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HIV-infected Men Who Have Sex with Men, Before and After Release from Jail: The Impact of Age and Race, Results from a Multi-Site Study

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Abstract

The U.S. HIV/AIDS epidemic is concentrated among men who have sex with men (MSM). Black men are disproportionately affected by incarceration and Black MSM experience higher infection rates and worse HIV-related health outcomes compared to non-Black MSM. We compared HIV treatment outcomes for Black MSM to other HIV-infected men from one of the largest cohorts of HIV-infected jail detainees (N=1,270) transitioning to the community. Of the 574 HIV-infected men released, 113 (19.7%) self-identified as being MSM. Compared to other male subgroups, young Black MSM (<30 years old, N=18) were significantly less likely: 1) before incarceration, to have insurance, access to a HIV healthcare provider, and use cocaine; 2) during incarceration, to receive a disease management intervention; and 3) in the 6 months post-release, to link to HIV care. Interventions that effectively link and retain young HIV-infected Black MSM in care in communities before incarceration and post-release from jail are urgently needed.

Keywords

MSM; Black; HIV; jail; retention in care; insurance; addiction; adherence; secondary prevention

Introduction

Men who have sex with men (MSM) comprise the majority of people living with HIV/AIDS (PLWH) in the U.S., (van Griensven, de Lind van Wijngaarden, Baral, & Grulich, 2009) with recent evidence of a volatile epidemic among Black and younger MSM. (Beyrer et al., 2013; Centers for Disease Control and Prevention, 2014) To address these healthcare disparities, creation of culturally sensitive, integrated clinical care programs to specifically target the needs of high-risk minority groups, including MSM, are urgently needed. (Maulsby et al., 2013; Mayer et al., 2012) Among the array of evidence-based practices to reduce new HIV infections, secondary prevention with PLWH involving antiretroviral treatment as prevention (TasP), is central to these efforts.

In order for TasP to be effective among PLWH who are diagnosed and aware of their status, they must not only be linked to and retained in care, but also be prescribed and adhere to antiretroviral therapy (ART) and achieve and maintain viral suppression. (Granich, Gilks, Dye, De Cock, & Williams, 2009) Additionally, it has recently been recognized that MSM, especially Black MSM, increasingly interface with the criminal justice system (CJS). (Lim, Sullivan, Salazar, Spaulding, & Dinunno, 2011) While there are 2 million people imprisoned in the U.S., most enter the CJS through jails and approximately 10 million transition to the community annually. (International Centre for Prison Studies, 2011; Minton, 2014) Among them, racial/ethnic minorities are disproportionately represented. (Spaulding et al., 2009) Moreover, PLWH are disproportionately concentrated among the CJS population, primarily due to underlying substance use disorders, resulting in 1 in 6 of the estimated 1.2 million PLWH transitioning through the CJS annually. (Altice et al., 1998; Spaulding et al., 2009)

Despite effective treatment response during incarceration, (J. P. Meyer, J. Cepeda, et al., 2014) the transitional period after release from incarceration is especially problematic for PLWH. Documented lapses in ART, (Baillargeon et al., 2009) the inability to maintain viral suppression (J.P. Meyer et al., 2014; S. A. Springer et al., 2004) and relapse to drug and/or alcohol use have been described. (Krishnan et al., 2013; S.A. Springer, Spaulding, Meyer, & Altice, 2011) The intertwining epidemics of incarceration, the explosion of HIV among MSM, including Black and younger MSM, as well as persistent healthcare access disparities and retention in care challenges among HIV-infected Black MSM indicate a need for targeted interventions that consider these factors. Thus, we examined the pre-incarceration and transitional health outcomes among various subgroups of MSM in the largest cohort of PLWH transitioning from jail. This study will provide important insights into improved transitional care interventions.

Methods

Setting and Participant Selection

EnhanceLink, a 10-site U.S. demonstration project, assembled the largest prospective cohort of PLWH in jails to date to assess health outcomes and the impact of diverse interventions delivered to HIV-infected jail detainees who were transitioning to the community from diverse urban and geographically diverse settings in the U.S. (Draine et al., 2011) The specific content of the interventions has been previously described. (Draine et al., 2011) The

project was designed primarily to examine the impact of case management and other brief interventions on linkage and retention in care and other HIV treatment outcomes during the six months post-release. In most instances, transitional care minimally consisted of case management transitional services.

Between January 2008 and March 2011, 1,270 HIV-infected jail detainees, 18 years or older, underwent baseline assessments during incarceration. Interviews and medical chart abstractions were conducted at 6 months post-release, by case management staff and overall, 73% of participants were interviewed at 6 months. (Spaulding et al., 2013) For this analysis of men, 696 (54.8%) participants were excluded for the following reasons: 283 were women, 337 were not released within one year (mainly because they were sentenced to prison terms), 12 died, 2 were deported, 52 moved out of the geographic catchment area or administratively transferred to another correctional facility and 10 did not report their sex. The final analytic sample consisted of 574 participants (Figure 1).

The Institutional Review Boards at all participating study sites approved the study and a Certificate of Confidentiality was obtained.

Dependent variables

The main outcome for this analysis was time to HIV care linkage, defined in terms of number of days to the first clinical visit linked to a viral load (VL), within a 6 month period from the time of release from jail. Intention-to-treat analyses were deployed, which meant that the absence of a VL linked to a HIV clinic visit was treated as no linkage and censored at 190 days from the release date.

Independent variables

The Behavioral Model for Vulnerable Populations (Andersen, 1995; Gelberg, Andersen, & Leake, 2000) was used to select and define covariates that may be independently correlated with healthcare utilization with linkage to and retention in HIV care being the primary outcome. (Althoff et al., 2013) In that model, healthcare utilization is influenced by various factors, including predisposing factors, enabling resources, and individual needs. The variables used in our analysis have been previously described (Chen et al., 2013; J. P. Meyer, A. Zeleney, et al., 2014; Zeleney et al., 2013) and are briefly discussed below.

Predisposing variables, or those intrinsic to the individual, were self-reported at baseline and included age, race/ethnicity, educational level and relationship status. Young age was defined as under 30 years. MSM, for the purposes of this paper, were defined as participants who self-identified as gay, or bisexual (see Limitations below, regarding the definition). Depression and anxiety were assessed by self-report for the 30 days prior to incarceration. Recent drug (cocaine, heroin) and alcohol use (within 30 days prior to incarceration) was obtained via the Addiction Severity Index (ASI). (McLellan, Luborsky, Woody, & O'Brien, 1980)

Several enabling/disabling resources included self-reported homelessness, (Zeleney et al., 2013) including reports of sleeping in a shelter, park, empty building, bus station, on the street, or in another public space. Re-incarceration was defined as anyone returning to jail or

prison during the six-month post-release period from their index incarceration; (Fu et al., 2013) HIV visits made during re-incarceration were not counted as linkages. Being prescribed psychiatric medications in the last 30 days prior to incarceration was measured using self-report.

We also incorporated several needs factors into the analysis, most of which measured the severity of a condition. Drug use severity was assessed using the ASI, calculated using previously validated cut-offs for alcohol (>0.17) and drug use (>0.16). (McLellan, Cacciola, Alterman, Rikoon, & Carise, 2006) In addition, psychiatric condition severity was assessed using the validated psychiatric composite index (>0.22), based on responses from the ASI. (McGahan, Griffith, Parente, & McLellan, 1986) This scoring has been validated against the 36-item Medical Outcomes Study Short Form (SF-36). (Calsyn et al., 2004)

Prior healthcare utilization has been associated with future behavior, including ART adherence. We therefore included baseline health behaviors, defined dichotomously, including self-reported 'taking any ART within the 7 days before incarceration' and 'attainment of 95% self-reported adherence to ART' using the Visual Analog Scale (Giordano, Guzman, Clark, Charlebois, & Bangsberg, 2004) during this time. In addition, having a regular HIV care provider in the 30 days pre-incarceration was assessed at baseline. Viral suppression ($VL < 400$ copies/mL) at the time of incarceration was also assessed as an independent variable. On average, VL was recorded approximately 2 weeks into a participant's jail stay. Last, we incorporated several additional enabling resources that were provided to some clients as part of their transitional plan, including a pre-release needs assessment session, a disease management session and discharge planning.

Statistical analyses

Approximately 5% of the independent variable data were missing at baseline. To address missing data, we performed a series of multiple imputations of our main covariates using a Markov Chain Monte Carlo (MCMC) simulation, conditional on the variables which were observed. (Jackman, 2000; Donald Rubin, 1987) Covariates were Missing at Random (MAR), which implies that the propensity for the data to be missing is related to the observables and not the unobservables (or the values themselves). (Enders C, 2010; DB Rubin, 1976; Donald Rubin, 1987) With 10 imputations, we found that we were able to attain 99% efficiency for all the indicators. We used Rubin's rules to combine the results from various imputations in each of our analyses. (Donald Rubin, 1987) As a comparison for our multiple imputation estimates, we included a lower bound estimate for sample proportions based on the assumption that all unobserved values are 0 (Table 1).

In the first part of the analysis, we compared various indicators between young Black MSM (YBMSM) and each of the three other groups (older Black MSM, non-Black [White and Hispanic] MSM, and non-MSM) using a Pearson Chi-squared test. T-tests were used to compare continuous variables. Second, we calculated and graphed non-parametric estimates of the Kaplan-Meier survival functions based on time to first HIV care linkage for each subgroup (Figure 2). Finally, we examined the differences in time to linkage using Cox proportional hazard models using three-way interactions between MSM, race and age variables. (Cleves, 2002; Hosmer, Lemeshow, & May, 2008) We used a fully interactive

model to compare the expected log of relative hazards within different groups. In this framework, each estimated coefficient can be expressed as an expected value or the difference between two or more expected values of the main outcome and a Wald test can be used to determine whether the difference is statistically significant. (Angrist, 2009; Cleves, 2002; Stock, 2011) In addition, for the baseline analysis, several univariate proportional hazard models were estimated where we compared the differences in the average time to linkage between selected groups and all other men in the sample. All statistical analyses were conducted using STATA v.12. (StataCorp., 2011.)

Results

Relevant characteristics of the participants are described in Table 1. At baseline, YBMSM differed from older Black MSM, non-Black MSM and non-MSM on a number of characteristics. YBMSM reported high prevalence of homelessness (38.9%) and were very likely to lack a stable relationship (72.2%). When compared to the other groups of men, YBMSM were significantly less likely to use cocaine or heroin in the 30 days prior to incarceration, but there was no difference in their addiction severity levels for alcohol and drugs. In contrast to all other men (MSM and non-MSM), YBMSM were significantly less likely to have health insurance (33.3% vs. 76.9%; $p<0.01$) and significantly fewer YBMSM had access to a regular HIV provider at baseline, compared to other men (55.5% vs. 78.6%; $p=0.02$). YBMSM were less likely to have been engaged in continuity of care services, such as needs assessment before release, relative to all other men (27.8% vs. 65.42%, $p<0.01$). Overall, YBMSM had very low rates of viral suppression at baseline (11.1%), but this was not statistically different from any of the other groups.

For post-release outcomes (Table 1, lower section), YBMSM were equally as likely to have a HIV provider or be virologically suppressed, as the other groups. While YBMSM were less likely to report any ART adherence or optimal ($>95\%$) ART adherence relative to non-Black MSM and non-MSM, this difference was primarily associated with young age. Additional analysis, not shown in the table, found young non-Black MSM (and young non-MSM) had lower ART adherence than their older counterparts, while there were no statistically significant differences in ART adherence between Black MSM and non-Black MSM of similar age categories, and no difference in ART adherence between Black MSM and Black non-MSM of young age.

The results of the Cox regression analysis (Table 2) indicate that the hazard of linkage to care among YBMSM is 41% (95% CI 0.20-0.89; $p=0.02$) of the hazard rate of other men suggesting that, on average, YBMSM had a lower probability of linking to care relative to other men within the first 6 months post-release. The difference in time to linkage within the first 6 months was closely associated with younger age, even after controlling for race and MSM status: YBMSM had a lower relative hazard of linkage as compared to older Black MSM (Hazard Ratio: 0.43, [95% CI 0.19-0.98; $p=0.04$]). No statistical differences in time to linkage were found between YBMSM and young Black non-MSM, between MSM and non-MSM, or between Black MSM and all other men (Table 2).

Discussion

As over 90% of the criminal justice population is comprised of men and post-release outcomes for HIV-infected women are markedly worse than for men, (J. P. Meyer, A. Zelenov, et al., 2014) we sought to analyze key differences among specific groups of HIV-infected men, including Black and younger MSM. While the sample size is relatively small and the confidence intervals are wide, YBMSM were significantly less likely to have health insurance, a HIV provider before incarceration and to use cocaine. They also had a significant delay until linkage to care, in the six months after release, which speaks to the urgent need to focus on leveraging the Affordable Care Act to enroll HIV-infected YBMSM (as well as all other individuals without insurance) into health insurance during periods of incarceration, even if incarcerated for short periods of time.

In order for TasP efforts to be optimized, individuals transitioning from jail should not only initiate ART during incarceration, but must adhere to treatment post-release, which first must involve linkage to care. Here, YBMSM were significantly less likely to be linked and retained in HIV care, but after six months, they ultimately achieved relative parity with other men, with regard to viral suppression. One explanation may be that insurance and linkage to a HIV provider was crucial to eventually being in care and that though there may have been structural delays in accessing health insurance across the sites, the case management intervention provided as part of the study may have eventually been able to achieve parity between these groups of men. The exact component of the case management intervention, however, is not known since the type of intervention differed between sites. The extraordinarily low rates of access to ART, retention in HIV care and attainment of viral suppression among all male jail detainees, including YBMSM, are a cause for major concern.

Incarcerated and formerly incarcerated Black MSM form a particularly vulnerable and understudied population, with even fewer interventions specifically targeting them. No studies, to our knowledge, have focused specifically on YBMSM in the CJS. Several recent studies provide converging data that are concerning, including 51% of Black MSM in Massachusetts had been previously incarcerated, (Bland et al., 2012) while recently incarcerated Black MSM were more likely to report unprotected anal intercourse than their non-Black counterparts. (Jones et al., 2008) A large national sample of Black MSM were estimated to have an incarceration incidence as high as 35% (Brewer et al., 2014a) and previous incarceration among Black MSM was associated with age, childhood violence and sexual experiences, alcohol and drug use, and not identifying as gay. (Brewer et al., 2014b) A study in a Fulton County Jail, in Atlanta, indicated that 38% of new HIV diagnoses were among Black MSM. (Centers for Disease & Prevention, 2013) None of these studies, however, examine post-incarceration HIV treatment outcomes and culturally tailored interventions for this group have yet to be tested.

Community-based interventions that target Black MSM have focused on increasing linkage to and retention in HIV care. Two studies among YBMSM showed that enhanced linkage to HIV care services, which included case management with weekly sessions initially followed by monthly sessions for 2 years, resulted in fewer missed visits and increased retention in

care. (Magnus et al., 2010; Wohl et al., 2011) A similar study, which included a social media campaign and outreach targeted to young minority MSM and linkage with a network of care providers, including physicians and counselors, also found increased linkage and retention in care. (Hightow-Weidman, Smith, Valera, Matthews, & Lyons, 2011) A recent systematic review of interventions to improve linkage to care, following HIV diagnosis, highlighted a number of relevant domains, including streamlining services to minimize patient visits, providing adequate medical and peer support, and providing incentives. (Govindasamy et al., 2014) While it is seductive to believe that these interventions may hold some promise for YBMSM transitioning for jail, the unique characteristics of incarceration with disruptions of social networks (Maru, Basu, & Altice, 2007) and the unique challenges following release, (S.A. Springer et al., 2011) may require alternative and more intensive approaches.

According to the International Association of Physicians in AIDS Care (IAPAC), three interventions are effective at linking and retaining newly diagnosed patients into care. The best evidence comes from two randomized controlled trials of a five-session strengths-based case management intervention, the Antiretroviral Treatment and Access Study (ARTAS), and is recommended for patients who are newly diagnosed with HIV infection to foster initial linkage to HIV medical care. (Gardner et al., 2005) Linkage and retention in this study were profoundly higher for both the intervention (80%) and control (60%) groups, relative to this jail-release population. (Craw et al., 2008) Several limitations about this intervention, however, are noteworthy and provide guidance for future adaptations. The intervention was most robust for older adults, those without substance use disorders and those that had case managers co-located onsite where medical care was provided. Moreover, ARTAS, while improving linkage to care, was not directly associated with improved ART access, ART adherence and viral suppression, which are important components of the HIV treatment continuum of care.

Compared to ARTAS II, Intensive Outreach Programs (IOP) are moderately recommended based on findings from a Health Resources and Services Administration (HRSA) funded Special Projects of National Significance (SPNS) project that promoted medical case engagement for recently diagnosed PLWH. (Naar-King et al., 2007) IOP are particularly effective where ARTAS failed, specifically for underserved groups including youth, the homeless and those with psychiatric and substance use disorders, and provides insights into how ARTAS can be adapted to partially meet the needs of YBMSM transitioning from jail. (Naar-King et al., 2007) Unlike ARTAS, however, IOP is not manual-guided and requires that there is field outreach involved. Last, another HRSA-funded study of Paraprofessional Patient Navigators (PPN) is modestly recommended to improve HIV medical visit attendance among patients tenuously connected to care and is recommended only for individual circumstances. (Bradford, Coleman, & Cunningham, 2007) For example, several replication programs and a controlled trial being performed targeting black MSM by the HIV Prevention Trials Network (HPTN 061) have been thwarted by legal, Health Insurance Portability and Accountability Act (HIPAA), confidentiality and acceptability concerns since they requires that highly stigmatized patients be found first and sign informed consent to have other “peers” know their HIV status and interact daily with them. Importantly,

however, both IOP and PPI approaches have been associated with viral suppression, (Bradford et al., 2007; Naar-King et al., 2007) which was not demonstrated in ARTAS.

Though not yet a recommended strategy, a 6-site CDC- and HRSA-sponsored Retention in Care project demonstrated the effectiveness of a low-effort, clinic-wide intervention including brochures, posters, and messages from clinic staff and providers that conveyed the importance of regular clinic attendance. (Gardner et al., 2012) Overall, clinic-wide attendance increased by only 3% following intervention implementation, but increased 8% in visit adherence, suggesting low-cost broad based messages may provide some incremental support. Thus, the new generations of interventions for YBMSM transitioning from jail are likely to need adaptation and incorporate elements of currently recommended practices.

This study is not without limitations. First, MSM were defined as participants who self-identified as gay or bisexual, therefore straight-identifying MSM, a group arguably considered to be even more at-risk, were not included. Data from elsewhere suggest that MSM on the “down low” are even more stigmatized and may not engage in care, suggesting our findings to be conservative. (Janssen, 2001; UNAIDS, 2002; Wolitski, 2006) Black participants, in this dataset, were equally likely to self-identify as gay or bisexual relative to white participants, and more likely, relative to Hispanics. Second, measurement error in the recording follow-up visits may have occurred, but there is no reason to presume that this ascertainment bias would disproportionately impact one risk group versus another. Third, the relatively small sample size of certain subgroups increases the sensitivity to the presence of non-random measurement error and possible selection bias. Last, endogeneity in the absence of a controlled trial may have limited our ability to determine a causal effect on the primary outcome. Notwithstanding these limitations, however, this is the largest longitudinal cohort of HIV-infected PLWHA who transitioned from jail and provides important insights into future targeted interventions.

Conclusions

In this study, HIV-infected young Black MSM were significantly less likely to have health insurance and a HIV provider and were also significantly less likely to be linked to care within 6 months of release from jail. Further interventions that increase linkage and retention of HIV-infected young Black MSM leaving jail are urgently needed. These interventions will need to incorporate and specifically adapt elements from existing strategies, like the ones discussed above (ARTAS, IOP, PPN), in order to be maximally effective.

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Figure 1.
Sample disposition.

Figure 2.
Kaplan-Meier estimates of time to linkage to care for HIV+ men released from jail.

Table 1
Summary characteristics of the Enhance Link sample of HIV+ men released from jail.

Covariate	Group A		Group B		Group C		Group D	
	Young Black MSM N=18		Older Black MSM N=55		Non-Black MSM N=40		Non-MSM N=461	
	n (%)	n (%)	n (%)	p-value (B vs. A)	n (%)	p-value (C vs. A)	n (%)	p-value (D vs. A)
Baseline Data								
Re-Incarcerated	3 (16.7)	23 (41.8)	11 (27.6)	0.06	11 (27.6)	0.38	143 (31.0)	0.21
Mean Duration of Incarceration (Days) (S.D.)	63.6 (87.5)	89.6 (100.9)	91.6 (101.2)	0.39	91.6 (101.2)	<0.01	105.1 (135.2)	<0.01
Homeless	7 (38.9)	18 (32.7)	9 (22.6)	0.63	9 (22.6)	0.20	166 (36)	0.80
In a Stable Relationship	5 (27.8)	14 (25.5)	12 (30.1)	0.85	12 (30.1)	0.86	136 (29.5)	0.88
Has Health Insurance	6 (33.3)	39 (70.9)	32 (80.1)	0.01	32 (80.1)	<0.01	356 (77.2)	<0.01
Education								
Below High School	7 (38.9)	20 (36.4)	11 (27.6)	0.89	11 (27.6)	0.39	220 (47.7)	0.46
High School	4 (22.2)	23 (41.8)	16 (40.1)	0.15	16 (40.1)	0.19	171 (37.1)	0.21
Above High School	7 (38.9)	11 (20.1)	13 (32.6)	0.13	13 (32.6)	0.64	69 (15.0)	0.01
Comorbidities								
Depression Symptoms	9 (50.0)	32 (58.2)	23 (57.6)	0.54	23 (57.6)	0.60	237 (51.4)	0.91
Psychiatric Medications	2 (11.1)	18 (32.7)	9 (22.6)	0.09	9 (22.6)	0.32	101 (21.9)	0.29
Substance Use (30 days pre-incarceration)								
Alcohol	6 (33.3)	18 (32.7)	15 (37.6)	0.99	15 (37.6)	0.75	129 (28.0)	0.63
Cocaine	3 (16.7)	32 (58.2)	18 (45.1)	0.01	18 (45.1)	0.04	225 (48.8)	0.02
Heroin	0 (0)	8 (14.5)	11 (27.6)	n/a	11 (27.6)	n/a	130 (28.2)	n/a
Addiction Severity								
High Psychiatric (>.22)	7 (38.9)	32 (58.2)	21 (52.6)	0.18	21 (52.6)	0.34	210 (45.6)	0.58
High Drug Use (>.16)	9 (50.0)	32 (58.2)	27 (67.6)	0.56	27 (67.6)	0.18	305 (66.2)	0.16
High Alcohol (>.17)	9 (50.0)	37 (67.3)	26 (65.1)	0.21	26 (65.1)	0.28	294 (63.8)	0.24
Enabling Resources								
Needs assessment	5 (27.8)	36 (65.5)	29 (74.4)	<0.01	29 (74.4)	0.02	285 (64.6)	0.03
Disease Management	3 (16.67)	20 (36.4)	19 (48.7)	0.12	19 (48.7)	0.03	167 (37.9)	0.09
Discharge Planning	9 (52.94)	36 (65.5)	27 (69.2)	0.35	27 (69.2)	0.24	297 (67.4)	0.22
HIV Care at Baseline								

Covariate	Group A			Group B			Group C			Group D		
	Young Black MSM N=18			Older Black MSM N=55			Non-Black MSM N=40			Non-MSM N=461		
Access to HIV provider	10 (55.6)			48 (87.3)			34 (85.1)			355 (77.0)		0.04
Any Adherence to HIV medication	8 (44.4)			30 (54.5)			28 (70.1)			258 (56)		0.51
>95% Adherence to HIV medication	3 (16.7)			16 (29.1)			16 (40.1)			154 (33.4)		0.21
Viral Suppression	2 (11.1)			13 (23.6)			15 (37.6)			150 (32.5)		0.12
Post-Release Data (6 months)												
HIV Care at 6 months	Lower Bound vs MI			Lower Bound vs MI			Lower Bound vs MI			Lower Bound vs MI		
Access to HIV provider	6(33.3)	15(83.3)		36(65.5)	47(85.4)		27(67.5)	36(90.0)		300(65.1)	405(87.9)	0.77
Any ART Adherence	3(16.6)	8(44.4)		33(60.0)	40(72.7)		26(65.0)	26(65.0)		274(59.4)	360(78.1)	0.02
>95% ART Adherence	2(11.1)	5(27.7)		22(40.0)	27(49.1)		22(55.0)	31(77.5)		209(45.3)	269(58.3)	0.03
Viral Suppression (<400 copies/mL)	3(16.6)	6 (33.3)		22(40.0)	29(52.7)		16(40.0)	22(55.0)		159(34.5)	221(47.9)	0.34
Immediate Linkage in Q1 (non-imputed)	3 (16.7)			18 (32.7)			16 (40.0)			152 (33.0)		0.16
Delayed Linkage in Q2 (non-imputed)	6 (33.3)			26 (47.3)			21 (52.5)			225 (48.8)		0.21
Continuous Retention, Visits in Q1 and Q2	2 (11.1)			9 (16.4)			8 (20.0)			70 (15.2)		0.64

LEGEND: Young: under 30 years of age; Older: 30 years of age or above; MSM: men who have sex with men; S.D.: standard deviation; Q1: first quarter; Q2: second quarter; MI: multiple imputation.

Table 2

Correlates of Time to Linkage to HIV Care for HIV+ men released from jail - Cox Proportional Hazard Regression (N=574).

Covariates	Coef.	Hazard Ratio (HR)	95% Confidence Interval	P-values
Young	0.03	1.03	(0.52, 2.01)	0.942
Black	-0.28	0.75	(0.60, 0.95)	0.016
MSM	0.25	1.28	(0.85, 1.93)	0.238
Young*Black (Interaction)	-0.41	0.66	(0.24, 1.83)	0.429
Black* MSM (Interaction)	-0.19	0.82	(0.47, 1.43)	0.497
MSM*Young (Interaction)	-2.04	0.13	(0.03,0.63)	0.011
Young*Black*MSM (Interaction)	1.60	4.97	(0.72,34.43)	0.105
Hypothesis Tested – Within Groups				
Difference in the LRH within Black MSM: Young vs. Older			LHR	95%CI HR
			-0.83	(0.19,0.98)
Difference in the LRH within Young MSM: Black vs. Non-Black			0.77	(0.41,9.91)
Difference in the LRH within Young Black: MSM vs. Non-MSM			-0.39	(0.24,1.94)
Hypothesis Tested from Bivariate Hazard Models				
Difference in the LRH between MSM vs. Non-MSM			LHR	95%CI HR
			-0.12	(0.69, 1.14)
Difference in the LRH between Black MSM vs. All Other Men			-0.22	(0.58, 1.09)
Difference in the LRH between Young Black MSM vs. All Others			-0.89	(0.20,0.89)
				0.02

LEGEND: Young: under 30 years of age; Older: 30 years of age or above; MSM: men who have sex with men; LRH: log of relative hazard; LHR: difference in log of relative hazard.