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Residential Transience and HIV Risk Behaviors Among Injection Drug Users

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Abstract Housing instability has been linked to HIV risk behaviors. Many studies have focused on the implications of one's housing structure or lack thereof. This study focuses on residential transience as an additional dimension of housing instability. Specifically, we assessed the associations between transience and four HIV risk behaviors. Transience was defined as moving twice or more in the past six months. Multivariate analyses of a sample of current injectors (n = 807) indicated that transience had an independent effect on HIV risk behaviors. Transient individuals were more likely to share needles and go to a shooting gallery than non-transient individuals. Transience was not associated with exchanging sex or having multiple sex partners when homelessness was included in the models. Further examination of the association between housing and HIV should consider the role of transience. Interventions that promote housing stability among IDUs and address HIV risk during times of instability are needed.

Keywords Housing stability · Transience · Homelessness · HIV risk · Injection drug users

Introduction

The emphasis on the link between housing and HIV has often focused on housing as a physical structure and the social arrangement within that structure. Housing stability has usually been defined in terms of whether an individual is currently or has been homeless or in a temporary housing situation, such as single room occupancy hotel, sharing space with someone else, or in transitional housing. The literature has demonstrated that rates of HIV infection are higher among homeless or instably housed individuals compared to individuals residing in more stable living arrangements (Paris, East, & Toomey, 1996; Shlay et al., 1996; Smereck and Hockman, 1998; Zolopa et al., 1994). For example, in a large national sample of injection drug users (IDUs) and cocaine smokers, the rate of HIV infection for homeless drug users was 19%, compared to 11.2% in the rest of the sample (Smereck and Hockman, 1998). A Vancouver study found an independent association between unstable housing and HIV seroconversion among IDUs; those who lived in a downtown hotel, on the street, in jail, or in a boarding house were twice as likely to seroconvert (Patrick et al., 1997).

Several recent studies have identified a link between housing and HIV risk behaviors. Aidala and colleagues (Aidala, Cross, Stall, Harre, & Sumartojo, 2005) found that both homelessness and unstable housing were significantly associated with increased odds of recent hard drug use, needle use, and recent sex exchange among 2159 HIV-positive clients presenting for medical and social services, compared to those living in permanent, secure housing. Homelessness was also significantly associated with increased odds of needle sharing and decreased odds of condom use at last sexual encounter. Corneil and colleagues (Corneil et al., 2006) found that living in an apartment or house was associated with decreased odds of borrowing used needles, daily injection, sex trade, and unprotected sex among IDUs. In addition, Metraux and colleagues (Metraux, Metzger, & Culhane, 2004) reported that homelessness was associated only with shooting gallery attendance, with no significant effect on sharing

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injection equipment or sex exchange. However, the authors note that their sample may have been biased toward injectors with greater economic and social resources.

Yet is housing stability solely defined by the physical structure in which one lives? Reliance upon the structural definition of housing stability minimizes the concept of a home, in which one establishes and maintains a safe and dependable space to live that has meaning beyond the material benefit of the surrounding walls. Having a home or fixed residence also confers meaning of social and physical stability. A conceptualization of housing stability should then have an element that refers not only to the structure of one's living environment, but also to the frequency of housing change. Frequent changes to one's housing situation challenge the ability to foster a sense of place attachment and minimize the extent to which one can establish and maintain social ties and daily routines in the surrounding neighborhood. Among those for whom frequent relocation is embedded in a context of turbulent life circumstances, such transience may reflect and amplify instability in other domains.

Housing mobility and transience have been evaluated for their relationship with psychosocial outcomes in a variety of populations, including adolescents (Institute of Medicine, 1999), low-income homeless women (Tomas and Dittmar, 1995), low-income families (Bartlett, 1996), and employee transfers (Carlisle-Frank, 1992). Some researchers have also recognized that residential mobility is common among populations experiencing homelessness (Sosin, Piliavin, & Westerfelt, 1990; Tomas and Dittmar, 1995; Weitzman Knickman, & Shinn, 1990). Frequent mobility has been associated with higher levels of depression and stress on an individual level (Sluzki, 1992; Stokols and Shumaker, 1982), due to the moving event itself as well as the surrounding life circumstances. Residential instability at the neighborhood level has also been associated with poorer perceived health status for individuals in low affluence communities (Browning and Cagney, 2003; Browning and Cagney, 2002).

Mobility may be a result of both positive and negative factors and the impact of frequent mobility may be moderated by many factors, including distance of move, one's reason for moving, perceived control, personal resilience, and whether the move is perceived to be an upward change (Shumaker and Stokols, 1982; Winstanley, Thorns, & Perkins, 2002); (Bartlett, 1996; Bolan, 1997). Residential transience may be due to internal or external challenges to sustaining a stable housing situation. However, changing residence may also reflect intentions to improve one's living situation, escape abusive situations, or alter access to drugs. In a qualitative study of homeless women, Tomas and Dittmar (Tomas and Dittmar, 1995) noted that 'residential instability' reflected the women's attempts to solve problems associated with housing. Yet residential change may also prompt retribution from an abusive partner or position an individual in a vulnerable situation with a new unknown partner. A recent study found that intimate partner violence by past and new partner offenders was twice as high among women who had moved in the past six months compared to those who had not (Waltermaurer, McNutt, & Mattingly 2006).

Transience and chaotic lifestyle among drug users has been recognized as a challenge, but remains relatively unexplored in the context of HIV prevention. Longitudinal studies cite transience as a primary reason for loss-to-follow among drug using participants (Cottler, Compton, Ben Abdallah, Horne, & Claverie, 1996; Messiah, Navaline, Davis-Vogel, Tobin-Fiore, & Metzger, 2003). Social instability and uncertain living situations are frequently cited barriers to initiation and adherence to HIV and HCV therapy among injection drug users (Bouhnik et al., 2002; Mehta et al., 2005). However, this is not the case for all drug users and little is known about the differences between those who move often and those who do not. Mobility has been identified as a structural barrier to HIV prevention (Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005; Parker, Easton, & Klein, 2000; Herdt, 1997); however, most studies refer to long distance moves, population mobility and disease transmission routes. Few studies have considered whether localized transience itself is associated with HIV risk behaviors or transmission.

Aidala and colleagues (Aidala et al., 2005) review a series of potential pathways through which housing instability may influence sexual and drug-related behavior due to the ''realities of life'' for those living in uncertain circumstances, citing instable relationships, stress of daily life, neighborhood effects, barriers to service utilization, exposure to trauma, substance use and lack of power within survival sex. Latkin and colleagues (1998) also identified that homeless IDUs receive less material aid and have less dense social networks than their housed counterparts. Regardless of living situation, residential mobility and transience present similar challenges for HIV protective behaviors.

There are a variety of pathways through which transience may impact HIV risk behaviors (see Fig. 1). Lack of stable housing may disrupt routines and impede control of one's physical environment. This instability often fosters high risk strategies to acquire drugs and money, such as needle sharing and exchanging sex for money or drugs. Instable living situations may also lead to frequenting high-risk settings such as shooting galleries due to lack of a safe injection space. In addition, mobility may disrupt resource networks or introduce HIV into a network. Frequent mobility may also impede resource acquisition due to lack of knowledge of opportunities and dangers in a new

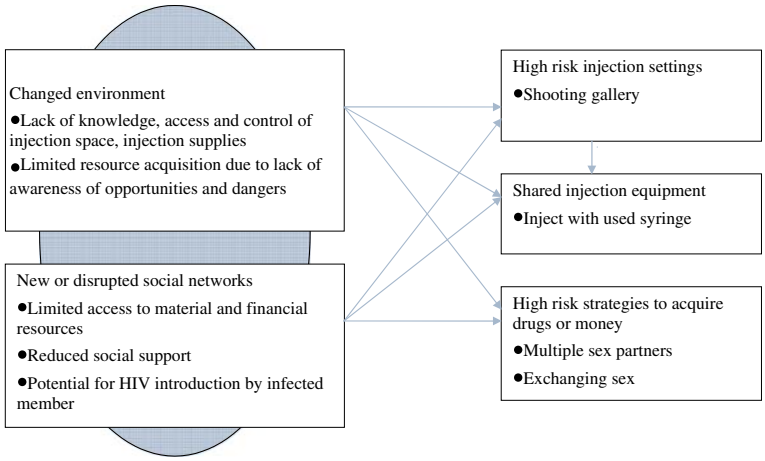

Fig. 1 Potential pathways between residential transience and HIV risk behaviors

environment. Frequent mobility may further prevent injectors' safe access to syringes or connection to known injecting partners. It may be that uncertain environments also increase reliance on a sexual partner, thus reducing condom bargaining power.

The present study sought to understand the relationship between residential transience, and HIV risk behaviors among a sample of current injection drug users. We defined residential transience according to the number of times an individual moved in the prior six-month period. In order to understand the differences in sociodemographics, drug use, and HIV risk behaviors between transient and non-transient injectors, we first provide a descriptive profile of two groups: (1) individuals who have moved two or more times in the past six months (transient group) and (2) individuals have not moved or only moved once in the past six months (non-transient group). Second, we examine the independent associations between residential transience and sexual and injection-related HIV risk behaviors. Specifically, we assess the extent to which transience is independently associated with two injection behaviors (sharing needles and going to a shooting gallery) and two sex behaviors (exchanging sex and having two or more sex partners), after controlling for homelessness and other sociodemographic characteristics.

Methods

Participants

Data used in the current analysis were from the Step into Action (STEP) study. STEP is a network-based HIV prevention intervention. Participants were recruited through targeted outreach in areas designated ''high drug activity'' as well as posted advertisements at local community based organizations and clinics. Eligibility criteria include: (1) 18 years or older; (2) Baltimore resident; (3) No prior enrollment in another HIV or network intervention in the past year; (4) willingness to introduce social network members into the study; and (5) self-reported injection drug use in the past six months.

Face-to-face interviews were administered by trained staff. Data were collected on several domains including demographics, health status, drug history and frequency, HIV drug and sexual behaviors, and housing situation. Data on HIV risk behaviors were collected through Audio-Computer Assisted Self Interview (ACASI) software to reduce social desirability bias and increase validity of self-reported data on risk behaviors (Macalino, Celentano, Latkin, Strathdee, & Vlahov, 2002).

Participants were paid $35 for completion of the baseline visit. The data presented here were collected during baseline visits conducted March 2004 to November 2005. All protocols were approved by the Johns Hopkins Bloomberg School of Public Health Committee for Human Research prior to implementation.

Measures

Residential Transience and Homelessness

Residential transience was measured by asking participants how many times they had moved in the past six months. This variable was recoded into two categories based on the following definition of residential transience: (1) moved two or more times in the past six months (transient); (2) moved only once or did not move in the past six months (non-transient).

A current homeless variable was created based on responses to the following question: ''What best describes your current living situation?'' Response options included: (1) Live in a house that I own; (2) Live in a house or an apartment I rent; (3) Rent a room or space in someone else's house or apartment; (4) Stay with someone else for free; and (5) Live on the street, homeless, or stay at more

than two different places a week. Respondents were classified as ''currently homeless'' if they chose the latter response. Verification of this response as an indicator of homelessness utilized participants' responses to an earlier survey question, which asked ''At any time during the past six months have you been homeless?'' Only those who responded that their current living situation was ''Live on the street, homeless, or stay at more than two different places a week'' and who also responded positively to having been homeless in the past six months were retained for analysis. Because of the question specificity regarding types of situations that might be considered homeless, this operationalization of homelessness was considered to be a more precise indicator than only the single item question regarding homelessness in the past six months. It remained possible for the transient group to have been homeless in the past six months and for currently homeless individuals to report recent residential stability. This allowed exploration of the effect of residential instability defined by recent transience, without excluding those whose instability included homelessness.

Respondents additionally were asked ''How long have you lived in your current neighborhood?'' Neighborhood change was assessed as having lived in their current neighborhood for less than six months.

Drug History and frequency

Participants reported the last time they engaged in a variety of drug-related behaviors including snorting heroin, snorting cocaine, injecting heroin, injecting cocaine, injecting speedball (a mixture of heroin and cocaine), and smoking crack. For any type of drug use reported in the past six months, participants were also asked about the frequency of use ranging from ''less than once per week'' to ''greater than 5 times a day''.

Current injection was measured by asking participants ''At any time during the past six months, have you injected drugs?'' (yes/no). In addition, two daily drug use variables were computed based on responses to items about specific drug use. First, daily injection was coded as (1) Injected cocaine, heroin, or speedball at least once a day vs. (2) Did not inject or injected less than once a day. Likewise, an overall daily use of cocaine, heroin, or speedball, was created (yes or no). Finally, each specific type of drug use (i.e. inject cocaine, snort heroin, smoke crack, etc.) was recoded as (1) In the past six months; (2) Never or more than six months ago.

Drug-related Risk Behaviors

Two drug-related injection behaviors were assessed. Receptive needle sharing was assessed through the question, ''In the past six months, when you injected drugs, how often did you use a needle or tools immediately after another person used it, without cleaning it first with bleach?'' Since the data were highly skewed, the variable was dichotomized based on any self-reported needle sharing in the past six months (0 = Never shared in the past six months; 1 = Shared needles at least once in the past six months). Visiting a shooting gallery was measured by the item ''In the past 6 months, have you gone to a shooting gallery to use your drugs?'' (Coded as yes or no).

Sex-related Risk Behaviors

Sexual risk was measured based on behaviors conducted in the past 90 days. Exchanging sex was measured by the following items: (1) ''During the past 90 days, have you had sex with someone to get money or drugs; this includes oral, vaginal, or anal sex?'' and (2) ''During the past 90 days, have you had sex with someone in exchange for food or shelter (this includes oral, vaginal, or anal sex)?'' Each response was coded as yes or no. The former variable was used as the outcome in the multivariate analyses.

Finally, data on the number of sex partners were gathered through ''I want you to think about the different people you had sex with in the past 90 days; this includes oral, vaginal, or anal sex. How many people did you have sex with in the past 90 days?'' Although the question was open-ended in the survey, the variable was recoded to (1) 0 or 1 partner, and (2) 2 or more partners for the present analysis.

Other Covariates

Demographic data, including age, race, gender, and sexual orientation, were also collected in this study. Socioeconomic data consisted of income in the past 30 days, highest education level attained, and current employment status (employed at least part-time vs. unemployed). Participants were also asked about HIV status and whether they had a main sexual partner.

Data Analyses

The present study included data collected from 807 drug injectors for whom information about housing status and transience was available. Thirty-nine respondents were excluded for insufficient housing data. As noted above, the first goal of this study was to describe differences between individuals who were transient and individuals who were not transient. Thus, chi-squares and *t*-tests were conducted to examine unadjusted bivariate relationships between the two groups.

The second goal of this study was to evaluate the relationship between residential transience and HIV risk behaviors, accounting for current homelessness. A series of logistic regression models were created to examine four HIV risk behaviors: (1) sharing needles in the past six months; (2) going to a shooting gallery to use drugs in the past six months; (3) exchanging sex for money or drugs in the past 90 days; and (4) having two or more sex partners in the past 90 days.

Multivariate regression analysis was used to examine the associations between residential transience and each of the four risk behaviors in the presence of common covariates including current homelessness. Four separate models were constructed with each of the HIV risk behavior as an outcome. Covariates included in the models were sociodemographics (age, race, and gender) and other variables (e.g., frequency of drug use, having a main sex partner, etc.) that literature has shown to be highly associated with each risk behavior.

Results

Approximately 15% ($n = 122$) of participants reported moving two or more times in the past six months (transient individuals) while 85% ($n = 685$) did not move or only moved once in the past six months (non-transient individuals). Among individuals in the transient group, the mean number of times moved was 3.83 (SD = 3.56).

Bivariate Analyses

Sample characteristics are presented in Table 1. As shown by the data, transient individuals differed from non-transient individuals on several sociodemographic variables. Overall, transient individuals had a more disadvantaged background. Although there were no differences in education level or current employment, transient individuals reported lower monthly income compared to non-transient individuals [χ^2 (1, $N = 807$) = 4.64, $P < .05$]. In addition, a larger proportion of transient individuals had spent time in prison in the past six months compared to non-transient individuals [χ^2 (1, $N = 807$) = 16.99, $P < 0.001$].

Thirty percent of transient individuals reported being currently homeless compared to only 11% of non-transient individuals. Eighty-seven percent of the transient group and 28% of the non-transient group reported being homeless in the past six months. Transient individuals tended to be younger (M = 40.3 years, SD = 8.41 vs. M = 43.5 years, SD = 8.02). A larger proportion of individuals who comprised the non-transient group, compared to the transient group, were African American [χ^2 (1, $N = 807$) = 20.46, $P < 0.001$]. Transient individuals were less likely to have a main sexual partner [χ^2 (1, $N = 807$) = 5.77, $P < 0.05$].

Drug Use and HIV Risk Behaviors

Table 1 also shows data on drug use and HIV risk behaviors. Although both groups were comprised of current drug injectors, transient individuals reported more frequent specific types of drug use as well as engagement in HIV risk behaviors. The two groups did not differ regarding daily drug use (overall) and daily injection. However, a larger proportion of transient individuals reported injecting speedball [χ^2 (1, $N = 807$) = 0.06, $P < 0.05$], snorting heroin [χ^2 (1, $N = 807$) = 4.38, $P < 0.05$], and smoking crack [χ^2 (1, $N = 807$) = 4.06, $P < 0.05$] in the past six months. Transient individuals were also more likely to inject with a used syringe [χ^2 (1, $N = 807$) = 25.72, $P < 0.001$], and go to a shooting gallery [χ^2 (1, $N = 807$) = 30.02, $P < 0.001$]. Likewise, exchanging sex [χ^2 (1, $N = 807$) = 8.57, $P < 0.01$] and having two or more sex partners [χ^2 (1, $N = 807$) = 7.79, $P < 0.01$], were more widely practiced by individuals in the transient group.

Drug Behaviors

Table 2 presents the results of the multivariate model assessing the association between residential transience and drug-related behaviors. In Model 1, sharing a used needle in the past six months was the outcome. As shown in this table, transient individuals were 88% more likely to report sharing needles in the past six months, after controlling for several other covariates [95% CI: 1.22–2.88]. Also shown in Table 2 are the results of the multivariate model with shooting gallery attendance as the outcome (Model 2). There was a significant association between going to a shooting gallery and residential transience [AOR: 2.45, 95% CI: 1.62–3.70].

Sex Behaviors

Table 3 presents the results of the multivariate models examining residential transience, and sex risk behaviors. Despite a significant association at the bivariate level, residential transience was not associated with exchanging sex in the past six months (Model 3). Likewise, there was not a significant association between residential transience and having two or more sex partners (Model 4).

Discussion

The results of this study of injection drug users suggest that individuals with recent transience differ from those who

Table 1 Comparison of STEP participants who moved 2 or more times vs. participants who moved 0 or 1 time in the past six months

Characteristic	Transient group (n = 122)	Non-transient group (n = 685)	df [a]	χ^2 [b]
Sociodemographics				
Age (Mean, SD) ***	40.3 (8.41)	43.5 (8.02)	805	4.01[c]
Gender: Female	47 (38.5)	249 (36.4)	1	0.21
Race: African American***	79 (65.3)	567 (83.0)	1	20.46
Currently homeless***	37 (30.2)	75 (10.9)	1	32.54
Homeless in past 6 months	106 (86.9)	191 (27.9)	1	155.00
Times moved in past 6 months (Mean, SD)***	3.83 (3.56)	0.15 (0.36)	222	–8.01 [c]
Lived in current neighborhood for less than 6 months***	76 (62.30)	81 (11.84)	1	168.03
HIV positive	16 (13.1)	100 (14.6)	1	0.19
Less than High School education	48 (39.3)	321 (46.9)	1	2.36
Employed at least part-time	15 (12.3)	118 (17.2)	1	1.83
Income: <$500 in past 30 days*	48 (39.3)	340 (49.9)	1	4.64
Has a main sexual partner*	59 (48.4)	411 (60.0)	1	5.77
Been prison in past 6 months***	53 (43.4)	173 (25.6)	1	16.99
Drug use				
Daily use of cocaine, heroin, or speedball	73 (59.8)	401 (58.5)	1	0.07
Daily injection of cocaine, heroin, or speedball	67 (54.9)	352 (51.4)	1	0.52
Injected speedball past 6 months*	93 (76.2)	515 (75.2)	1	0.06
Injected heroin past 6 months	110 (90.2)	639 (93.3)	1	1.51
Injected cocaine past 6 months	88 (72.1)	442 (64.5)	1	2.66
Snorted heroin past 6 months*	66 (54.1)	300 (43.9)	1	4.38
Smoked crack past 6 months*	89 (72.9)	435 (63.5)	1	4.06
HIV risk behaviors				
Inject with used needle in past 6 months***	75 (61.5)	253 (36.9)	1	25.72
Gone to shooting gallery in past 6 months***	68 (55.7)	207 (30.2)	1	30.02
2 or more sex partners in past 90 days**	60 (49.2)	245 (35.9)	1	7.79
Exchanged sex in past 90 days**	34 (32.4)	110 (19.6)	1	8.57

[a] Degree of freedom; [b] Chi-square test statistic; [c] t-statistic; * $P < .05$, ** $P < .01$, *** $P < .001$

Table 2 Multivariate results of association between residential transience and drug-related risk behaviors

Variable	Model 1: Sharing needles		Model 2: Going to a shooting gallery	
	Odds ratio	95% CI	Odds ratio	95% CI
Transience (Moved more than 2 times)	1.88***	[1.22, 2.88]	2.45***	[1.62–3.70]
Currently homeless	2.20***	[1.41, 3.42]	2.07***	[1.35, 3.16]
Age	1.01	[0.99, 1.03]	0.98	[0.96, 0.990
Gender: Female	0.94	[0.68, 1.29]	0.65*	[0.47, 0.91]
Race: African American	0.50***	[0.34, 0.75]	1.13	[0.75, 1.70]
Income: <$500 in past 30 days	1.00	[0.74, 1.35]	1.04	[0.77, 1.41]
Daily injection	1.23	[0.91, 1.67]	1.12	[0.83, 1.53]
Going to a shooting gallery	2.36***	[1.41, 3.42]	–	–

* $P < .05$, ** $P < .01$, *** $P < .001$

are not transient in several sociodemographic, drug behaviors, and HIV risk behaviors. In addition, this study identified that although residential transience and homelessness are correlated, both have independent effects on HIV risk behaviors. Transience was associated with having used non-injection drugs in the past six months, but drug use and injection frequency did not differ between the groups. Even in the presence of important covariates, transient individuals were more likely to share needles and go to a shooting gallery compared to non-transient indi-

Table 3 Multivariate results of association between residential transience and sex-related risk behaviors

Variable	Model 3: Exchanging sex		Model 4: Having 2 or more sex partners	
	Odds ratio	95% CI	Odds ratio	95% CI
Transience (Moved more than 2 times)	1.48	[0.86, 2.55]	1.37	[0.90, 2.09]
Currently homeless	3.08***	[1.72, 5.51]	2.00***	[1.29, 3.10]
Age	0.96***	[0.93, 0.99]	0.95***	[0.93, 0.97]
Gender: Female	7.75***	[4.69, 12.8]	1.19	[0.85, 1.66]
Race: African American	1.50	[0.84, 2.68]	1.80***	[1.19, 2.74]
Income: <$500 in past 30 days	1.24	[0.81, 1.91]	1.16	[0.85, 1.57]
Daily drug use	1.46	[0.93, 2.30]	1.13	[0.83, 1.55]
Smoke crack	1.59	[0.96, 2.65]	2.07***	[1.48, 2.88]
Has a main sex partner	0.46***	[0.28, 0.77]	0.78	[0.56, 1.07]

* $P < .05$, ** $P < .01$, *** $P < .001$

viduals. Transience was not associated with transactional sex or having two or more sex partners when homelessness was included in the models.

Our findings are consistent with research which has shown that injection risk behaviors, including needle sharing, are associated with homelessness (Evans et al., 2003). Current homelessness was significantly associated with each of the outcomes. Our study further showed that residence transience was independently associated with injection risk behaviors even after controlling for current homelessness and homelessness in the past six months (data not shown). Individuals who move around may not have a safe place to keep their personal materials, including injection equipment. As a result, transient individuals may be more likely to share someone else's equipment or go to a shooting gallery where equipment is easily accessible. Our past work with IDUs has shown that many injectors have a regular network of drug partners with whom they engage in drug use. Frequent relocation may disrupt this network, prompting individuals to utilize shooting galleries and rely on uncertain syringe sources. Alternatively, transience may lead to increased dependence on others for resources including injection supplies, making it increasingly difficult to ensure cleanliness.

This study did not allow us to explore the circumstances of respondents' recent moves. We were unable to determine whether transience in the past six months was limited to that time period or part of a pattern of residential instability. Research on residential mobility has indicated that moving among low-income populations can reflect attempts to better one's circumstances (Tomas and Dittmar, 1995). It is possible that the injection risks preceded the residential transience among this sample of IDUs. Thus, injection risk would be a factor of the context of life prior to moving rather than the transience itself. Some individuals may move to another location that is safer, or in the case of someone attempting to reduce or cease using drugs, away from their risky environment. Although this study did not examine distance of recent move, length of time in current neighborhood was not a significant modifier when included in the multivariate models.

In this sample of IDUs, residential transience was not independently related to either of the sex risks when current homelessness was included in the models. However, when homelessness was not in the model, transience was significantly related to each of the sex risk behaviors. Both of the sexual risk behaviors considered here, having multiple partners and exchanging sex for money or drugs, are behaviors that may be associated with financial resource acquisition. While transience may disrupt opportunities for resource acquisition, it is likely that homelessness is a more immediate marker of financial need. In contrast, injection risk behaviors are often dependent on access to sterile injection equipment and safe spaces in which to inject, both of which may be easily disrupted in transient circumstances. Homeless individuals who are not transient may be able to establish routines and consistent places to stay, enabling relative consistency in access to and storage of injection equipment. Individuals may also move with their sex partners, thus removing the likelihood of an association between transience and having multiple sex partners.

The lack of association between residential transience and exchanging sex for money and drugs was somewhat surprising, given evidence of an association between unstable housing and sex exchange in previous research (Corneil et al., 2006). These authors defined housing instability based on the structure of one's housing with those living in shelters, single room occupancy hotels and similar structures considered to have instable housing. This further suggests that the association between housing instability and sex exchange is driven by financial need. It is possible that transient individuals, in contrast to those who are homeless, have some resources that protect them from having to engage in sex exchange. These resources

might include social support or financial support from other individuals. Our findings indicate that individuals who have a main sex partner were less likely to exchange sex.

More research is needed to understand the intersection of transience with homelessness and ways in which a broader picture of residential instability may be associated with sex and drug-related risk behaviors. In our study, the effect of transience on sex and injection risk behaviors was slightly attenuated when past six month homelessness was included in the models, with a reduction in the odds of shooting gallery attendance (data not shown). This attenuation illustrates that length of homelessness affects HIV risk behavior. It is also possible that the effect of transience is partially accounted by underreported levels of recent homelessness. Future research should utilize a combination of quantitative and qualitative measures to better understand homelessness reporting.

Additionally, this sample included a portion of individuals who reported being homeless but not transient. This is consistent with our local ethnographic data, which shows that some individuals who are homeless remain in the same physical space, such as a shelter or consistent encampment, for extended periods of time. Staying in the same physical location may allow a level of residential stability where one can build a social network and store belongings, compared to someone who is homeless and moves around. Due to limited sample size, it was not possible to compare homeless, transient individuals and homeless, non-transient individuals in this study. More exploration is needed to understand how these two groups differ from each other and from those who are not and who have not been homeless.

This study has some limitations. First, we did not ask participants about their reasons for moving. The residential mobility literature indicates that the impact of frequent mobility is moderated by many factors, including motivation for moving and whether the move is perceived to be a positive or negative life event (Bolan, 1997). In addition, sex risk behaviors were measured in the past 90 days while both residential mobility and injection behaviors were assessed over six-month duration. Ninety days is a commonly used time period for sex risk items to increase recall of sex behaviors and partners. This limits our ability to understand the timeline and direction of association between transience and sexual behavior. Due to the difference in time periods, the moves may have preceded the 90 day period for which sex risk was assessed. Therefore, it is possible that these respondents were able to alter or improve their circumstances by changing their residential situation to the extent that sex exchange and having multiple partners is no longer necessary. Additionally, although we have adequate power in analyses, it is possible that our study did not detect small group differences, especially in the sex behaviors.

Another limitation is that the data were cross-sectional and reciprocal causation is a possibility. Our study has identified association between residential transience and HIV risk behaviors. Longitudinal studies are needed to determine the causal relationships between these variables and the patterns over time. The sample size also did not allow stratification by gender, which may have helped to inform understanding of gender differences in the effect of transience

Additionally, all data were self-reported. There is the potential for social desirability bias on risk behaviors. However, the use of ACASI for reporting of injection and drug risk-behaviors likely mitigated this concern (Macalino et al., 2002). It is also possible that participants over-estimated their risk reduction behaviors and under-estimated their engagement in risky behaviors. Finally, the results of this study may have limited generalizability since participants were self-selected volunteers. We do not have any reason to suspect that our sample is different from the at-large drug injection population.

This study has illustrated that residential transience plays a role in HIV risk behaviors and is an additional dimension of housing stability that should be considered in further exploration of the association between housing and health outcomes. While there is an overlap between homelessness and transience, this study indicates that there are unique implications associated with transience versus homelessness. These data also provide cause for social services to consider the needs of transient clients as well as those who are experiencing homelessness. Thus, health care providers and social service agencies may need to gather broader information about housing circumstances when interacting with clients. It is clear that current living situation does not provide a sufficiently comprehensive picture of an individual's residential stability. Asking about recent moves may provide critical detail regarding the stability of an individual's current life circumstances without requiring identification as homeless, an identity that may be avoided due to imprecision, inaccuracy, potential stigma or disinterest in further engagement.

Our study did not examine reasons why transient individuals moved around. Little is known about the contextual factors associated with residential mobility among IDUs. Future research should explore the longitudinal patterns of residential transience, reasons for moving, and ways in which mobility is associated with HIV risk behaviors. As moving may also be due to favorable circumstances and have positive outcomes, more research is needed to identify the reasons why individuals move and the extent to which these may partially explain their engagement in HIV risk-related behaviors. More research is needed to understand the context of residential instability among IDUs and to identify alternate pathways of association between

residential transience and HIV risk behavior. Further understanding of the factors that contribute to residential stability in this population would also contribute to a broader picture of the diversity among drug users and may provide insight into potential housing strategies.

This research indicates that both homeless and transient individuals should be targeted for intervention efforts. Agencies working with unstably housed populations should address harm reduction needs, including resources for sterile injection equipment, cleaning injection equipment, and limiting the number of people with whom drugs are used. HIV intervention strategies that focus on injection settings (Rhodes et al, 2006) and address issues related to acquiring, carrying and storing syringes may be particularly effective for transient IDUs. Trainings on how to inject more safely in high-risk settings such as shooting galleries may also be a useful prevention approach for this group.

Beyond the implications of housing instability for HIV risk, priority should be given to the development of interventions to help IDUs achieve safe and consistent housing that provides the benefits associated with having a home. Interventions and resources are needed to promote residential stability. On a structural level, these findings underscore a need for provision of stable housing beyond temporary shelters that are likely to necessitate moving. Mechanisms to link transient individuals to a permanent housing situation, such as expansion of subsidized housing and vouchers, are also needed. Strategies to help IDUs maintain a stable living situation and avoid transience may have utility as well. Strengthening social networks may help to increase housing stability, mediate difficulties associated with transience, increase social support, and alter norms to promote HIV risk reduction.

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