HIV Care After Jail: Low Rates of Engagement in a Vulnerable Population

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Published online: 9 March 2018
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Abstract The criminal justice system is a critical area of focus to improve HIV outcomes and reduce health disparities. We analyzed demographic, incarceration, socioeconomic, and clinical data for HIV-positive persons released to the community from the Dallas County Jail (1450 incarcerations, 1111 unique individuals) between January 2011 and November 2013. The study population was 68% black and 14% Hispanic; overall linkage to care within 90 days of release was 34%. In adjusted analyses, Hispanics were more likely to link than whites (aOR 2.33 [95% CI: 1.55–3.50]), and blacks were as likely to link as whites (aOR 1.14 [95% CI: 0.84–1.56]). The majority of HIV-positive jail releases did not re-engage in HIV care after release, though Hispanics were twice as likely as other groups to link to care. Further efforts are needed to improve the transition from jail to community HIV care with particular attention to issues of housing, mental illness, and substance use.

Keywords HIV/AIDS · Health services · Jail · Health disparities · Housing · Linkage to care

Introduction

The incarcerated population has up to five times the rate of HIV as the general US population [1], and HIV prevalence is higher among local jail inmates than among state and federal prisoners [2]. Approximately one in seven HIV-positive individuals in the USA passes through a correctional facility every year [3], particularly jails, given short jail stays and high recidivism rates. Viral suppression, which is achieved and maintained through uninterrupted antiretroviral therapy (ART), is necessary both to optimize the health of those already

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living with HIV and also to stop the spread of HIV in the population [4, 5]. For criminal justice-involved patients with HIV, treatment with ART is generally sufficient and available during incarceration, but in the immediate post-release period, it diminishes significantly to rates lower than before incarceration [6].

HIV patients who are involved with local jails often face multiple barriers to care (e.g., unemployment, homelessness, mental illness, addiction), and at the time of incarceration, many of these individuals are not on ART and have uncontrolled HIV viremia [7]. Therefore, local jails are a key point of contact with a difficult-to-reach HIV population, and evidence-based interventions are needed to improve the HIV care cascade of the individuals who move through these facilities [8]. However, the high rate of turnover through jails creates a more challenging context in which to study HIV care continuity and implement interventions. Prior studies of the jail-involved HIV population have depended primarily on jail health records to identify those with HIV (both previously and newly diagnosed), which likely misses a not insignificant number of HIV-positive individuals. In addition, jail health records are typically not integrated with community clinic-based health records, limiting evaluation of the HIV care continuum after release. Linking both jail- and community-based data sources would better capture the full cohort of HIV-positive individuals who pass through a local jail and allow for a more thorough characterization of their HIV care cascade.

This retrospective cohort study of HIV-positive individuals released from a local jail was conducted in order to better characterize the HIV care continuum after jail release, with a specific focus on the following: (a) the initial step of (re)linkage to HIV care in the community, and (b) predictors associated with post-incarceration continuity of care.

Methods

Study Population This retrospective cohort study included all incarcerations of individuals with HIV at the Dallas County Jail (DCJ) that resulted in release to the community between January 1, 2011 and November 30, 2013. An incarceration was excluded from our sample if it did not result in a community release (e.g., transferred to prison or state jail) or if the inmate reported they planned to receive care with a provider outside of the

Dallas Ryan White-funded clinic system. This study was approved by the University of Texas Southwestern Institutional Review Board.

In the DCJ, individuals are identified as HIV-positive if they disclose their HIV status during medical intake, if they are known to be HIV-positive from prior incarcerations, or if they are tested during incarceration (by request or through an opt-out HIV testing program offered to any individuals undergoing a blood draw). There are approximately 125 HIV-positive inmates (2% of population) at any point in time, and HIV providers from Parkland Health and Hospital System are available 4 to 5 days per week. During the study period, HIV discharge planning included an in-person case manager meeting while in jail, 1-week supply of medications provided upon request at release and a follow-up phone call from the case manager. There is a large Ryan White-funded clinic system in the Dallas area, including that operated by Parkland Health and Hospital Systems (providing care to over 5000 clinic patients per year during study period), as well as Prism Health (around 1500 patients per year during study period). The patient population that attends these clinics is predominately minority (approximately 50% black, 25% Hispanic), around 70% male, and nearly 50% of the overall clinic population are men who have sex with men.

Data Sources A master data set was compiled from multiple sources, including the DCJ electronic medical record (Pearl, Business Computer Applications), DCJ release data (Adult Information System), Parkland Hospital electronic medical record (Epic, Epic Systems Corporation), AIDS Arms clinic electronic medical record (Centricity, General Electric Company), and Ryan White Service Report (RSR, used by HIV clinics for reporting to Health Resources and Services Administration (HRSA)). Initial matching of data was performed using an encrypted unique client identifier, or eUCI (described elsewhere [9]), with validation through manual review of jail and community electronic health records. Additional HIV-positive inmates, who were negative matches using the eUCI method, were identified with “HIV” or “AIDS” in the problem list in the jail electronic health record and validated through electronic chart review.

Independent Variables/Predictors Independent variables were collected from one or more of the above data sources. Demographic variables include age, race/ethnicity, and gender. Age (as of December 31,

2013) was calculated using date of birth from the jail medical record. Race was collected from the RSR and initially included White, Black/African American, Asian, Native Hawaiian/Pacific Islander, American Indian, or Alaska Native. Hispanic ethnicity was collected from Jail and outpatient clinic datasets, and was counted if patient was ever recorded as being Hispanic. For the purposes of this analysis, race ethnicity was re-defined as non-Hispanic black, non-Hispanic white, or Hispanic, leaving three incarcerations as “other,” which were excluded. Gender was originally determined from the RSR and jail health record as female, male, or transgender. There were 14 incarcerations identified among transgender patients (all male to female), though due to this small size, gender at birth was used for the purposes of data analysis. HIV risk factor was extracted from the RSR, and narrowed down to history of injection drug use (IDU), men who have sex with men (MSM), or heterosexual/other. Individuals reporting multiple risk factors (e.g., bisexual) were categorized in the higher risk group; from higher to lower risk, the group rankings were IDU, then MSM, and then heterosexual/other.

Marital status (ever married vs. other), family aware of HIV status (yes/no), and family supportive (yes/no) were obtained from jail case management documentation in Epic. Housing status was abstracted from the RSR and case management notes; the possible entries in those sources (stable/permanent, temporary, unstable, or unknown) were collapsed into a binary variable—stable/permanent vs. other—and if it was recorded multiple times, the less stable housing status reported was used for analyses. Stable housing per HRSA includes renting or owning a room, home, or apartment; permanent placement with families; subsidized housing; or living in an institutional setting with continuing residence expected. Whether someone was employed, unemployed, or on disability and self-reported history of sexual or physical abuse (yes/no) were obtained from jail case management notes. Self-reported use of alcohol, tobacco (yes/no), and substance use (cannabis, club drugs, cocaine, crack cocaine, heroin, opiates, methamphetamines, and prescription medications) in the 12 months prior to incarceration was obtained from both jail HIV case manager reports and jail medical records. Alcohol use was condensed to a binary variable denoting at-risk alcohol use, defined as ≥ 14 drinks per week for men and ≥ 7 drinks per week for women, or not; data was not routinely collected on the frequency of binge drinking,

though if patients reported this behavior (days with ≥ 4 drinks for females and ≥ 5 drinks for male), this was also considered at-risk alcohol use. A binary composite variable, “stimulant/opioid use,” was created for any reported use of cocaine, crack cocaine, methamphetamines, opioids, and/or heroin. Mental illness was collected as binary variables for depression, anxiety, PTSD, bipolar disorder, and schizophrenia based on case management and electronic medical record (EMR) notes. No data were available to quantify the degree of impairment from mental illness, and a binary composite variable “serious mental illness” was defined as having a diagnosis of bipolar disorder, psychosis, and/or schizophrenia. Self-reported information on prior use of an HIV clinic, prior prescription of ART, and prior adherence to ART before incarceration was available from case management and EMR data.

Income level was abstracted from the RSR as an ordinal variable based on percentage of federal poverty level (%FPL) using the earliest occurrence in the dataset for each individual. Health insurance coverage was abstracted from Epic and categorized as commercial insurance, Medicaid, Medicare, “charity” insurance (including Ryan White and local programs), or missing. Both income level and insurance coverage had significant amounts of missing data, and, since they were collected in community outpatient settings, the missing categories are collinear with not linking to care. Additionally, the income variable had a very limited range of responses (i.e., virtually every subject was under FPL). Due to these limitations, income and insurance were not included in the final linkage analysis.

Outcomes The primary outcome was post-release linkage to care, defined as attending an ambulatory care visit with a Ryan White-funded HIV provider in Dallas County within the first 90 days after release, as documented in the RSR and/or provider EMRs. This definition differs from the HRSA “linkage to care” definition, which refers to attending an initial medical visit after a new diagnosis of HIV, whereas in this study, linkage refers to a medical visit within 90 days of jail release regardless of when HIV was diagnosed. If there was no documentation of such a visit, it was counted as failure to link to care for that incarceration. Additionally, retention in care, ART prescription, and viral load suppression after each release were measured in order to characterize the entire post-release HIV care cascade. Retention in care, defined as having at least one visit every

6 months with at least 60 days between visits, was gathered from provider EMRs. ART prescription was counted if the year on the RSR documentation of ART prescription matched the year of release from jail records. Based on the provider EMRs, viral load suppression was counted if the last recorded viral load in the 6-month period after release was under 200 copies/mL.

Statistical Analyses The main unit of analysis was each incarceration during the study period. Cross-tabular frequencies were used to calculate baseline characteristics. Univariate analysis was run, and associations between each independent variable and linkage to care were presented by an odds ratio with Wald confidence intervals. Subsequently, a multivariate logistic regression model was built by including all variables with a priori variables of age, gender, and length of incarceration included. The final model was constructed using a backward elimination selection method. Variables were retained in the model if $p < 0.20$. Three interaction terms were tested for significance (between the housing, stimulant/opioid use, and serious mental illness variables), and significant interaction term(s) were included in the final multivariate model. As Hispanic ethnicity was significantly associated with linkage to care after

incarceration, the care cascade was also examined by race/ethnicity.

Sensitivity Analysis In order to assess possible biases due to multiple incarcerations by the same individual, a mixed effects model analysis was performed. Also, the same multivariate analysis was repeated using unique individuals as the main unit of analysis (instead of incarcerations) by considering only the longest incarceration of individuals with multiple incarcerations.

All statistical analyses were run using SAS, version 9.4 (SAS Institute Inc., Cary, NC).

Results

Of 2473 incarcerations of HIV-positive individuals identified during the study period, 669 were excluded for not being released to the community, 163 planned to seek care outside of the Dallas Ryan White-funded system, and 188 were excluded due to having less than 90 days of follow-up in the study period (Fig. 1). The final study population consisted of 1450 incarcerations involving 1111 unique individuals.

Fig. 1 HIV-positive individuals released from Dallas County Jail to the community, January 2011–November 2013

The general characteristics of the study population are shown in Table 1. Blacks made up the majority (68%), while whites constituted 19% and Hispanics 14%. The mean age was 39.0 years, and 77% were male. Regarding primary risk factors for HIV, 11% were classified as IDU and 30% MSM. Only about one quarter reported a stable/permanent living situation, and employment was 8.2% overall. Reported use of any recreational drug was 64%, with the most prevalent drug being cannabis (43%). Stimulant/opioid use was reported in 44.9%. Over half of the cohort reported a history of mental illness (50.7%), and serious mental illnesses (bipolar, psychosis, schizophrenia) were noted in 34.7%. In terms of prior HIV care, 62% reported prior ART prescriptions, but only 40% of the overall cohort reported that they had been adherent, and relatively little variation was seen in these categories across racial/ethnic groups.

Outcomes The overall rate of linkage to care within 90 days of release from incarceration was 30% (Table 2). In the univariate analysis, the major predictors of linkage to care were older age, Hispanic ethnicity, being married, stable/permanent housing, receiving disability benefits, not having serious mental illness, reported prior care at a community HIV clinic, reported prior prescription for ART, and reported prior adherence to ART. The rate of linkage among whites was 28%, blacks 33%, and Hispanics 45%.

In multivariate logistic regression analysis, Hispanics were significantly more likely to link to care than whites (aOR 2.33 [95% CI: 1.55–3.50]), and there was no significant difference in linkage between blacks and whites (aOR 1.14 [95% CI: 0.84–1.56]). Prior engagement in HIV care (reporting a prior HIV clinic and prior ART adherence) were positively associated with linkage to care after release. Housing, serious mental illness, and stimulant/opioid use were all significantly associated with linkage (housing was positively associated and mental illness and substance use were negatively associated). In the multivariate model, the interaction term between housing and mental illness met our criteria for inclusion in the model ($p = 0.10$) such that, among those with mental illness, lack of stable housing predicted lower linkage (aOR 0.59 [95% CI: 0.43–0.80]), but not in those with both serious mental illness and stable housing. Female gender and longer duration of incarceration became significant predictors of linkage to HIV care in the multivariate analysis.

Overall, the largest gap in the HIV care cascade was in linking to care (34%), as the rates of retention in care

(31%), ART prescription (28%), and viral suppression (28%) were similar to that of linkage (Fig. 2). Hispanics performed the best at each step in the cascade.

Mixed Effects Model and Analysis by Unique Individual Analysis using a mixed effects model produced similar results, with Hispanics significantly more likely to link to care and the same covariates as significant predictors of linkage (age, gender, length of incarceration, housing, stimulant/opioid use, serious mental illness, prior HIV clinic, and prior adherence). Analysis using only the longest incarceration for each unique individual ($N = 1111$) also produced similar results, with the same significant predictors of linkage to care and similar magnitude of effect size.

Discussion

By linking both jail-based and community-based data sources, this study offers the most comprehensive assessment to date of post-jail HIV care in a large urban center. The overall rates of linkage to community HIV care within 90 days of release were low (34%). Linkage was negatively associated with co-morbid mental illness, substance use, and unstable housing and varied significantly by race/ethnicity, with Hispanics being significantly more likely to link to care than either their white or black counterparts. In agreement with existing data [6], the largest gap in our HIV care cascade occurred in linkage to care, and most of those who linked remained in care and achieved viral suppression. Also, the same racial/ethnic differences seen in linkage to care persisted throughout the cascade, with Hispanics performing best at every step. These findings underscore the relevance of our targeted analysis of the predictors of linkage and further emphasize the need to improve this crucial first step in the transition to community HIV care.

The overall rate of post-jail linkage to care in this study is similar to other observational studies, with 29% of newly diagnosed HIV-positive inmates released in Philadelphia [10] and 19% of HIV-positive jail releases from the multicenter EnhanceLink study [11] attending a clinic visit within 90 days of release. Rates of re-engagement in HIV care after prison release (up to 6 months) range from 58 to 83% [6], and this difference may reflect the known release dates and increased

Table 1 Baseline characteristics of all the releases of HIV-positive individuals from Dallas County Jail to the community, January 2011–November 2013.

	Proportion of total <i>N</i> = 1450 (%)
Demographics and incarceration	
Age (mean ± SD)	39.1 ± 10.6
Male	76.8
Race/ethnicity	
White	18.9
Black	67.6
Hispanic	13.5
Median incarceration length [IQR] (days)	6 [1, 19]
HIV risk factor (%)	
IDU + MSM	3.2
IDU (non-MSM)	7.5
MSM (non-IDU)	30.1
All others	59.3
SES/housing	
Ever married	23.2
Family aware of HIV status	53.0
Family supportive of HIV status	59.3
Stable/permanent housing	26.0
Source of income	
Employed	8.3
Disability benefits	27.3
History of physical/sexual abuse	24.3
Income level	
Percent at or below 100% FPL	69.2
Percent above 100% FPL	5.4
Unknown or missing	25.4
Insurance coverage	
Commercial	2.3
Medicare	12.1
Medicaid	26.8
Charity	37.8
Missing	20.1
Substance use	
At-risk alcohol use	5.5
Tobacco use	55.6
Any illicit drug use	62.8
Cannabis	42.2
Club drug	7.0
Cocaine	26.5
Crack cocaine	18.1
Heroin	7.2

Table 1 (continued)

	Proportion of total <i>N</i> = 1450 (%)
Other opiates	0.6
Methamphetamines	13.4
Prescription medications	1.2
Stimulant/opioid use ^a	43.6
Mental illness	
Any mental illness	50.1
Bipolar disorder	28.3
Schizophrenia/psychosis	16.8
Anxiety	9.0
Depression	31.2
PTSD	3.4
Serious mental illness ^b	33.5
HIV care	
Reported prior HIV clinic	60.2
Prescribed ART before incarceration	63.3
Adherent to ART before incarceration	40.7
First viral load in jail undetectable ^c	31.6
Last viral load in jail undetectable ^c	35.3

SD standard deviation, *IQR* interquartile range, *IDU* injection drug use, *MSM* men who have sex with men, *FPL* federal poverty level, *PTSD* post-traumatic stress disorder, *ART* antiretroviral therapy

^a“Stimulant/opioid use” is a composite binary variable of any reported prior use of heroin, opiates, cocaine, crack cocaine, and/or methamphetamines

^b“Serious Mental Illness” is a composite binary variable that includes any diagnosis with bipolar disorder and/or a psychotic illness

^cFirst viral load was available for *N* = 504 (missing 946, 65% of total), and last viral load was available for *N* = 507 (missing 943, 65% of total). Most of the subjects that had any viral load measured while in jail had only one measurement; in such cases, the single viral load was counted as both the first and last viral load while in jail

discharge planning for those released from prison rather than jails. Overall, our study cohort describes an underserved population whose outcomes are strongly influenced by social determinants of health. The HIV-positive DCJ population is predominantly minority (over 80% black or Hispanic), poor (93% with data available were at or below 100% federal poverty level), with high rates of prior physical and sexual abuse, mental illness, substance use, and low rates of stable housing (25%), family support, employment (8% employed), insurance, and engagement in HIV care. Future interventions aimed at improving HIV outcomes

Table 2 Univariate and multivariate predictors of linkage to care within 90 days of release

Independent variable	Univariate analysis		Multivariate analysis	
	Unadjusted OR (95% CI)	<i>p</i> value	Adjusted OR (95% CI)	<i>p</i> value
Demographics and incarceration				
Race/ethnicity				
White	(Reference)	–	(Reference)	–
Black	1.26 (0.94–1.70)	0.12	1.14 (0.84–1.56)	0.40
Hispanic	2.12 (1.44–3.11)	0.0001	2.33 (1.55–3.50)	< 0.0001
Age (per 5 years in units)	1.12 (1.07–1.18)	< 0.0001	1.08 (1.02–1.15)	0.01
Female gender (vs. male)	1.27 (0.98–1.63)	0.07	1.46 (1.10–1.94)	0.009
Days of incarceration	1.002 (1.000–1.005)	0.05	1.003 (1.000–1.006)	0.02
HIV risk factor				
Heterosexual	(Reference)	–	–	–
MSM (non-IDU)	0.85 (0.66–1.08)	0.18	–	–
IDU	1.15 (0.81–1.64)	0.44	–	–
SES/housing				
Ever married	1.57 (1.22–2.02)	0.0004	1.29 (0.97–1.71)	0.08
Family aware of HIV status	1.16 (0.94–1.45)	0.17	–	–
Family supportive of HIV status	1.18 (0.94–1.47)	0.16	–	–
Stable housing	1.48 (1.16–1.89)	0.0015	1.15 (0.85, 1.56)	0.36 ^a
Source of income				
Employed (vs. other)	0.89 (0.59–1.35)	0.59	0.71 (0.45–1.12)	0.14
Disability benefits (vs. other)	1.44 (1.13–1.84)	0.004	1.27 (0.95–1.70)	0.11
h/o physical/sexual abuse	0.94 (0.73–1.21)	0.62	–	–
Substance use				
At-risk alcohol use	1.15 (0.72–1.85)	0.56	–	–
Tobacco use	0.65 (0.52–0.81)	0.0001	–	–
Any illicit drug use	0.80 (0.638–0.997)	0.047	–	–
Cannabis	0.79 (0.63–0.98)	0.03	–	–
Club drug	1.19 (0.78–1.80)	0.43	–	–
Cocaine	1.03 (0.80–1.32)	0.82	–	–
Crack cocaine	0.94 (0.70–1.24)	0.64	–	–
Heroin	0.81 (0.53–1.26)	0.35	–	–
Opiates	0.56 (0.12–2.71)	0.47	–	–
Methamphetamines	0.61 (0.43–0.86)	0.005	–	–
Prescription medications	1.77 (0.68–4.60)	0.25	–	–
Stimulant/opioid use ^b	0.89 (0.71–1.10)	0.28	0.72 (0.55–0.93)	0.01
Mental illness				
Any mental illness	0.96 (0.77–1.19)	0.71	–	–
Bipolar	0.81 (0.64–1.04)	0.10	–	–
Schizophrenia/psychosis	0.85 (0.63–1.15)	0.29	–	–
Anxiety	0.96 (0.66–1.41)	0.83	–	–
Depression	0.97 (0.76–1.22)	0.77	–	–
PTSD	0.63 (0.33–1.22)	0.17	–	–
Serious mental illness ^c	0.82 (0.65–1.03)	0.09	–	–
Stable housing			0.96 (0.57–1.62)	0.88

Table 2 (continued)

Independent variable	Univariate analysis		Multivariate analysis	
	Unadjusted OR (95% CI)	<i>p</i> value	Adjusted OR (95% CI)	<i>p</i> value
Lack stable housing			0.59 (0.43, 0.80)	0.0008
Prior HIV care				
Prior HIV clinic before incarceration	1.90 (1.51–2.40)	< 0.0001	1.79 (1.33–2.40)	0.0002
Prescribed ART before incarceration	1.53 (1.21–1.93)	0.0003	0.70 (0.49–1.00)	.05
Adherent to ART before incarceration	2.13 (1.71–2.66)	< 0.0001	1.96 (1.43–2.69)	< 0.0001
ART prescribed in jail	1.19 (0.95–1.49)	0.13	–	–

OR odds ratio, CI confidence interval, MSM men who have sex with men, IDU injection drug use, PTSD post-traumatic stress disorder, ART antiretroviral therapy

^a The *p* value for stable housing was no longer significant when the interaction term stable housing*mental illness was included in the final multivariate model

^b “Stimulant/opioid Use” is a composite binary variable of any reported prior use of heroin, opiates, cocaine, crack cocaine, and/or methamphetamines

^c “Serious Mental Illness” is a composite binary variable that includes any diagnosis with bipolar disorder and/or a psychotic illness

in jail releases must take into account the medical and social complexity of this patient population, requiring a culturally competent, comprehensive, multisector approach. Successful examples include post-release navigation by formerly incarcerated community health workers [12, 13], and intensive case management [14], though more re-entry initiatives are needed which directly engage additional sectors (such as community supervision, employment, and education).

Hispanics’ relative success at linking to care did not diminish in the multivariate analysis, suggesting either that we did not adequately control for other factors in the study or that there were additional unmeasured factors that account for their higher linkage rates. In the EnhanceLink study, Hispanics also had better care utilization and virologic suppression [11, 15]. In the general HIV population, Hispanics may often present to care later [16], due to barriers such as language, stigma,

Fig. 2 HIV care cascade after release from Dallas County Jail, 2011–2013

and immigration status [17], but once they are in care, they tend to do just as well or better than whites [18], even in the case of Hispanic undocumented immigrants [19]. The “Hispanic paradox,” the notion that Hispanics often have better health outcomes than other minorities despite significant socioeconomic adversity, has been observed in other health fields [20]. Family support is one hypothesized explanation for the paradox [21] and may have been operating in this study population in a way that was not accurately measured by the family support variables. On the other hand, the findings that whites in our study were more likely to be to have serious mental illness or a history of opioid and/or stimulant use (particularly methamphetamines), and to experience housing instability may be markers of individuals with particularly high risk for poor HIV outcomes and/or high adversity. It may be that only the most high-risk whites become involved with the criminal justice system, since whites are less likely than other groups to be incarcerated for the same crimes (due to arrest and sentencing practices, cash bail) [22]. Further research should be done to better characterize the factors that enable Hispanics to better engage in HIV care after incarceration.

This study also reaffirms or clarifies other major factors that predict post-incarceration linkage to HIV care, including substance use, mental illness (negative predictors) and older age, female gender, stable housing, prior engagement in care, and prior adherence to HIV medications (positive predictors). One novel finding was that methamphetamine use, which has previously been described as an important syndemic with HIV in urban MSM populations [23], was uniquely associated with poor engagement in HIV care in recent jail releases. In addition, evidence-based treatment options for methamphetamine use are limited. Our study’s mental illness findings add clarity to prior literature, because, while mental illness has been associated with decreased linkage to and retention in post-incarceration care in one study [11], others have correlated mental illness with positive outcomes (engagement in primary care [24] and virologic suppression [15]). Many of these previous studies on post-release HIV care were done in the setting of concurrent interventions that provided multidisciplinary assistance to former inmates, including addiction and mental health services. In contrast, this study was done in the absence of a new intervention and in the state of Texas which consistently has one of the lowest rates of per capita public spending on mental health

[25]. Our findings around housing stability reinforce what has been identified in the literature, both in recently incarcerated populations [11, 15, 26] and in the general HIV population [27] that have associated unstable or inadequate housing with poor engagement in care and other negative HIV outcomes. Housing has been demonstrated to be particularly important for those with serious mental illness and substance use problems [28], which is corroborated by this study.

Previous HIV care utilization, consistent with existing data [11, 29, 30], strongly predicted (re)linking to care after incarceration, and therefore efforts to improve linkage to care after incarceration should focus on high-risk groups with a history of suboptimal care engagement. In fact, the median length of stay in this study population, while it was shorter than what has been described in some previous jail-based HIV studies, is typical of many county and city jails. This highlights the most important difference between prisons and jails. With longer incarcerations, individuals are removed from their communities, spend enough time in a correctional facility to address their health conditions and plan for release, and then undergo the major transition back into the community. By comparison, the individuals who move through local jails can be thought of as a vulnerable population that mostly resides in the community and has one or more brief stays in a local jail, which further disrupts their social situation. One longitudinal study of HIV-positive people who inject drugs in Chicago found that brief incarcerations predicted virologic failure while longer incarcerations (> 30 days) did not [31]. If our study’s finding are generalizable, most jail-involved HIV patients have had some community HIV care in the past but are not engaged in care at the time of their incarceration, so incarceration itself may be the disruption that interferes with care engagement, or it may be a marker for other, more important de-stabilizing factors. Nevertheless, the fact that they are institutionalized, even if briefly, provides an opportunity to connect many unengaged patients to HIV care and other necessary support services.

This study has several limitations. First, it is a retrospective, descriptive study. One major consequence of this is that the definitions of some variables were not standardized to fit established definitions for research purposes. For example, we did not have data on binge drinking for all participants nor did we have a measure of severity of mental illness in order to follow the Substance Abuse Mental Health Service Administration

(SAMHSA) definitions [32], for these disorders. Nonetheless, this study integrates multiple data sources, including jail release data, jail medical records, and extensive community-based records, and therefore, this is one of the only studies on HIV patients in the criminal justice system that provides this level of comprehensive and longitudinal data. Second, this study was performed at a single jail, limiting its generalizability to other settings, though similarities were found between our results and those reported in other studies of HIV-positive jail inmates. Third, we do not know if individuals sought HIV care outside of the Ryan White care system in the Dallas metropolitan area, though we excluded those who reported that they planned to do so, potentially resulting in lower measured linkage to care rates. Lastly, several variables, such as insurance coverage and income, had significant amounts of missing data among those who did not link to care (as these elements are collected as part of outpatient care), limiting their inclusion in multivariate analyses.

The overall low rate of linkage to HIV care, retention in care, ART receipt, and virologic suppression after jail release in this study highlight the need for dedicated re-entry services for HIV-positive individuals who pass through correctional facilities. Individuals who were not previously engaged in HIV care and have not been adherent to medications are at particularly high risk for not linking to care, with a need for improved post-release services targeting mental illness, substance use, and housing. Further research on the psychosocial and structural factors that contribute to the racial/ethnic differences in this study would yield a better understanding of the complex needs of this vulnerable population and could guide future policy changes.

Acknowledgements The investigators were supported by the following grants from the National Institutes of Health: R01 DA030778 (J.R.), K24 DA022122 (J.R.), T32 DA013911 (Y.T.), K23 AI112477 (A.N.), P30 AI042583, CTSA UL1-RR024982.

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