

# Factors Associated With Incarceration History Among HIV-Positive Persons Experiencing Homelessness or Imminent Risk of Homelessness

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**Abstract** Among persons living with HIV/AIDS (PLWHA) experiencing homelessness or imminent risk of homelessness, a history of incarceration may serve as a marker for ongoing risk behavior or health disparities. We examined factors associated with a history of incarceration among HIV-positive clients of housing agencies in Baltimore, Chicago, and Los Angeles ( $N = 581$ ). We used logistic regression to conduct analyses. Of the 581 participants, 68% ( $n = 438$ ) reported a history of incarceration: 32% ( $n = 182$ ) had spent more than 1 year incarcerated. After adjustment for covariates, incarceration history was associated with having ever injected drugs, ever engaged in sex exchange, and ever experienced physical abuse. Incarceration history was also associated with having a detectable HIV viral load, better mental health, and being a biological parent. It was not associated with current risk behavior. Service providers may explore possible increased need for medical support among homeless PLWHA with a history of incarceration.

**Keywords** Incarceration · HIV/AIDS · Homelessness · Health status · Risk behavior

## Introduction

Incarceration rates in the United States are among the highest in the world and are continuing to rise [1]. In 2005, nearly 2.2 million persons were held in prisons or local jails; the majority were men of minority races and ethnicities [2]. If current trends continue, the lifetime prevalence of serving time in prison could become 6.6% for all Americans [3]. This estimate does not include jail incarcerations.

In numerous studies, arrest or incarceration experience has been associated with ongoing health-related risks. Arrest or incarceration history has been associated with greater risk of emergency department recidivism among patients visiting emergency departments for trauma care [4]. It has been associated with substance abuse [5, 6], homelessness [5, 6], and crime victimization [5] among mentally ill adults. It has also been associated with ongoing sharing of drug paraphernalia among injection drug users [7] and high-risk sexual behavior among male STD clinic patients [8] and sexually active youth [9].

The lifetime prevalence of incarceration among homeless persons ranges from 23% to over 50% [10, 11], and having an arrest history has been associated with longer duration of homelessness among homeless adults [12]. Indeed, in at least one study of post-release needs among HIV-infected inmates, housing was identified as a primary need among both men and women [13].

Jail and prison inmates have elevated rates of HIV infection, AIDS, sexually transmitted infections (STIs), hepatitis C, and tuberculosis [14]. In 2003, known HIV

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seroprevalence was 2.8% among female prisoners and 1.9% among male prisoners; the AIDS rate in the prison population was more than 3 times the rate in the general population [15]. Although recent years have brought more attention to the health-related needs that all inmates face upon re-entry to the community [16], published data on the potential associations between history of incarceration and current risk behavior or health-related issues for persons living with HIV/AIDS (PLWHA) continue to be limited.

Sowell et al. [17] reported that HIV-infected persons with a history of incarceration reported a wide range of needs for social and health services. However, one recent study found that access to medical care among homeless and unstably housed PLWHA was not as problematic as had been expected [18]. The authors reported high rates of access to a regular HIV medical provider and receipt of care in non-emergency settings. Prevalence of incarceration experience was also high with 53% of the sample having been incarcerated in the past year, but no association between incarceration history and having adequate access to care was reported. However, in another study, HIV-infected persons who were incarcerated within 12 months of initiating antiretroviral treatments were less likely to adhere to treatment regimens and achieve HIV viral suppression [19]. To the extent that incarceration history may be associated with current health status, access to medical care and treatment, ability to meet basic needs, and ongoing illegal behavior among PLWHA, these associations are likely to be observed among those who are experiencing homelessness or imminent risk of homelessness.

In the present study, we explored factors associated with lifetime history of incarceration among HIV-positive persons experiencing homelessness or imminent risk of homelessness. We compared the extent to which health status and other factors, such as social network size, access to medical care and HIV treatment, and incarceration-related risk behaviors such as substance abuse and exchanging sex for other commodities varied among HIV-positive homeless persons in association with incarceration history. The findings from our study will be useful in identifying the extent to which incarceration history can serve as a marker for potential ongoing health and risk reduction needs among PLWHA experiencing homelessness or imminent risk of homelessness.

## Methods

### Participants

We used baseline data from the Housing and Health Study, a multisite, longitudinal randomized controlled trial investigating the impact of stable housing on the health and

HIV risk behaviors of PLWHA who were experiencing homelessness or imminent risk of homelessness. Participants were recruited through local housing agencies in Baltimore, MD; Chicago, IL; and Los Angeles, CA. Eligible participants spoke English or Spanish and were HIV-positive, at least 18 years old, low income (less than 80% of the area median income), currently experiencing homelessness or imminent risk of homelessness, and able to provide proof of identity. Data were collected from July 2004 through July 2005. The total baseline sample was 644 persons, with approximately one third recruited from each site.

### Design and Materials

Participants completed 3 baseline sessions. During the first visit, eligibility was verified and consent to participate was obtained. At the second visit, participants completed a 90-min questionnaire, blood specimen collection to test for CD4 cell count and HIV viral load, and the first of 2 HIV prevention intervention sessions. The questionnaire combined computer-assisted personal interviewing (CAPI) and audio computer-assisted self-interviewing (ACASI) technology. ACASI was used for sections with the most sensitive questions (i.e., sexual behavior, alcohol and drug use, traumatic events).

At the third visit, participants received their lab results, completed the second HIV prevention intervention session, and were randomly assigned to 1 of 2 conditions. The treatment condition involved immediate access to immediate permanent supportive housing assistance, and the comparison condition involved customary care housing assistance. Services for the customary care condition included referrals for social and housing services. Participants received \$40 for completing the 3 baseline sessions.

The Housing and Health Study was reviewed and approved by the Institutional Review Boards at the Centers for Disease Control and Prevention, RTI International, and Columbia University. The Office of Management and Budget reviewed the study forms for compliance with respondent burden standards. In addition, local community advisory committees were convened to review the study within each participating city. A more detailed description of the study methods is available elsewhere [20].

### Measures

Participant characteristics selected for analysis included gender; race/ethnicity (African American vs. others); age (18–29, 30–39, 40–49, over 50); education (less than high school, completed high school/GED, more than high school); time since HIV diagnosis (less than 5 years, 5 to less than 10 years, 10 to less than 15 years, 15 years or

more); and employment status (employed full or part-time, unemployed). Sexual orientation (heterosexual, gay/bisexual, other/not specified) was not included in initial analyses, but was included in a follow-up analysis.

Housing stability (whether homelessness was experienced during the past 90 days) and supportive housing (whether the participants' current living place had a social worker on premises) were measured. Social network size was measured by using total number of family, friends, and other relationships (5 or fewer, 6–10, more than 10) and the proportion who knew the participant's HIV status (less than 50%, 50% to <100%, 100%). Participants were asked about their current marital/domestic partnership status and whether they had ever been a parent. Participants were also asked whether they had gone without food during the past 7 days.

Mental health was measured by using the mental component summary (MCS) score from the Medical Outcomes Study Short Form-36 (MOS SF-36 v.2) [21]. This scale has been normed with a population mean of 50 and a standard deviation of 10. Lifetime history of problem drinking (i.e., scoring higher than 1 out of 4 on the CAGE index) [22] and lifetime experience of having injected drugs were measured dichotomously. Recent (i.e., in the past 90 days) use of any illegal substances was also measured dichotomously. Frequency of recent alcohol use was categorized by quantity and frequency (1 = 3 drinks or more per occasion and at least one occasion per week, 0 = less than 3 drinks per occasion, at least once a week).

Physical health measures included whether the participant had ever received a diagnosis of hepatitis B, hepatitis C, or any other chronic health condition. Participants reported whether they had any active STIs in the past 6 months and whether they had ever received an AIDS diagnosis. The physical component summary (PCS) score from the SF-36 v.2 was used to measure self-perceived physical health, with higher scores indicating better physical health [21]. HIV-specific health measures included biological measures of CD4 cell count (less than 200/ml vs. greater than or equal to 200/ml), HIV viral load (detectable/greater than or equal to 400 HIV viral copies per milliliter vs. undetectable/less than 400 HIV viral copies per milliliter), and presence of any opportunistic infections (self-report). Active tuberculosis infection (in the past 6 months) was reported by only 1.6% ( $n = 10$ ) participants, precluding further analysis.

To measure health care access and appropriate treatment, we examined whether the participant was currently receiving a recommended antiretroviral treatment regimen (i.e., at least 3 antiretrovirals, of which at least 2 are of different drug classes) [23], had any medical insurance, and had received any medical services in the past 6 months.

We asked participants whether they had ever experienced sexual abuse and whether they had ever experienced physical abuse. We also examined whether participants had ever and in the past 90 days exchanged sex for money, drugs, or shelter.

To assess history of incarceration, we asked participants whether they had ever been in jail or prison. Previous research has demonstrated that self-reported lifetime arrest and incarceration items can demonstrate greater reliability than items assessing more short-term recall periods [24]. Information on whether participants had been incarcerated in the past 6 months and how much total time they had spent incarcerated was examined for descriptive purposes.

### Statistical Analysis

Our analytic approach involved three steps. First, we used logistic regression to identify a set of demographic covariates related to incarceration history. Each potential covariate was regressed on incarceration history separately. These variables are listed in Table 1. Those with  $P < .25$  were included as covariates in subsequent models [25]. Where categorical variables were represented by multiple dummy-coded indicators, evaluation for inclusion into subsequent regression models was based on the  $P$ -value for the set of dummy-coded indicators.

Second, a set of adjusted bivariate regression models (hereafter referred to as Model 1 analyses) were fit to identify predictors of incarceration history, adjusted for the demographic covariates. Variables with  $P < .25$  in Model 1 analyses were entered into a final multivariable regression model (Model 2) that again included the demographic covariates. We reported adjusted odds ratios and 95% confidence intervals from these models. Odds ratios and 95% confidence intervals for the multiple regression analysis were adjusted for all other variables in the model. The criterion for statistical significance was set at  $P < .05$  for all regression models. All statistical analyses were performed by using SAS/STAT software version 9.1 [26], and logistic regression models were fit by using the LOGISTIC procedure. Cases with missing data for any variable were excluded from analyses.

### Results

After 63 (9.8%) cases were excluded because of missing data, the sample for all analyses was 581. As illustrated in Table 1, a large proportion of the participants were male (70%,  $n = 407$ ), identified as Black or African American (78%,  $n = 454$ ), and nearly half (49%,  $n = 283$ ) were in the 40–49 age group. Nearly one third had less than a high school education, and most (83%,  $n = 484$ ) were

**Table 1** Selected characteristics of Housing and Health Study participants (*N* = 581) and their associations with incarceration experience, in 3 US cities, 2004–2005

Variable	Total <i>N</i>	Ever incarcerated <i>N</i> (%)	OR (95% CI)	<i>P</i> -value
<b>Race/ethnicity</b>				
Black/African American	454	301 (66.3)	0.66 (0.43, 1.04)	.0702
Others	127	95 (74.8)	Ref	
<b>Gender</b>				
Males	407	292 (71.7)	1.71 (1.18, 2.48)	.0047
Females	174	104 (59.8)	Ref	
<b>Age</b>				
18–29	65	33 (50.8)	0.46 (0.23, 0.91)	.0085
30–39	158	105 (66.5)	0.88 (0.49, 1.58)	
40–49	283	206 (72.8)	1.18 (0.68, 2.06)	
50+	75	52 (69.3)	Ref	
<b>Years HIV+</b>				
Less than 5 years	190	117 (61.6)	Ref	.0962
5 to <10 years	161	111 (68.9)	1.39 (0.89, 2.16)	
10 to <15 years	139	101 (72.7)	1.66 (1.03, 2.66)	
More than 15 years	91	67 (73.6)	1.74 (1.01, 3.02)	
<b>Study site</b>				
Baltimore	183	119 (65.0)	0.57 (0.37, 0.90)	.0086
Chicago	199	125 (62.8)	0.52 (0.34, 0.81)	
Los Angeles	199	152 (76.4)	Ref	
<b>Education</b>				
Less than HS/GED	196	140 (71.4)	1.33 (0.88, 2.03)	.4087
HS/GED	178	121 (68.0)	1.13 (0.74, 1.73)	
More than HS/GED	207	135 (65.2)	Ref	
<b>Currently employed</b>				
No	484	345 (71.3)	2.24 (1.44, 3.49)	.0004
Yes	97	51 (52.6)	Ref	

Note: OR = odds ratio; CI = confidence interval; HS/GED = High school diploma or general educational development credential; Ref = reference category

unemployed. Additional demographic characteristics are reported elsewhere [20].

Of the 581 participants, 68% (*n* = 438) reported that they had ever been incarcerated; and 15% (*n* = 89) had been incarcerated in the past 6 months. The total amount of time spent incarcerated in one’s lifetime was less than 1 month for 18% (*n* = 101), 1 month to a year for 18% (*n* = 102), and more than 1 year for 32% (*n* = 182) of participants. History of incarceration was associated with male gender, older age, Los Angeles study site, and unemployment (see Table 1). Factors that were treated as covariates for all subsequent analyses were race/ethnicity, gender, age, years HIV-positive, study site, and employment status.

**Model 1**

In Table 2, a series of logistic regression analyses are presented in the column labeled Model 1. For each variable in the table, the odds ratio and *P*-value under Model 1 represent the association of that variable with incarceration history, controlling for demographic characteristics.

Model 1 factors that were significantly associated with incarceration history included some from nearly every category of factors explored. Being a biological parent was strongly associated with greater odds of incarceration history. Those with smaller social networks had lower odds of incarceration history. Having ever experienced physical violence resulted in greater odds of incarceration history. Not having received any medical care in the past 6 months was associated with reduced odds of incarceration history than having received care.

Lifetime problem drinking (i.e., CAGE score), ever injecting drugs, and ever exchanging sex for other commodities were common experiences (44%, 28%, and 52%, respectively), and each was associated with greater odds of incarceration history. However, recent risk behaviors such as more frequent alcohol use, illegal drug use, and sex exchange behaviors were not related to incarceration history. Higher MCS scores and hepatitis C infection were associated with greater odds of incarceration history. In terms of HIV-specific health issues, having a detectable HIV viral load was significantly associated with incarceration history.

**Table 2** Percentage of participants ever incarcerated by group, and regression analyses of factors associated with incarceration experience, in 3 US cities, 2004–2005

Variable	Total <i>N</i>	Ever incarcerated <i>N</i> (%)	Model 1 <sup>a</sup>		Model 2 <sup>b</sup>	
			AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value
<i>Social and contextual factors</i>						
Recently homeless				.7892		–
Recently homeless	165	119 (72.1)	1.06 (0.70, 1.61)		–	
Not recently homeless	416	277 (66.6)	Ref			
Living place has social worker				.3062		–
Yes	139	103 (74.1)	1.27 (0.80, 2.00)		–	
No	442	293 (66.3)	Ref			
Ever hungry/could not afford food				.1638		.5266
Yes	351	234 (66.7)	0.76 (0.52, 1.12)		0.86 (0.55, 1.36)	
No	230	162 (70.4)	Ref		Ref	
Ever a biological parent				<.0001		<.0001
Yes	307	227 (73.9)	3.27 (2.06, 5.21)		4.01 (2.35, 6.83)	
No	274	169 (61.7)	Ref		Ref	
Total social network size				.0179		.4702
≤5	184	113 (61.4)	0.51 (0.32, 0.81)		0.81 (0.47, 1.39)	
6–10	204	137 (67.2)	0.70 (0.44, 1.10)		1.09 (0.64, 1.86)	
>10	193	146 (75.7)	Ref		Ref	
Proportion of social network disclosed HIV status to				.6679		–
<50%	102	66 (64.7)	0.82 (0.50, 1.35)		–	
50 to <100%	164	106 (64.6)	0.87 (0.57, 1.32)			
100%	315	224 (71.1)	Ref			
<i>Lifetime exposure to violence</i>						
Ever experienced physical abuse				.0037		.0147
Yes	449	320 (71.3)	1.87 (1.23, 2.86)		1.89 (1.13, 3.15)	
No	132	76 (57.6)	Ref		Ref	
Ever experienced sexual abuse				.6050		–
Yes	286	193 (67.5)	1.11 (0.76, 1.62)		–	
No	295	203 (68.8)	Ref			
<i>Access to medical care and treatment</i>						
Has health insurance				.3772		–
Yes	494	337 (68.2)	Ref			
No	87	59 (67.8)	1.26 (0.75, 2.11)		–	
Received any medical care, past 6 months				.0070		.1291
Yes	478	334 (69.9)	Ref		Ref	
No	103	62 (60.2)	0.53 (0.33, 0.84)		0.66 (0.39, 1.13)	
Taking HIV antiretrovirals				.6001		–
Yes	327	225 (68.8)	Ref			
No	254	171 (67.3)	1.11 (0.76, 1.61)		–	
<i>Lifetime sexual and substance use risk behavior</i>						
Lifetime problem drinking (CAGE)				.0048		.0556
Yes	256	192 (75.0)	1.72 (1.18, 2.51)		1.53 (0.99, 2.37)	
No	325	204 (62.8)	Ref			

**Table 2** continued

Variable	Total <i>N</i>	Ever incarcerated <i>N</i> (%)	Model 1 <sup>a</sup>		Model 2 <sup>b</sup>	
			AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value
Ever injected drugs				<.0001		.0014
Yes	161	139 (86.3)	4.02 (2.38, 6.78)		2.73 (1.48, 5.05)	
No	420	257 (61.2)	Ref		Ref	
Ever exchanged sex for money, drugs, or place to stay				<.0001		.0006
Yes	302	235 (77.8)	2.65 (1.82, 3.86)		2.29 (1.42, 3.68)	
No	279	161 (57.7)	Ref		Ref	
<i>Recent sexual and substance use risk behaviors (past 90 days)</i>						
Alcohol use (quantity and frequency)				.2593		–
≥3 drinks, at least once/week	90	65 (72.2)	1.35 (0.80, 2.25)		–	
<3 drinks, at least once/week	491	331 (67.4)	Ref			
Used any illegal drug				.1429		.2773
Yes	246	175 (71.1)	1.32 (0.91, 1.92)		1.27 (0.83, 1.96)	
No	335	221 (66.0)	Ref		Ref	
Exchanged sex for money, drugs, or place to stay				.0683		.7476
Yes	83	64 (77.1)	1.69 (0.96, 2.97)		1.12 (0.55, 2.29)	
No	498	332 (66.7)	Ref		Ref	
<i>Health factors (not HIV-specific)</i>						
SF-36 Mental Component Summary ( <i>M</i> = 37.6, <i>SD</i> = 12.8)			1.03 (1.01, 1.04)	.0011	1.04 (1.02, 1.06)	<.0001
SF-36 Physical Component Summary ( <i>M</i> = 41.3, <i>SD</i> = 9.9)			0.99 (0.98, 1.01)	.4824		–
Any chronic illness				.4480		–
≥1 chronic condition	168	121 (72.0)	1.18 (0.78, 1.78)		–	
No chronic conditions	413	275 (66.6)	Ref			
Hepatitis B co-infection				.9488		–
Yes	88	63 (71.6)	1.02 (0.60, 1.72)		–	
No	493	333 (67.6)	Ref			
Hepatitis C co-infection				<.0001		.0827
Yes	162	136 (84.0)	2.86 (1.75, 4.68)		1.67 (0.94, 2.96)	
No	419	260 (62.1)	Ref		Ref	
Any active STI, past 6 months				.6120		–
Yes	113	79 (69.9)	1.13 (0.71, 1.79)		–	
No	468	317 (67.7)	Ref			
<i>Health factors (HIV-specific)</i>						
Ever diagnosed with AIDS				.6864		–
Yes	221	161 (72.9)	1.09 (0.73, 1.62)		–	
No	360	235 (65.3)	Ref			
CD4 < 200				.0823		.1382
Yes	127	81 (63.8)	0.68 (0.44, 1.05)		0.68 (0.41, 1.13)	
No	454	315 (69.4)	Ref		Ref	
Detectable viral load				.0331		.0246
Yes	397	282 (71.0)	1.53 (1.04, 2.26)		1.67 (1.07, 2.62)	
No	184	114 (62.0)	Ref		Ref	



**Table 2** continued

Variable	Total <i>N</i>	Ever incarcerated <i>N</i> (%)	Model 1 <sup>a</sup>		Model 2 <sup>b</sup>	
			AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value
Any opportunistic infection				.1391		.2121
Yes	170	114 (67.1)	0.74 (0.49, 1.11)		0.74 (0.45, 1.19)	
No	411	282 (68.6)	Ref		Ref	

Note: AOR = adjusted odds ratio; CI = confidence interval; *M* = mean; *SD* = standard deviation; STI = sexually transmitted infection; Ref = reference category; – = not included in the model

<sup>a</sup> Model 1 represents adjusted bivariate analyses of the association of incarceration history with each predictor variable, adjusted for race, age, number of years positive, city, gender, and current employment status

<sup>b</sup> Model 2 presents the multivariable logistic regression results adjusted for race, age, number of years positive, city, gender, current employment status, and all variables from Model 1 analyses with *P* < .25

## Model 2

Table 2 also presents a final regression model (Model 2). In this model, all variables with an association to incarceration history of *P* < .25 from Model 1 analyses were included in a simultaneous logistic regression, again controlling for demographic covariates. Factors that were associated with incarceration history included having been the biological parent of 1 or more children, having ever experienced physical abuse, having ever injected drugs, having ever exchanged sex for money or other commodities, having a higher MCS score, and having a detectable HIV viral load.

## Further Exploration of Findings

We sought to further explore the association of parenting status with greater odds of incarceration, observed in both Models 1 and 2, because the direction of the association was counterintuitive. In a series of follow-up tests, we examined the hypothesis that heterosexually identified persons may be more likely than non-heterosexual persons to experience incarceration, thereby explaining the association between parenting status and incarceration history. Sexual orientation was not significantly associated with incarceration history ( $\chi^2 [2] = 4.2, P = .124$ ). When sexual orientation was added to the full prediction model (Model 2 in Table 2), parenting status remained significantly associated with incarceration history and the regression coefficients were virtually unchanged.

We also examined the association of parenting status with social network size, recent use of alcohol and illegal drugs, and having ever exchanged sex. Although in an unadjusted model parents had a significantly higher rate of ever injecting drugs than non-parents ( $\chi^2 [1] = 4.1, P = .042$ ), when the set of covariate characteristics were included in the model they fully accounted for the association. No other factors were associated with parenting status, and none of the factors explored could further explain the association of parenting status with incarceration history.

Finally, we sought to understand which factors accounted for the association of social network size and incarceration history, found in Model 1 but not in Model 2. After adjustment for the set of covariates and MCS, persons with larger social networks were more likely to have ever injected drugs ( $\chi^2 [2] = 8.56, P = .014$ ) and to have a history of problem drinking ( $\chi^2 [2] = 15.08, P < .001$ ); and when these were added to Model 1 for social network size, social network size was no longer associated with incarceration history.

## Discussion

In the present study, PLWHA experiencing homelessness or imminent risk of homelessness reported high rates of incarceration, above those reported in other samples of homeless persons [10, 11]. Those who experienced incarceration in our sample shared some characteristics with incarcerated persons generally, such as being disproportionately male and having lower educational achievement [2]. Unlike the general population of incarcerated persons, however, African Americans were no more likely than persons from other racial/ethnic groups to report having ever been incarcerated. It may be that homeless, HIV-infected persons are so multiply disadvantaged that any racial/ethnic differences in disadvantage become obscured.

Incarceration history was associated with lifetime exposure to violence and history of engaging in other risk behaviors, such as injection drug use and exchanging sex for other commodities, but it was not associated with current risk behaviors. These findings are encouraging because they suggest that whereas those most likely to have experienced incarceration in the past may have experienced more violence and engaged in riskier behavior in the past as well, having been incarcerated in the past may not lead those persons disproportionately into ongoing illegal activity such as illegal drug use and sex work.

Persons with larger social networks initially appeared more likely to experience incarceration. However, on

further investigation, we discovered that this association was accounted for by the relations between social network size and drug and alcohol abuse. It may be that those who abused drugs and were heavier drinkers in our sample had larger social networks because of ‘partying’ networks; however, because of illegal drug use in particular, they were also more prone to interactions with law enforcement.

We also found it encouraging that previously incarcerated persons were not less likely than others to access medical care and treatment, to meet basic housing and food-related needs, or to demonstrate differences in most HIV-specific and other health characteristics. The 1 exception was in HIV viral load levels, where a history of incarceration was associated with having detectable viral load. Among PLWHA, it is critical that the medical care received maximally reduces HIV viral load levels and maintains the highest levels of CD4 white blood cells possible. The highest standards of care should be achieved for all PLWHA, and determining the cause of the disparity in HIV viral load levels observed in the present study should be further explored.

Initially, we were surprised at the direction of the association between having ever been a biological parent and incarceration history. This could not be explained by sexual orientation or by risk behavior. We speculated that those who experienced incarceration may have been embedded in higher risk social networks, in which a variety of risk behaviors (e.g., substance use and having multiple sex partners) clustered to increase the likelihood of having conceived children and of engaging in activities that led them to the criminal justice system. However, parents in this sample were no more likely to have larger social networks and no more likely to engage in incarceration-related risk behaviors. It may be that, among those in poverty, having children places additional pressure to engage in illegal activities—such as property crimes, the drug trade, or sex work—to earn income for support of those children. However, these are merely hypotheses, and more research is needed to explore these issues further. The Bureau of Justice statistics has reported that, in 1999, more than half of state and federal inmates were the biological parents of children under the age of 18 and over 9% of incarcerated parents reported having been homeless in the year prior to incarceration [27].

We also did not anticipate that those who had experienced incarceration would report better mental health indicators than those who had never been incarcerated. However, the mean MCS [21] in our sample was more than 1 standard deviation lower than the mean for the general population. It may be that those who scored relatively higher on the MCS nonetheless had poorer mental health; and those who scored even lower may have been more incapacitated by mental illness [28]. Possibly, more

debilitating levels of mental or physical disability limit criminal behavior along with other activities. Alternatively, PLWHA experiencing homelessness or imminent risk of homelessness may have greater access to services (e.g., drug treatment and mental health services) either during incarceration or on release into the community than if they were never-incarcerated. This study was not designed to address these issues.

Our study is limited in a number of ways. Given its cross-sectional design, causality cannot be attributed between predictors and criterion variables. The present investigation is not generalizable to all PLWHA experiencing homelessness or imminent risk of homelessness because it did not involve a randomly drawn sample of this population. However, the sample was recruited through local Department of Housing and Urban Development (HUD) grantee agencies in 3 US cities, which were very well-positioned to access members of our target population.

There may have been mediators of some associations in our models that, because of limitations in our questionnaire, we were not able to examine. In addition, descriptive information on incarceration history was limited as we were not able to assess precisely when the last incarceration episode occurred, what type of crime it was for, how many total times participants had been incarcerated, and other details that may have illuminated a more complete picture of how and under what circumstances incarceration occurs in this population.

Finally, social desirability bias may have played a role in our finding no association between current risk behavior and incarceration history. Study participants might have been more reticent to divulge recent illegal behaviors than behaviors that occurred in the more distant past. However, the rate of recent substance use in this sample was comparable to the rate in other homeless samples [29]. Furthermore, ACASI was used to collect data on sexual and substance use behaviors; and this technology has been shown to reduce social desirability bias for such information [30–32]. Hence, social desirability is not expected to have been a major limitation.

These results contribute to our knowledge in several important ways. First, questions regarding the characteristics of PLWHA experiencing homelessness or imminent risk of homelessness in terms of the prevalence of, and factors associated with, incarceration have not been adequately addressed in previous studies. In this study, we explored access to basic needs such as medical care and treatment, food, and housing, and found overall that those who have been incarcerated were not significantly disadvantaged relative to their never-incarcerated peers. Finally, the study addressed whether there were important health factors that distinguished between those who have and those who have not been incarcerated. We found that rates



of detectable HIV viral load were higher among those who were incarcerated relative to those who were not. This finding may point to an important issue for the medical management of HIV among persons experiencing homelessness or imminent risk of homelessness with a history of incarceration. Although the majority were receiving medical care, the quality or continuity of care, or their adherence to treatment, may have differed in as-yet unexplored ways.

Homeless persons and those at imminent risk of homelessness represent a highly vulnerable segment of the HIV-infected population. Future research must continue to examine the service needs and health status of such persons. To the extent that incarceration history is a useful indicator of service and prevention needs, we may be able to better target services that can simultaneously improve the health and well-being of this group of HIV-infected persons and have an impact on HIV transmission within the larger community.

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