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Correlates of durable viral suppression (DVS) among criminal justice-involved (CJI) Black men living with HIV in Louisiana

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Abstract

Durable viral suppression (DVS) is needed to reduce HIV transmission risk and prevent new HIV infections. We examined changes in viral suppression and correlates of DVS among 97 criminal justice-involved (CJI) Black men living with HIV in Louisiana enrolled in a linkage, re-engagement, and retention in care intervention. Most participants (75%) were Black men who have sex with men. Forty-four percent (44%) were virally suppressed at baseline and only 20% had achieved DVS over a 12-month period. Multinomial logistic regression analyses showed that compared with DVS participants, those with no viral suppression (NVS) and some viral suppression (SVS) were more likely to have lived with HIV for a longer period of time and were less likely to be adherent at baseline. Medication adherence was critical for DVS among this sample of CJI Black men living with HIV who represent a high priority population for HIV care and treatment interventions.

Keywords

durable viral suppression; Black men who have sex with men (BMSM); criminal justice-involved; HIV; South

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Contributors:

All authors contributed to concept development. R. Brewer generated the manuscript outline and contributed to the initial and subsequent versions. M. Moore, R. Issema, and M. Odlum contributed to data cleaning, methods, analyses, and the results section. S. Chrestman, S. Mukherjee, and J.A. Schneider contributed to the introduction, results, and discussion section. In addition, R. Brewer served as PI for the study with S. Chrestman and S. Mukherjee as Co-Investigators.

Conflict of interest: Dr. Russell Brewer currently serves as advisory to Gilead's Implementation Science Group and ViiV Healthcare's Accelerate Initiative.

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Informed consent: Informed consent was obtained from all study participants.

INTRODUCTION

The National HIV/AIDS Strategy (NHAS) has described the need for persons living with HIV (PLWH) to access and be retained in HIV care in order to achieve viral suppression and improvements in overall health (1). In addition, the Southern United States and criminal justice-involved (CJI) populations living with HIV are key priority jurisdictions and populations for HIV care and treatment interventions (1–5). The post-release transition period is a vulnerable time for many CJI individuals living with HIV infection as the benefits of HIV treatment experienced during incarceration are frequently lost upon community re-entry (2–5). Post-release HIV care visits and medication adherence become challenging due to a variety of co-occurring factors including limited income, high levels of unemployment, HIV stigma, mental health issues, and relapse to drug and alcohol use (2–12). Such barriers have also been noted among CJI Black men who have sex with men (BMSM) living with HIV infection (13, 14).

Louisiana has been described as “ground zero” for both HIV and incarceration given that the state has the third highest HIV diagnosis rate and highest incarceration rate in the United States (15–17). An estimated 2.5% (500) of all PLWH are housed in Louisiana’s prisons, which is not inclusive of all PLWH in correctional settings (15, 18). BMSM in particular are over-represented in correctional settings and experience a disproportionate burden of HIV (16, 19–22).

An examination of the correlates of durable viral suppression (DVS), a long-term indicator of sustained viral suppression among PLWH, has become an emerging and important area of HIV research (23–27). Researchers contend that the most common measure of viral suppression in clinical and surveillance studies, the most recent viral load (VL) < 200 copies/mL in the last 12 months, is not a long-term indicator of viral suppression as it does not allow for VL dynamics or fluctuations over time. Persistent VL suppression, measured at multiple time points, can account for cumulative exposure to viral replication over time (23). DVS is also necessary to prevent HIV transmission potential and new HIV infections (23–25).

Racial and ethnic differences in DVS have been observed among large representative samples of PLWH (23, 24). Blacks are less likely to achieve DVS compared with their White and Hispanic counterparts living with HIV across a variety of subcategories including sex, age, and HIV risk group (23, 24). The literature on the prevalence and correlates of DVS specifically among CJI Black men living with HIV who represent a high priority population is scant and studies in this area can inform future HIV care and treatment efforts for this population.

Strategies to enhance linkage, re-engagement, and retention in HIV care for CJI PLWH have included patient-centered approaches (e.g., case management and health navigation) focused on enhancing linkage and/or referrals to medical care and supportive services (e.g., substance abuse treatment, mental health services, housing placement, employment, health insurance support) (28–33); the use of health information technology to facilitate access to HIV care (e.g., utilization of video conferencing between currently incarcerated individuals

and case managers at Ryan White agencies) (34, 35); and the use of health department staff dedicated to preventing treatment interruptions upon release (34). What is less known about these approaches are their associations and long-term contributions to DVS among CJI Black men, particularly CJI BMSM living with HIV which is critical to improving their overall health, likelihood of HIV transmission, and preventing new HIV infections among a highly HIV impacted population.

The Louisiana Reentry Initiative (LRI) cohort intervention study was implemented from January 2013 – February 2016, with a primary goal of linking, re-engaging, and retaining in HIV care, CJI PLWH in Louisiana. Three main patient-centered interventions (i.e., pre/post release case management, health navigation, and community outreach) were adapted and implemented to improve HIV outcomes among CJI PLWH. LRI was conducted in collaboration with six agencies from a variety of sectors (i.e., a community health center, two-community-based organizations, a local jail, state health department, and statewide public health institute) in two Louisiana cities (New Orleans and Baton Rouge) (33). The primary aims of this exploratory analysis based on longitudinal data from the parent LRI study are to: 1) examine changes in viral suppression over time; and 2) identify the correlates of DVS over a one-year period among CJI Black men living with HIV in Louisiana. We also describe differences between CJI BMSM and Black men who have sex with women (BMSW) in terms of demographic, psychosocial, behavioral, health, and HIV outcomes.

METHODS

Study Design

We conducted secondary data analysis from the parent LRI study which was a three-year (i.e., 2013–2016) multi-city and-multi-intervention cohort study. The inclusion criteria for participation in the parent LRI study included: 1) individuals with a confirmed HIV diagnosis, 2) persons with a history of incarceration (i.e., jail or prison) or current jail incarceration, 3) individuals living in or who intended to reside in the New Orleans or Baton Rouge metropolitan area post-incarceration, and 4) those who were at least 18 years of age. Participants may have consented to the study while in jail but the remaining study procedures (i.e., VLs, referrals to supportive services, medical appointment accompaniments) were completed post-release. One hundred and forty-four (N=144) individuals participated in the parent LRI study and completed a baseline intake assessment and VL test at enrollment or within the early stages of receiving one of the three patient-centered interventions. VL levels were measured at multiple time points (i.e., enrollment, 6-months, and 12-months post enrollment) and obtained from the Louisiana State Department of Health's HIV surveillance system. A preferred variability of +/− 1 month was allowed for the 6 and 12-month follow-up periods. The patient-centered interventions were conducted over a 12-month period. LRI intervention components have been previously described (33). Our analysis was restricted to 97 LRI participants who self-identified as a Black/African American male.

Study Measures

Baseline demographic characteristics—The demographic characteristics assessed at enrollment included race/ethnicity, gender identity, sexual orientation, sexual partners within the last six months, age, annual income, education, relationship status, employment status, health insurance status, years living with HIV, and whether or not an individual was stably housed. The BMSM category included Black men who identified as gay, bisexual, and/or reported sex with other men. The BMSW category included Black men who identified as heterosexual or straight and only reported sex with women in the last six months.

Baseline psychosocial & behavioral characteristics

Incarceration-related characteristics -: Participants responded to a series of incarceration-related questions that assessed incarceration frequency in the last six months of at least twenty-four hours; duration of most recent incarceration; whether or not they were on parole or probation; whether or not someone picked them up from a correctional facility after their most recent release; and whether or not they received any HIV-related services (e.g., HIV testing, treatment, education) during their most recent incarceration.

HIV stigma -: HIV stigma was assessed using a perceived stigma distancing scale (Cronbach alpha [α] = 0.803) which has been utilized in previous Louisiana studies among PLWH (3, 36). Clients were read four stigma-related statements related to their HIV with responses ranging from “often” to “not at all” that measured how often they felt people avoided them, feared they would lose friends, thought people were uncomfortable being around them, and avoided obtaining treatment because someone might find out about their HIV status. Responses of “often” or “sometimes” were assigned one point and “not at all” or “rarely” were assigned zero points. These responses were summed and divided by four to create a final HIV stigma score with higher scores indicating greater levels of HIV stigma.

Social support -: A six-item social support scale adapted from the Human Population Laboratory survey was used to assess levels of social support (37). This scale has been utilized among large samples of BMSM in the United States (20, 37). The six items measured the availability of someone to talk to, availability of good advice about a problem, availability of love and affection, help with daily chores, emotional support, and level of contact with a trusted individual. Responses ranged from “none of the time” to “all of the time” and were assigned scores of one to four accordingly. These responses for each individual were summed to create a final social support score. Scores ≥twenty-one were categorized as high levels of social support and scores less than twenty-one were categorized as moderate/low levels of social support (α = 0.93).

Depression -: The Patient Health Questionnaire (PHQ-9) was used to assess depressive symptomatology within the past two weeks. This scale has been previously validated among racially and ethnically diverse patients (α = 0.915) (38). Scores of zero to three were assigned to the response categories of “not at all” to “nearly every day”. Total scores ranging from 0–4, 5–9, 10–14, 15–19, and 20–27 represented minimal, mild, moderate, moderately severe and severe depression, respectively (38).

Any drug Use -: An adapted six-item drug use scale based on the Texas Christian University (TCU) Drug Screen II which has been validated among CJI populations was used to assess any drug use in the last month (39). This scale measured the frequency with which participants used certain drugs (e.g., crack, cocaine, heroin, crystal meth, etc.) in the last month. Scores of zero to four were assigned to response categories of "never", "only a few times", "1–3 times per month", "1–5 times per week", and "about every day", respectively. Mean scores of zero were categorized as not using drugs while a mean score of one or more was categorized as any drug use.

Baseline health and HIV-related characteristics

Any health care provider visit -: Participants indicated if they did or did not see a health care provider within the last six months.

Co-occurring health condition -: Participants responded to an open-ended question about whether or not they were ever diagnosed with another health condition such as a sexual transmitted infection (STI), diabetes, or high blood pressure.

Most urgent need -: Most urgent need was categorized as either a health care-related urgent need or an immediate urgent need. Health care-related needs consisted of dental services, drug and alcohol abuse treatment, HIV-related medical services, mental health services (inpatient or outpatient), non-HIV-related medical services, and pharmacy or medication services (for HIV or non-HIV reasons). Immediate urgent needs included employment, food or other subsistence needs, and housing or shelter. This measure was adapted from The Measurement Group, Missouri Department of Health and Senior Services, and the New York State Department of Health AIDS Institute (33).

Greatest barrier to HIV care -: Greatest barrier to HIV care consisted of three main categories: no barriers, individual-level barriers, and structural barriers. Participants who did not report any barriers to care at enrollment were classified as not having any barriers to care. Individual-level barriers consisted of denial, drug use, competing priorities, lack of money, lack of perceived need, stigma, and transportation. Structural barriers comprised homelessness, incarceration, and location of care. These measures were also adapted from The Measurement Group, Missouri Department of Health and Senior Services, and the New York State Department of Health AIDS Institute (33).

HIV medication self-efficacy -: Participants responded to an adapted measure based on the HIV Taking Self-Efficacy Scale which has been validated among PLWH in the United States (40). The modified 3-item scale measured the ability of participants to get their medications, take their medications, and attend their medical appointments ($\alpha = 0.825$). Scores of one to five were assigned to responses of "strongly disagree" to "strongly agree" with higher scores indicating greater HIV medication self-efficacy.

HIV medication adherence -: Participants first responded to whether or not they were prescribed medications to treat their HIV. They then responded to five items to assess their level of adherence. Participants who answered "Yes" to being prescribed medications for

HIV treatment and identified as always taking their medication at the correct time were described as being adherent. Participants who either said they were not prescribed medications, skipped medications, took medication half the time, taking medication caused problems, or took medication less than half the time were defined as not being adherent (41).

HIV Outcomes

Baseline viral suppression -: Baseline viral suppression was defined as having a VL of < 200 copies/milliliter (mL) at enrollment or within the early stages of receiving one of three patient- centered interventions. VL data was obtained from the Louisiana State Department of Health's HIV surveillance system and later matched with each participant's unique identifier.

DVS -: Three categories of viral suppression were assessed in the study: DVS, some viral suppression (SVS), and no viral suppression (NVS). DVS was defined as three VL values measured at baseline, 6, and 12- months post enrollment that were < 200 copies/mL. The SVS group consisted of participants with VL results of < 200 copies/mL at one or two data collection time points while participants in the NVS group did not have any VL measures of < 200 copies/mL at all of the three data collection time points.

Statistical Analyses—Descriptive analysis was performed and the sample was stratified into two groups: BMSM and BMSW. Given our interest in identifying differences between the two groups of Black men, chi-square and Fisher's exact tests were used to assess demographic, psychosocial, behavioral, health, and HIV outcomes. Variables were shortlisted for this analysis based on their importance in the literature (i.e., previous association with HIV care and treatment) and given our interest in exploring the incarceration-related covariates in order to inform future intervention studies (2, 3, 19, 20). To address our goal of identifying the correlates of DVS, we conducted a multinomial logistic regression analysis by specifying two logit models to predict DVS as referent to NVS and SVS. Participants did not have to have all three VL measurements to be included in the analysis. Variables for the bivariate analysis were also shortlisted based on similar priorities already described. Bivariate multinomial analyses were conducted to shortlist variables for the multivariable multinomial models. All variables significantly associated with the outcome (level of significance ≤ 0.10) in the bivariate analysis were included in the multivariable model. Years living with HIV was included in the adjusted model a priori and enrollment city was excluded from the adjusted model because it was closely correlated with the intervention type (r=0.95). All multinomial analyses were run using robust calculations for the variance/covariance matrices, to limit the influence of potential outliers in the data. All analyses were performed using Stata 14.0 (42).

RESULTS

Characteristics of Black men enrolled in the study

Participant characteristics are described in Table 1. Nearly half of all participants either received the health navigation (47%) or pre/post release case management intervention (49%). The majority of participants were enrolled in Baton Rouge (53%); were BMSM

(75%); were aged thirty or older (78%); reported limited income (90%) and education (88%). Most participants were not in a relationship (93%); did not have health insurance (64%); did not have a co-occurring health condition (59%); were living with HIV for ten years or less (60%); and were stably housed (73%). In terms of employment status, 44% were unemployed and 30% were considered disabled/unable to work. The most common co-occurring conditions were (not included in Table 1): Syphilis (19%), hepatitis (11%), depression (5%), diabetes (5%), and hypertension (5%).

Most participants had been incarcerated within the last 6 months (71%) with a length of stay of less than six months (54%). Most participants were not on parole or probation (62%); were not picked up by a family member, friend, or other person upon most recent release from a correctional facility (59%); and most reported receiving HIV-related services during their most recent incarceration (61%). The majority of participants reported low levels of stigma (53%) with a mean score of 0.27 (standard deviation (SD), 0.33); high levels of social support (64%); minimal depressive symptoms (53%); a visit with a health care provider in the last 6 months (69%); non-health related immediate needs as urgent (51%); high levels of HIV medication self-efficacy (4.49, SD=0.70); and no drug use in the last month (73%). The most common types of drugs used included (not shown in Table 1): marijuana (22%), cocaine (4%), crack (3%), and prescription drugs (2%). More than a third of participants (38%) reported no barriers or individual-level barriers to HIV care. Fifty percent (50%, n=49) of participants had completed three VL tests, 34% (n=33) had completed two VL tests, and 15% (n=15) had only completed only one VL test (not included in Table 1). The majority of participants were not virally suppressed at baseline (56%) and an even higher percentage of participants did not achieve DVS (80%) within a 12-month period even though a substantial number of participants were prescribed HIV meds (68%) and were considered adherent (62%) at enrollment.

Comparing BMSW with BMSM participants

Participant characteristics comparing BMSW with BMSM are described in Table 1. The majority of BMSM (63%) participants received the health navigation intervention whereas all (100%) BMSW received the pre/post release case management intervention ($p<0.001$). All (100%) BMSW participants were enrolled in New Orleans and the majority of BMSM participants (63%) were enrolled in Baton Rouge ($p<0.001$). Compared with BMSW, a greater proportion of BMSM were employed (34% vs. 0%, $p=0.002$); did not have a co-occurring health condition (64% vs. 42%, $p=0.05$); had been living with HIV for ten years or less (66% vs. 42%, $p=0.04$); and were not on parole or probation (70% vs. 38%, $p=0.004$). Group differences in depression approached significance with a greater proportion of BMSM reporting minimal depressive symptoms compared with BMSW (58% vs 38%, $p=0.06$).

Compared with BMSM, a greater proportion of BMSW had been incarcerated within the last six months (100% vs. 60%, $p<0.001$); were not picked up from a correctional facility post-release (79% vs. 51%, $p=0.02$); had received HIV services while incarcerated (96% vs. 49%, $p<0.001$); and reported no drug use (96% vs. 66%, $p=0.003$). Group differences in income levels approached significance with a greater proportion of BMSM reporting lower income

levels compared with BMSM (100% vs. 86%, p=0.06). Higher proportions of BMSW were virally suppressed at baseline (54% vs. 41%) and had achieved DVS (25% vs. 18%) compared with BMSM but these differences were not statistically significant.

Correlates of DVS among participants

The unadjusted and adjusted models with relative risk ratios (RRRs) are shown in Table 2 which compared the baseline correlates of DVS, NVS, and SVS among participants. Compared with the DVS group in the adjusted model, the NVS group was less likely to report a co-occurring health condition (aRRR = 0.12, 95% CI: 0.02 – 0.91); more likely to have lived with HIV for a longer period of time (aRRR=18.80, 95% CI: 3.16 – 111.73); and less likely to be adherent at baseline (aRRR = 0.09, 95% CI: 0.01 – 0.66). Group differences in age where the NVS group was less likely to be younger than the DVS group approached significance (aRRR = 0.01, 95% CI: 0.01 – 1.10). Compared with the DVS group in the adjusted model, the SVS group was more likely to have lived with HIV for a longer period of time (aRRR = 7.0, 95% CI: 1.29 – 37.70); less likely to have received HIV-related services during their most recent incarceration (aRRR = 0.10, 95% CI: 0.02 – 0.68); more likely to report severe depression (aRRR=16.27, 95% CI:1.99 – 133.35); and less likely to be adherent at baseline (aRRR=0.13, 95% CI: 0.02 – 0.98).

DISCUSSION

The primary goals of this exploratory study was not to examine intervention effects but rather to identify changes in viral suppression and the correlates of DVS among a CJI sample of Black men living with HIV. It is important to note that the LRI patient-centered interventionists provided individualized client-centered support (e.g., medical care accompaniments, referrals to supportive services) to enhance HIV linkage and retention in care. To the best of our knowledge, this is one of the first studies to examine the correlates of DVS among a CJI population living with HIV.

Characteristics of CJI Black men enrolled in LRI

The majority of enrolled CJI Black male participants were BMSM with limited education, income, and health insurance which is consistent with the literature on the impact of incarceration among BMSM and low socio-economic and health insurance status among CJI populations in the United States (14, 19–21). Overall, the current study found that the majority of CJI Black male participants reported low levels of stigma, high levels of social support, and minimal depressive symptoms. Few studies have documented and/or examine these characteristics among this population (43). One-third of participants in our study did not report any barriers to HIV care at baseline. Such findings have been documented among previous samples of PLWH in Louisiana (3). Participants may be unsure about and/or are still assessing their current HIV care barriers at enrollment. The majority of participants did not report any drug use in the last month which is contrary to previous studies which have shown higher levels of drug use among CJI BMSM populations prior to and post incarceration (14, 20, 44). This is a high priority sample for HIV care and treatment interventions as most participants were not virally suppressed at baseline (56%) and had not achieved DVS (80%) over a 12-month period.

Differences between CJI BMSW and BMSM

Surprisingly, none of the BMSW participants were employed in the current study. This may be related to the high percentage of BMSW (52%) who were disabled /unable to work. There were no observed statistically significant differences between BMSW and BMSM in terms of baseline viral suppression and DVS. This is contrary to the literature which has shown that MSM in general are more likely to achieve DVS compared with other transmission groups (23, 24).

Changes in viral suppression and correlates of DVS

Correctional settings constitute an important setting for HIV care and treatment interventions as the receipt of HIV-related services during most recent incarceration was associated with DVS (2, 5, 6, 14). The observed changes in viral suppression (i.e., baseline suppression of 44% and DVS of 20%) are consistent with previous studies that have shown HIV care and treatment benefit loss upon community release (2–12). As expected, medication adherence was critical for DVS such that participants who had achieved DVS were more likely to be adherent at baseline compared with both NVS and SVS participants. Participants who had achieved DVS were less likely to report severe depression compared with those who had achieved SVS. Previous studies have shown poor HIV outcomes among persons with a mental health condition (45, 46). Even with the support of the patient-centered interventions, 80% of CJI Black male participants had not achieved DVS which may point to the need for more integrated and/or structural-focused strategies to support medication adherence and DVS among this sample of participants (47, 48).

We found an interesting association between the presence of a co-occurring health condition and DVS. Participants reporting a co-occurring health condition such as diabetes and hypertension were more likely to have achieved DVS compared with the NVS group. This finding is aligned with a growing body of research suggesting that greater frequency and contact with health service providers may provide secondary gains including greater opportunities for the diagnosis of a co-occurring health condition, health education, and treatment of a comorbid condition (49). Compared with the DVS group, participants in the NVS and SVS group were more likely to have lived longer with HIV. This was a surprising finding and may point to treatment fatigue (50).

Limitations and other considerations

Our study findings should be considered within the context of several limitations. A major limitation of this analysis is the borderline sample size and associated wide confidence intervals. Our results should therefore be interpreted with caution. Given that this was an exploratory study and covariates were measured at one point in time (i.e., baseline), inferences about causality cannot be made. Study findings are specific to CJI Black men and cannot be generalized to all CJI Black men living with HIV in the United States. The HIV stigma scale only included questions about the general public and did not include any questions related to negative experiences from correctional staff, health care providers, front-line staff, or supportive service providers. In addition, we did not assess intersectional stigma which are the perceived experiences and perceptions related to multiple identities (i.e., HIV stigma, sexual orientation, race, CJI background), and its impact on viral suppression and/or

sustained viral suppression which is a barrier to medication adherence (51). Participants did not have to have all three VL measurements to be included in the analysis. DVS was only measured over a period of a year in the current study compared with longer time-periods reported in previous studies (23, 24, 26, 27). It is also unclear as to the actual contributions of the various interventions to DVS and/or how they may have impacted the findings. Additional research is needed in this area with a representative sample of CJI participants.

CONCLUSIONS

Our study contributes to the HIV care continuum literature on the correlates of DVS among a CJI population living with HIV in a Deep South state. It highlighted changes in viral suppression, low levels of DVS, and the continued importance of HIV adherence among this subset of participants.

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Table 1:

Sociodemographic and psychosocial characteristics among criminal justice-involved Black men living with HIV in Louisiana, Louisiana Re-Entry Initiative 2013–2016 (n=97)

Participant Characteristics	Total (n=97) n (%)[a]	BMSW (n=24) n (%)[a]	BMSM (n=73) n (%)[a]	p value
Intervention				
Health Navigation	46 (47)	0 (0)	46 (63)	
Pre/Post Release CM	48 (49)	24 (100)	24 (33)	<0.001
Community Outreach	3 (3)	0 (0)	3 (4)	
City (Baton Rouge)	51 (53)	0 (0)	46 (63)	<0.001
Age (30+)	76 (78)	22 (92)	54 (74)	0.09
Income (< $20,000)	87 (90)	24 (100)	63 (86)	0.06
Education (≤ High school or GED)	85 (88)	23 (96)	62 (85)	0.28
Not in a relationship	87 (93)	21 (88)	66 (94)	0.37
Employed				
No	42 (44)	11 (48)	31 (42)	0.002
Yes	25 (26)	0 (0)	25 (34)	
Disabled/Unable to work	29 (30)	12 (52)	17 (23)	
Uninsured	62 (64)	16 (67)	46 (63)	0.75
Co-occurring health condition (No)	57 (59)	10 (42)	47 (64)	0.05
Years living with HIV (≤ 10 years)	58 (60)	10 (42)	48 (66)	0.04
Stable Housing	71 (73)	16 (67)	55 (75)	0.41
Incarceration (last 6 months)	61 (71)	24 (100)	37 (60)	<0.001
Length of incarceration (< 6 months)	51 (54)	11 (46)	40 (57)	0.34
Not on parole or probation	59 (62)	9 (38)	50 (70)	0.004
Picked up from correctional facility (No)	55 (59)	19 (79)	36 (51)	0.02
Received HIV services while incarcerated	59 (61)	23 (96)	36 (49)	<0.001
Stigma, Mean (SD)	0.27 (0.33)	0.38 (0.32)	0.24 (0.33)	0.07
Social Support (High)	62 (64)	13 (54)	49 (67)	0.25
Depression				
Minimal	51 (53)	9 (38)	42 (58)	
Mild	23 (24)	7 (29)	16 (22)	0.06
Moderate/Moderately Severe	14 (14)	7 (29)	7 (10)	
Severe	9 (9)	1 (4)	8 (11)	
Drug Use (No)	71 (73)	23 (96)	48 (66)	0.003
Health Care Provider (Last 6 months)	67 (69)	17 (71)	50 (68(	0.83
Most Urgent Needs (Non-Health-related)	49 (51)	13 (54)	36 (49)	0.68
Greatest Barriers				
No Barriers	37 (38)	8 (33)	29 (40)	
Individual	37 (38)	7 (29)	30 (41)	0.18
Structural	23 (24)	9 (38)	14 (19)	
HIV Medication Self-Efficacy, Mean (SD)	4.49 (0.70)	4.36 (0.51)	4.54 (0.76)	0.29

Participant Characteristics	Total (n=97) n (%)[a]	BMSW (n=24) n (%)[a]	BMSM (n=73) n (%)[a]	p value
Baseline Viral Suppression (Yes)	43 (44)	13 (54)	30 (41)	0.26
Durable Viral Suppression				
NVS	36 (37)	6 (25)	30 (41)	
SVS	42 (43)	12 (50)	30 (41)	0.36
DVS	19 (20)	6 (25)	13 (18)	
Prescribed HIV Meds (Yes)	65 (68)	18 (75)	47 (65)	0.38
HIV Adherence (Yes)	60 (62)	14 (58)	46 (63)	0.68

[a]May not sum to 100% due to rounding

*CM=Case Management

Table 2.

Results of estimated relative risk ratios (RRRs) (95% CI) of changes in viral suppression among criminal justice-involved Black men living with HIV in Louisiana, Louisiana Re-Entry Initiative (n=97), 2013–2016

Characteristics	DVS[a]	NVS[b] relative to DVS				SVS[c] relative to DVS				
	n (%)	n (%)	Unadjusted	p value*	Adjusted[d]	p value	n (%)	Unadjusted	p value*	Adjusted[d]	p value
Intervention											
Health Navigation	5 (13)	19 (49)	REF		REF		15 (38)	REF		REF	
Pre/Post Release CM*	11 (24)	13 (29)	0.27 (0.07, 0.92)	0.04	0.53 (0.03, 8.51)	0.66	21 (47)	0.48 (0.14, 1.63)	0.24	1.76 (0.12, 24.98)	0.68
Community Outreach	2 (67)	0 (0)	--		--		1 (33)	0.13 (0.01, 1.79)	0.13	0.70 (0.02, 22.42)	0.84
City											
Baton Rouge	5 (11)	22 (48)	4.40 (1.29, 15.02)	0.02			19 (41)	2.31 (0.70, 7.64)	0.17		
New Orleans	14 (27)	14 (27)	REF				23 (45)	REF			
Age											
<30	1 (6)	12 (67)	REF		REF		5 (28)	REF		REF	
30+	17 (25)	20 (29)	0.09 (0.01, 0.74)	0.03	0.10 (0.01, 1.10)	0.06	32 (46)	0.33 (0.04, 3.02)	0.33	0.55 (0.05, 6.13)	0.63
Annual Income ($)											
<20,000	17 (22)	26 (33)	REF				36 (46)	REF			
≥20,000	1 (13)	6 (75)	5.14 (0.59, 45.17)	0.14			1 (13)	0.44 (0.03, 7.52)	0.57		
Education											
≤High School or GED	17 (20)	29 (34)	REF				39 (46)	REF			
>High School or GED	2 (17)	7 (58)	2.05 (0.38, 11.12)	0.41			3 (25)	0.65 (0.10, 4.32)	0.66		
Relationship											
No	17 (20)	34 (39)	REF				36 (41)	REF			
Yes	0 (0)	2 (29)	--				5 (71)	--			
Employed											
No	10 (24)	16 (38)	REF				16 (38)	REF			
Yes	4 (16)	13 (52)	2.03 (0.51, 8.06)	0.31			8 (32)	1.25 (0.29, 5.30)	0.76		
Disabled	5 (17)	7 (24)	0.87 (0.22, 3.55)	0.85			17 (59)	2.12 (0.59, 7.63)	0.25		
Health Insurance											

Characteristics	DVS[a]	NVS[b] relative to DVS				SVS[c] relative to DVS				
	n (%)	n (%)	Unadjusted	p value*	Adjusted[d]	p value	n (%)	Unadjusted	p value*	Adjusted[d]	p value
No	13 (21)	24 (39)	REF				25 (40)	REF			
Yes	6 (17)	12 (34)	1.08 (0.33, 3.58)	0.9			17 (49)	1.47 (0.47, 4.67)	0.51		
Co-occurring health condition											
No	5 (10)	23 (46)	REF		REF		22 (44)	REF		REF	
Yes	13 (35)	9 (24)	0.16 (0.05, 0.55)	0.004	0.12 (0.02, 0.91)	0.04	15 (41)	0.20 (0.06, 0.66)	0.01	0.17 (0.03, 1.12)	0.07
Years Living with HIV											
≤10 Years	11 (22)	18 (37)	REF		REF		20 (41)	REF		REF	
>10 Years	7 (18)	14 (37)	1.09 (0.34, 3.46)	0.88	18.80 (3.16, 111.73)	0.001	17 (45)	1.29 (0.42, 3.94)	0.66	7.00 (1.29, 37.70)	0.02
Housing Status											
No Stable Housing	8 (35)	6 (26)	REF		REF		9 (39)	REF		REF	
Stable Housing	10 (16)	26 (41)	3.01 (0.88, 10.36)	0.08	4.98 (0.54, 45.83)	0.16	28 (44)	2.05 (0.65, 6.46)	0.22	6.14 (0.84, 45.09)	0.07
Incarceration (last 6 months)											
No	4 (16)	13 (52)	REF				8 (32)	REF			
Yes	15 (25)	19 (31)	0.39 (0.10, 1.45)	0.16			27 (44)	0.90 (0.23, 3.52)	0.88		
Length of Incarceration Stay											
<6 months	7 (14)	21 (41)	REF				23 (45)	REF			
≥6 months	12 (28)	14 (33)	0.39 (0.12, 1.24)	0.11			17 (40)	0.43 (0.14, 1.33)	0.14		
Parole or probation											
No	10 (17)	25 (42)	REF				24 (41)	REF			
Yes	9 (25)	11 (31)	0.49 (0.15, 1.55)	0.22			16 (44)	0.74 (0.25, 2.24)	0.6		
Picked up from correctional facility											
No	14 (26)	17 (32)	REF		REF		22 (42)	REF		REF	
Yes	4 (12)	15 (44)	3.50 (0.96, 12.79)	0.06	1.31 (0.09, 20.25)	0.85	15 (44)	2.59 (0.72, 9.33)	0.15	2.71 (0.18, 41.20)	0.47
Received HIV services while incarcerated											
No	3 (9)	16 (50)	REF		REF		13 (41)	REF		REF	

Characteristics	DVS[a]	NVS[b] relative to DVS					SVS[c] relative to DVS				
	n (%)	n (%)	Unadjusted	p value*	Adjusted[d]	p value	n (%)	Unadjusted	p value*	Adjusted[d]	p value
Yes	15 (27)	16 (29)	0.19 (0.05, 0.76)	0.02	0.15 (0.02, 1.29)	0.08	24 (44)	0.28 (0.07, 1.10)	0.07	0.10 (0.02, 0.68)	0.02
Stigma, Mean (SD)	0.31 (0.33)	0.17 (0.31)	0.24 (0.04, 1.47)	0.12			0..34 (0.35)	0.89 (0.20, 4.00)	0.88		
Social Support											
Low/Moderate	7 (20)	13 (37)	REF				15 (43)	REF			
High	12 (19)	23 (37)	1.03 (0.32, 3.29)	0.96			27 (44)	1.05 (0.34, 3.26)	0.93		
Depression											
Minimal	7 (15)	21 (46)	REF		REF		18 (39)	REF		REF	
Mild	7 (32)	5 (23)	0.21 (0.05, 0.87)	0.03	0.33 (0.06, 1.76)	0.19	10 (45)	0.55 (0.15, 1.99)	0.36	0.59 (0.12, 2.85)	0.52
Moderate/Moderately Severe	3 (25)	4 (33)	0.49 (0.09, 2.58)	0.4	0.89 (0.03, 27.58)	0.95	5 (42)	0.70 (0.14, 3.61)	0.67	3.20 (0.10, 97.39)	0.51
Severe	1 (14)	2 (29)	0.29 (0.03, 2.49)	0.26	8.80 (0.46, 169.73)	0.15	4 (57)	0.88 (0.14, 5.63)	0.89	16.27 (1.99, 133.35)	0.01
Any Drug Use											
No	15 (21)	27 (38)	REF				29 (41)	REF			
Yes	4 (15)	9 (35)	1.25 (0.33, 4.79)	0.75			13 (50)	1.68 (0.46, 6.10)	0.43		
Health Care Provider (Last 6 Months)											
No	1 (4)	14 (56)	REF		REF		10 (40)	REF		REF	
Yes	17 (27)	18 (29)	0.06 (0.01, 0.47)	0.01	0.11 (0.00, 13.80)	0.37	27 (44)	0.16 (0.02, 1.33)	0.09	0.12 (0.00, 15.43)	0.39
Most Urgent Needs											
Non-Health-Related	11 (22)	15 (31)	REF				23 (47)	REF			
Health-Related	8 (17)	21 (44)	1.93 (0.62, 5.97)	0.26			19 (40)	1.14 (0.38, 3.41)	0.82		
Greatest Barriers											
No Barriers	10 (28)	8 (25)	REF		REF		15 (47)	REF		REF	
Individual	5 (15)	16 (47)	4.50 (1.15, 17.63)	0.03	4.20 (0.49, 35.94)	0.19	13 (38)	1.47 (0.41, 5.31)	0.55	2.12 (0.24, 18.38)	0.5
Structural	4 (19)	8 (38)	3.13 (0.70, 13.92)	0.14	6.05 (0.53, 69.08)	0.15	9 (43)	1.18 (0.29, 4.86)	0.81	3.08 (0.29, 32.67)	0.35
HIV Medication Self-Efficacy, Mean (SD)	4.70 (0.43)	4.27 (0.86)	0.31 (0.14, 0.69)	0.004	0.22 (0.03, 1.56)	0.13	4.65 (0.56)	0.79 (0.33, 1.87)	0.59	0.70 (0.11, 4.53)	0.7

Characteristics	DVS[a]	NVS[b] relative to DVS					SVS[c] relative to DVS				
	n (%)	n (%)	Unadjusted	p value*	Adjusted[d]	p value	n (%)	Unadjusted	p value*	Adjusted[d]	p value
Adherence											
No	1 (3)	16 (55)	REF		REF		12 (41)	REF		REF	
Yes	17 (29)	16 (28)	0.04 (0.01, 0.37)	0.004	0.09 (0.01, 0.66)	0.02	25 (43)	0.09 (0.01, 0.75)	0.03	0.13 (0.02, 0.98)	0.048

[a] Durable Viral Suppression,

[b] No Viral Suppression,

[c] Some Viral Suppression

[d] Only participants without missing covariates data were included in the model (n=87)

* 0.10 used as cut-off point for short-listing variables to adjusted model

* CM = Case Management