.3 (5.7-14.9)	<.001	19.0 (13.3-4.7)	<.001
Food insecurity												
Yes	944	20.7 (19.3-22.1)	571	19.9 (18.2-21.6)	226	23.0 (19.5-26.5)	147	20.8 (17.5-24.2)	-1.0 (-4.8-2.9)	0.627	2.2 (-2.6-7.0)	0.372
Health insurance/coverage												
Any private insurance	1056	24.4 (22.4-26.4)	683	25.3 (23.3-27.4)	169	18.2 (14.9-21.6)	204	28.5 (24.1-32.8)	-3.1 (-7.5-1.3)	0.168	-10.2 (-15.3- -5.2)	<.001
Public insurance only	3058	66.6 (64.3-68.9)	1899	65.3 (63.1-67.4)	693	71.8 (67.1-76.5)	466	64.9 (60.6-69.3)	0.3 (-4.4-5.0)	0.895	6.8 (1.2-12.4)	0.017
Ryan White coverage only or Uninsured	346	9.0 (7.5-10.6)	235	9.4 (7.8-11.0)	77	10.0 (6.5-13.5)	34	6.6 (3.6- 9.6)	2.8 (0.0-5.6)	0.049	3.4 (-0.9-7.7)	0.121
Gap in health coverage												
Yes	354	8.0 (6.9- 9.2)	258	9.0 (7.5-10.5)	63	7.6 (5.3- 9.8)	33	5.3 (3.3- 7.3)	3.7 (1.5-6.0)	0.001	2.3 (-0.7-5.3)	0.137
Emergency room visit												
Yes	1979	43.6 (41.5-45.8)	1291	45.1 (42.6-47.7)	385	40.8 (37.1-44.5)	303	41.6 (37.4-45.9)	3.5 (-1.4-8.4)	0.161	-0.8 (-6.5-4.8)	0.777
Low health literacy												
Yes	1245	27.4 (25.5-29.2)	740	25.9 (23.7-28.1)	361	38.1 (34.2-42.0)	144	19.8 (16.3-23.3)	6.1 (2.1-10.0)	0.003	18.3 (13.3-23.3)	<.001
Homeless												
Yes	337	7.2 (6.2-8.2)	219	7.6 (6.3-8.8)	60	6.5 (4.4- 8.6)	58	6.8 (4.9- 8.8)	0.8 (-1.4-2.9)	0.484	-0.3 (-3.3-2.6)	0.823

Unmet need for transportation help												
Yes	1940	42.0 (40.5-43.6)	1285	44.3 (42.4-46.2)	411	43.8 (39.9-47.7)	244	32.0 (27.9-36.2)	12.3 (7.6-17.0)	<.001	11.8 (6.2- 17.4)	<.001
Incarceration												
Yes	118	3.0 (2.3- 3.8)	73	3.0 (2.1- 3.9)	12	1.2§ (0.5- 1.9)	33	5.4 (3.3- 7.5)	-2.4 (-4.7- -0.1)	0.045	-4.2 (-6.4- -2.0)	<.001
Behaviors												
History of forced sex or physical intimate partner violence												
Yes	1819	42.0 (39.9-44.1)	1028	36.7 (34.4-38.9)	388	42.1 (38.7-45.6)	403	60.1 (55.7-64.5)	-23.4 (-28.2- -18.6)	<.001	-18.0 (-23.2- -12.7)	<.001
Any drug use												
Yes	792	17.5 (16.1-18.9)	509	17.9 (16.1-19.7)	111	10.7 (8.6-12.7)	172	24.0 (20.5-27.5)	-6.1 (-9.8- -2.3)	0.002	-13.3 (-17.3- -9.2)	<.001
Binge drinking, past 30 days												
Yes	450	9.7 (8.7-10.7)	295	9.8 (8.5-11.2)	86	9.6 (7.3-11.9)	69	9.4 (7.1-11.8)	0.4 (-2.2-3.0)	0.764	0.2 (-3.2-3.5)	0.920
Other Clinical Variables												
Symptoms of major/other depression, past 2 weeks												
Yes	999	22.5 (21.0-24.1)	590	21.2 (19.4-22.9)	233	23.4 (20.6-26.2)	176	26.1 (22.4-29.8)	-4.9 (-8.6- -1.3)	0.009	-2.7 (-7.1-1.7)	0.227
Symptoms of moderate to severe anxiety, past 2 weeks												
Yes	860	19.6 (18.0-21.1)	467	16.7 (14.9-18.4)	210	20.9 (18.4-23.5)	183	28.1 (24.4-31.8)	-11.4 (-15.0- -7.8)	<.001	-7.1 (-11.6- -2.7)	0.002
Time since HIV diagnosis, years												
<5 years	510	11.2 (10.1-12.3)	315	11.2 (9.9-12.5)	103	10.5 (8.1-12.9)	92	12.2 (9.6-14.9)	-1.1 (-3.9-1.8)	0.459	-1.7 (-5.3-1.8)	0.338
5-9 years	760	17.7 (16.3-19.1)	504	18.7 (16.7-20.7)	135	14.7 (11.5-17.9)	121	17.5 (14.0-21.0)	1.2 (-2.8-5.2)	0.560	-2.8 (-7.8-2.2)	0.271
>=10 years	3226	71.1 (69.5-72.8)	2019	70.1 (67.7-72.5)	712	74.8 (71.5-78.1)	495	70.3 (66.5-74.1)	-0.1 (-4.4-4.2)	0.958	4.5 (-0.9-10.0)	0.102
HIV care engagement												
Yes	3843	84.5 (82.8-86.2)	2393	83.0 (81.2-84.9)	851	90.5 (87.7-93.3)	599	82.5 (77.8-87.3)	0.5 (-4.2-5.2)	0.826	8.0 (2.4-13.5)	0.005

Note: numbers may not equal to total due to missing data.
Period: In the past 12 months, unless otherwise noted. All measures are self-reported unless otherwise noted.
n = unweighted sample size
*Hispanic/Latina women can be of any race.
†Weighted column percentages.
‡Assessed by medical record abstraction.
§Coefficient of variation > 0.30, estimate may be unstable.

Table 2. Crude and Adjusted Prevalence Differences (PD) for ART Adherence and Sustained Viral Suppression Among Black and Hispanic/Latina Women taking ART Compared with White Women taking ART – Medical Monitoring Project, United States, 2015-2019

Black-White Adjusted Prevalence Differences (PDs)*							
ART Adherence	**PD (95% CI)**	***p***	**% change**	**Sustained Viral Suppression**	**PD (95% CI)**	***p***	**% change**
Model†: ART adherence = race groups ‡	-16.0 (-21.2- -10.8)	<.0001	-	Model†: Sustained viral suppression = race groups ‡	-7.9 (-12.9 - -3.0)	0.0015	-
After adjusting for the following§:				After adjusting for the following§:			
poverty	-14.8 (-20.3 - -9.3)	<.0001	-7.5%	ART adherence	-6.1 (-11.2 - -1.0)	0.0184	-22.8%
poverty + unmet need for transportation help	-14.7 (-20.2 - -9.1)	<.0001	-8.1%	ART adherence + poverty	-5.3 (-10.6 - -0.0)	0.048	-32.9%
poverty + unmet need for transportation help + health literacy	-14.5 (-20.0 - -8.9)	<.0001	-9.4%	ART adherence + poverty + health insurance/coverage	-5.3 (-10.7 - -0.0)	0.050	-32.9%
poverty + unmet need for transportation help + health literacy + gap in coverage	-14.2 (-19.8 - -8.6)	<.0001	-11.3%	ART adherence + poverty + health insurance/coverage + gap in coverage	-5.0 (-10.3 - 0.3)	0.667	-36.7%
Hispanic/Latina-White Adjusted Prevalence Differences (PDs)*							
ART Adherence	**PD (95% CI)**	***p***	**% change**	**Sustained Viral**	**PD (95% CI)**	***p***	**% change**

				Suppression			
Model†: ART adherence = race groups ‡	-12.7 (-18.8 - -6.5)	0.0001	-	Model†: Sustained viral suppression = race groups ‡	-1.4 (-6.9 - 4.1)	0.6142	-
After adjusting for the following§:				Not applicable**			
poverty	-10.5 (-17.0 - -4.0)	0.0015	-17.3%	-	-	-	-
poverty + health literacy	-9.7 (-16.3 - -3.1)	0.0040	-23.6%	-	-	-	-
poverty + health literacy + unmet need for transportation help	-9.6 (-16.3 - -3.0)	0.0046	-24.4%	-	-	-	-

*Prevalence differences are based on differences between mean predicted marginals between Black and Hispanic/Latina women compared with White women.

†Initial unadjusted models to compute prevalence differences in an outcome (ART adherence or SVS) between the different race groups.

‡Race groups included in the models were 2 levels (1 = White; 2 = Black for Black-White comparisons or (1 = White; 3 = Hispanic/Latina) for Hispanic/Latina-White comparisons.

§Multivariable models after adjusting for selected characteristics. Additional models describe the variables added to the initial model and the resulting prevalence differences after adjusting for the additional covariates added to the model.

**Adjusted models were not analyzed because there was not significant difference in the crude PD in SVS between Hispanic/Latina and White women.