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Housing Status and HIV Risk Behaviors among Transgender Women in Los Angeles

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Abstract

Due to social stigma, lack of social support, and minimal legal employment opportunities, transgender women (transwomen) face elevated rates of unstable housing. This study examined the association between housing status and HIV risk behaviors among 517 transwomen encountered through street outreach. Seven variables (including sociodemographics, HIV status, housing status, and sexual partner type) were used to estimate partial associations during multivariable analyses; housing status was coded trichotomously (housed, marginally housed, and homeless) for these analyses. Results demonstrated that homeless and marginally housed transwomen engaged in significantly higher rates of illicit drug use than housed transwomen; however, marginally housed and housed transwomen engaged in significantly higher rates of illegal hormone injections than homeless transwomen. Rates of sex work were high in the sample as a whole, though sex with an exchange partner was most common among the marginally housed transwomen. Multivariate logistic regression revealed that unstable housing moderated the association between HIV status and engagement in unprotected serodiscordant anal intercourse. The marginally housed transwomen exhibited the greatest risk profile for HIV acquisition or transmission.

Keywords

transgender women; HIV; homelessness; substance use; sex work

Introduction

Male-to-female transgender women (hereafter transwomen) experience elevated rates of stigma, discrimination, and prejudice (Grant et al., 2011; Lombardi, Wilchins, Priesing, & Malouf, 2001; Sugano, Nemoto, & Operario, 2006). Such social stigmatization can lead to reduced social support (Gagné, Tewksbury, & McGaughey, 1997; Garofalo, Osmer, Sullivan, Doll, & Harper, 2007), barriers to educational attainment (Kosciw, Greytak, & Diaz, 2009; Ryan & Rivers, 2003), and employment discrimination (Grant et al., 2011; Nemoto, Hsueh, Steuerman, McCree, & Horne, 2007), each of which can lead to financial

hardship and increased rates of unstable housing. Poverty and unstable housing may also lead some transwomen to engagement in the street economy (Hartzell, Frazer, Wertz, & Davis, 2009), including sex work, substance use, and the use of illegal and unmonitored hormone injections. The interrelationships between these elements are complex, as engagement in high-risk behaviors may also precede and contribute to unstable housing and economic hardship. Health and economic disparities facing transwomen (e.g., homelessness, substance use, sex work, illegal hormone injections) are likely reciprocally and syndemically related (Operario & Nemoto, 2010; Wolf & Dew, 2012), working in concert to increase a transwoman's risk for either HIV acquisition or transmission.

Transwomen Face Elevated Rates of Poverty and Unstable Housing

Acquiring and sustaining legal employment can be difficult for transwomen due to pervasive discrimination (Grant et al., 2011; Wilson et al., 2009; Xavier, 2000; Xavier, Bobbin, Singer, & Budd, 2005). Nationally, a transgender person is twice as likely to be unemployed as a non-transgender person and rates of employment discrimination are further increased among transwomen (relative to female-to-male transgender individuals or “transmen”), especially ethnic minority transwomen (Grant et al., 2011). Such trends are mirrored in California, where employment discrimination against transwomen has led to widespread unemployment; the rate of unemployment among the transgender population is twice the state-wide average and transwomen exhibit twice the rate of unemployment as transmen (Hartzell et al., 2009). Partially as a result of these institutional inequalities (Albiston, 2010), transwomen are more likely to live in poverty or extreme poverty both nationally (Grant et al., 2011) and in California (Hartzell et al., 2009), placing them at increased risk for unstable housing (National Coalition for the Homeless, 2010).

Unstable Housing and Health Consequences among Transwomen

Rates of current homelessness are doubled among transgender individuals compared to the United States general population. When comparing transgender individuals, transwomen have been shown to be more likely to be evicted, more likely to have to move out of their homes due to discrimination, and more likely to engage in sex work to afford housing than transmen (Grant et al., 2011). One California study found that 41% of transwomen experienced unstable housing in the previous year (Sevelius, Reznick, Hart, & Schwarcz, 2009), while a street-encountered Los Angeles County sample revealed that 55.3% reported unstable housing in the previous 30 days (Bowers, Branson, Fletcher, & Reback, 2011). Both of these results were derived from samples of high-risk urban transwomen and, therefore, these findings cannot be generalized to other populations of transwomen. This limitation is most likely true of many studies with transwomen and it is, thus, an important stipulation for all results summarized or reported here. Such a stipulation does not, however, obviate the fact that urban transwomen are a group disproportionately affected by public health issues such as poverty, unstable housing, and risk for HIV transmission.

Homelessness and unstable housing are associated with suboptimal physical and mental health outcomes regardless of one's gender identity (Hwang, Tolomiczenko, Kouyoumdjian, & Garner, 2005; O'Campo et al., 2009). Transwomen, however, are faced with additional hardships associated with homelessness as many are exposed to increased levels of physical,

sexual, emotional, and psychological injury due to the increased exposure to transphobia while living in public or while attempting to access services for the unstably housed (Kushel, Evans, Perry, Robertson, & Moss, 2003; Sakamoto, Chin, Chapra, & Ricciardi, 2009). More than half of all transgender persons attempting to access homeless shelter services report harassment by shelter staff and/or residents, almost a third report having been turned away or refused services, and over 20% report having been sexually assaulted by shelter staff and/or residents (Grant et al., 2011). Where data are available, rates of such discrimination and harassment are elevated for transwomen, relative to transmen (Grant et al., 2011). These factors lead many transwomen to avoid accessing social services designed to alleviate housing insecurity (Sakamoto et al., 2009). In an effort to leave the streets and acquire more stable and secure housing, and in the absence of social support/services, minimal educational attainment, and legal employment opportunities, many transwomen turn to sex work in exchange for money, drugs, shelter, food or other necessities (Reback, Lombardi, Simon, & Frye, 2005; Sevelius et al., 2009; Wilson et al., 2009).

Transwomen and Sex Work

Rates of sex work among transwomen are high. Although some transwomen report engagement in sex work for pleasure (Almeida, 2011) or as a means of gender affirmation or to gain status within a broader transgender community (Sausa, Keatley, & Operario, 2007), many transwomen enter into sex work as a means of basic economic survival (Hwahng & Nuttbrock, 2007). A meta-analysis estimated proportional engagement in sex work among transwomen to be 41.5% (Herbst et al., 2008), with rates of sex work being even higher among unstably housed transwomen (Wilson et al., 2009). Substance use during sex is common among transwomen and sex work amplifies this association (Herbst et al., 2008; Melendez & Pinto, 2007; Sausa et al., 2007).

Meta-analytic data suggest that the highest rates of unprotected anal intercourse among transwomen occur with exchange sex partners (Herbst et al., 2008) and transwomen often report engaging in riskier, often unprotected, sexual encounters for increased pay (Sausa et al., 2007). Sex work among transwomen has been associated with hormone misuse and gender enhancing medical procedures (Sevelius et al., 2009), as many choose to enhance their gender presentation both to affirm their gender identity and as a means of procuring more customers at higher prices. Hormone injections performed illegally, or outside the supervision and direction of a medical professional, can be physically damaging and may create an additional avenue for HIV transmission through the use of improperly sterilized needles and the sharing of needles at “pumping parties” (Sanchez, Sanchez, & Danoff, 2009). Partially as a result of these accompanying risk factors (i.e., increased substance use, inconsistent condom use, and hormone misuse), transwomen who engage in sex work are at significantly higher risk for HIV infection than both non-transgender male and non-transgender female sex workers (Operario, Soma, & Underhill, 2008). Thus, as transwomen face elevated rates of poverty, unstable housing, sex work, and substance abuse, they are confronted with multiple potential pathways to HIV infection.

Transwomen and HIV

HIV prevalence rates for transwomen have not always been captured in assessment instruments and, therefore, accurate reports are limited. One meta-analysis estimated HIV prevalence in transwomen living in the United States to be between 24.8 and 30.6% (95% CI; Herbst et al., 2008) while another estimated the rate to be between 18.4% and 25.1% (95% CI; Baral et al., 2013). Rates in California appear to be near the expected range of national estimates, with a sample of transwomen in San Francisco revealing an HIV prevalence rate of 35% (Clements-Nolle, Marx, Guzman, & Katz, 2001) and a sample of transwomen in a community-based harm reduction program in Los Angeles exhibiting a prevalence rate of 28% (Reback & Lombardi, 2001).

In an attempt to escape poverty and unstable housing (Sevelius et al., 2009; Wilson et al., 2009), many transwomen engage in HIV risk behaviors, including sex work, substance use, and illegal hormone injections. In response to prior studies (e.g., Sevelius et al., 2009) that suggest a shift in focus toward research that examines the effects of external, structural factors influencing health risks among transwomen, such as institutionalized unemployment/housing discrimination resulting in reduced housing (Grant et al., 2011), this study sought to better understand the association between housing status and HIV risk in this extremely high-risk population. Given current literature, it was hypothesized that unstable housing would lead to greater HIV transmission risk among transwomen.

Methods

Participants

Participants were transwomen (N = 517) who attended a community-based, low-intensity, health education/risk reduction HIV prevention program (*TransAction*) serving transwomen in the Hollywood/West Hollywood area of Los Angeles County. Any person who believed her male biological sex assigned at birth was in conflict with her gender identity as a transwoman was eligible to participate in the *TransAction* program.

Procedure

Data collection occurred over a seven-year period, from March 2005 through March 2012. Procedures and intervention designs have been reported elsewhere (Bowers et al., 2011). Recruitment and intervention activities were carried out by trained indigenous paraprofessional staff. Enrollment occurred when an eligible individual attended at least one individual-level or group-level intervention at the research institute's community site. The *TransAction* program consisted of a multi-tiered, culturally appropriate continuum of services including outreach encounters, individual-level interventions, and group-level interventions (skills building groups, support groups, and transitional life skills groups) designed to reduce high-risk sexual and substance use behaviors. All program activities focused on the specific sociocultural circumstances of high-risk transwomen. All program materials were approved by the funding agency.

Measures

Using a unique identifier to ensure anonymity, staff recorded participant responses on a paper behavioral risk assessment instrument that was subsequently scanned into an electronic database. The behavioral risk assessment was designed by the senior author and records data on participants' sociodemographic characteristics (e.g., gender identity, sexual identity, age, race/ethnicity, HIV status, educational attainment, housing status), alcohol and injection/non-injection drug use in the previous 30 days, number and type of sexual partners in the previous 30 days (main, casual, exchange; a standardized definition for “main,” “casual,” and “exchange” [i.e., sex work] sexual partners were provided to staff and participants), and details about the participants' three most recent sexual encounters (partner type, HIV status of partner(s), sexual activities during the encounter); there were 72 questions on the behavioral risk assessment. Though participants were potentially allowed to recall sexual encounters from the previous 12 months, 79% of the sexual encounters reported and analyzed occurred within the previous 30 days and over 90% occurred within the previous 90 days, reducing concern of telescopic recall bias. Only baseline assessments were included for analysis. Unstable housing was assessed along with participant sociodemographics and was coded according to three exhaustive and mutually exclusive housing status categories: housed (e.g., participant owns/rents house/apartment/condo); marginally housed (e.g., participant is staying with friends/family, living in hotel/motel, or is in a recovery or sober living house); or homeless (e.g., participant is living on the streets, an abandoned building or in a car). This trichotomous coding scheme has been used in prior studies assessing transgender homelessness (e.g., Marshall et al., 2009).

Statistical Analysis

Descriptive statistics are provided for participant sociodemographics, substance use, and sexual partnering. Tests for associations between nominal outcomes were carried out using chi-square or Fisher's exact analyses, while tests for the difference between means were carried out using ANOVAs.

The sexual behavior attended by the highest risk for HIV transmission was defined as unprotected serodiscordant receptive or insertive anal intercourse. Serodiscordance was defined as any difference between the HIV serostatus of the participant and the HIV serostatus of the sexual partner (e.g., positive/negative or don't know). Three (one for each partner type: main, casual, and exchange) clustered multivariate logistic analyses regressed self-reported engagement in unprotected serodiscordant anal intercourse on participant housing status, HIV status, and the interaction between housing/HIV status while controlling for participant sociodemographics. Clustered multivariate logistic regression analyses allow correlated errors when estimating the variance/covariance regression matrices, thereby overcoming the problem of intraclass correlation arising from the inclusion of multiple cases of the same individual (in this instance, the participants' three most recent sexual encounters). All sociodemographic variables that were found to be divergent across groups at baseline were included as covariates in the multivariate analyses. Given the complex nature of interpreting interaction effects in a clustered multivariate logistic regression, adjusted probabilities of engaging in unprotected serodiscordant anal intercourse are provided; these adjusted probabilities hold all control variables artificially at their mean. As

such, confidence intervals are provided for these probabilities simply to give indication of the reliability and specificity of these estimates; overlapping confidence intervals are not necessarily indicative of a lack of statistical contrast across groups and should not be interpreted in this way. Significance was indicated through flagged coefficient estimates in the multivariate logistic regression analyses. All analyses employed “housed” participants as the reference category. Reported sexual encounters that included more than one partner type ($n = 75$ encounters, 4.8% of total) were not included in the multivariate analyses, so as to maintain partner type exclusivity across tests and allow for proper estimation of the effect of partner type on unprotected serodiscordant anal intercourse. Sexual identities were self-reported. All significance tests were two-tailed and all analyses were carried out using Stata v13.

Results

Sociodemographics

As shown in Table 1, slightly less than half (42.8%) of the participants reported being housed, 22.4% reported being marginally housed, and 34.8% reported being homeless. Among those participants who identified a primary racial/ethnic category ($n = 483$), most participants were Hispanic/Latina (48.0%), with African American/black and Caucasian/white being the next two most common racial/ethnic categories (25.1% and 17.6%, respectively). Hispanics/Latinas were underrepresented in the homeless category while Caucasians/whites, African Americans/blacks, and Native Americans were overrepresented. Differences in sexual identity across housing groups did not reach statistical significance ($p = .095$) though the differences were pronounced enough to warrant inclusion as a statistical covariate in the multivariate analyses (reference category: heterosexual). Differences in HIV prevalence across the groups narrowly missed significance ($p = .083$), with the marginally housed participants exhibiting the highest rate of HIV sero-positivity (31.9%) relative to housed (21.3%) and homeless (22.8%) participants. There were significant differences in the mean ages across housing statuses ($F_{2, 512} = 18.7$, $p < .001$), with housed participants being the oldest. There were no significant differences in educational attainment across groups, with 43% of the sample as a whole having less than a high school education.

Substance Use

Homeless and marginally housed transwomen reported significantly higher rates of crack, methamphetamine, and marijuana use than housed participants (Table 2). Only homeless transwomen reported heroin use. Housed and marginally housed transwomen reported significantly higher rates of illegal hormone injections than homeless transwomen (10.0% and 9.5% vs. 3.3%; $p = .030$). Housed and marginally housed transwomen also reported significantly higher rates of lifetime injection drug use (including illegal hormone injections) than homeless participants (75.1% and 75.9% vs. 58.3%; $p < .001$).

Sexual Partners

Less than one-third (31.0%) of the sample reported sex with a main partner in the previous 30 days and 26.5% reported sex with a casual partner during the same recall period (Table 3). Sex with an exchange partner was more common, with nearly half (48.6%) of the sample

reporting recent engagement in sex work. Marginally housed transwomen reported significantly higher rates of sex with an exchange partner than the homeless transwomen (59.5% vs. 41.1%; $p = .002$), with housed participants displaying an intermediate rate (48.9%).

Multivariable Analyses

Table 4 estimates the likelihoods of engagement in unprotected serodiscordant anal intercourse during the participants' three most recent sexual encounters. The table contains three separate analyses, one for each partner type. As shown in the top analysis, 137 transwomen reported engaging in any anal intercourse with a main partner during one of their three most recent sexual encounters; a total of 234 such sexual encounters were reported by these 137 transwomen. Unadjusted rates of recent engagement in unprotected serodiscordant anal intercourse with main partners varied by housing status ($p_{\text{housed}} = 6.0\%$; $p_{\text{marginal}} = 11.5\%$; $p_{\text{homeless}} = 18.0\%$). After adjusting for sociodemographics and covariates, homeless transwomen were estimated to be nine times (AOR = 9.21; $p = .016$) more likely to report engagement in unprotected serodiscordant anal intercourse with a main partner than housed transwomen (the reference category). Thus, while housed transwomen were estimated to have a 3%-11% probability of engagement in serodiscordant anal intercourse with a main partner (depending on their HIV status), homeless transwomen were estimated to have a 17%-21% probability of engagement in unprotected serodiscordant anal intercourse with a main partner. Marginally housed transwomen exhibited an intermediate rate, though the general pattern of the finding was similar to that of the housed transwomen.

Fewer transwomen reported any anal intercourse with casual partners ($n = 91$, 143 such sexual encounters) than with either main or exchange partners. Rates of engagement in unprotected serodiscordant anal intercourse during these sexual encounters was elevated relative to main or exchange partners, and varied by housing status ($p_{\text{housed}} = 16.0\%$; $p_{\text{marginal}} = 17.2\%$; $p_{\text{homeless}} = 23.1\%$). When adjusting for statistical controls, participant HIV status was associated with engagement in unprotected serodiscordant anal intercourse, with HIV-positive transwomen estimated to be over 6.5 times (AOR = 6.7; $p = .044$) more likely to engage in unprotected serodiscordant anal intercourse with casual partners than HIV-negative transwomen. Though the finding was only trending towards significance ($p = .064$), marginal housing may have moderated the association between HIV status and engagement in unprotected serodiscordant anal intercourse. Examination of the adjusted probability estimates revealed that HIV-negative housed and homeless transwomen were predicted to have rates of engagement in unprotected serodiscordant anal intercourse with casual partners only one-fourth to one-fifth as large as their HIV-positive counterparts ($p_{\text{HIV-}} = 7\%$ vs. $p_{\text{HIV+}} = 33\%$ and $p_{\text{HIV-}} = 13\%$ vs. $p_{\text{HIV+}} = 42\%$, respectively). In direct contrast, HIV-negative marginally housed transwomen were estimated to have nearly double the probability of engagement in unprotected serodiscordant anal intercourse than HIV-positive marginally housed transwomen ($p_{\text{HIV-}} = 23\%$ vs. $p_{\text{HIV+}} = 12\%$).

Anal intercourse with an exchange partner was reported by 138 transwomen during one of their three most recent sexual encounters; a total of 242 such sexual encounters were reported by these 138 transwomen. Unadjusted rates of engagement in unprotected

serodiscordant anal intercourse varied by housing status ($p_{\text{housed}} = 6.3\%$; $p_{\text{marginal}} = 8.1\%$; $p_{\text{homeless}} = 11.5\%$) and were lower overall than that observed with either main or casual partners. After adjusting for controls, participant HIV-positive status was associated with an estimated 16 times increase in the likelihood of engagement in unprotected serodiscordant anal intercourse with an exchange partner (AOR = 16.29; $p < .01$) though this main effect was significantly moderated by participant homelessness (AOR = .04; $p = .039$). Thus, whereas the HIV-negative housed ($p_{\text{HIV-}} = 3\%$ vs. $p_{\text{HIV+}} = 33\%$) and marginally housed ($p_{\text{HIV-}} = 2\%$ vs. $p_{\text{HIV+}} = 24\%$) transwomen were estimated to be much less likely to engage in unprotected serodiscordant anal intercourse than their HIV-positive counterparts, homeless transwomen were estimated to show nearly equal rates of engagement regardless of HIV-status ($p_{\text{HIV-}} = 8\%$ vs. $p_{\text{HIV+}} = 6\%$).

Discussion

Sociodemographics

Homeless and marginally housed participants comprised 57.2% of the sample, though homelessness was not equally common across racial/ethnic categories; Hispanics/Latinas were underrepresented in the homeless category relative to Caucasian/white and African American/black participants. This reflects national patterns, in which Hispanic-identified individuals are underrepresented among those accessing housing and shelter services (Paquette, 2011).

Average age in the sample increased as participants went from homeless to marginally housed to housed. Many transwomen are rejected by their family of origin (Spicer, 2010) and are forced into unstable housing at an early age. As a result, many transwomen “age out” of homelessness, living out their young adulthood on the streets and regaining stable housing only after significant exposure to HIV and other health risks. In addition to rejection by family members, transgender youth are often bullied or otherwise victimized in school during their teenage years (Kosciw, Greytak, Bartkiewicz, Boesen, & Palmer, 2012), leading to higher rates of school drop-out and lower rates of postsecondary education. Educational attainment was similarly limited in the sample, with “less than high school” being the most common educational attainment category. Each subsequent higher educational category was also sharply less common, implying increasing obstacles at each higher level of education.

Overall HIV prevalence in the sample was high (24%; estimated prevalence in U.S. general population: 0.3% - 0.4%; Centers for Disease Control and Prevention, 2013), but consistent with other studies with transwomen both nationally and in Los Angeles County (Baral et al., 2013; Reback et al., 2005). There were no statistically significant differences in HIV prevalence by housing status, though marginally housed transwomen displayed an elevated rate.

Substance Use

The homeless and marginally housed transwomen reported significantly more street drug use (i.e., crack, methamphetamine, marijuana) than the housed transwomen. Chronic homelessness has been shown to lead to sharply elevated rates of substance use in both non-

transgender males and non-transgender females (Edens, Mares, & Rosenheck, 2011). Rates of methamphetamine use were high, particularly among the marginally housed (34.5%) and homeless (37.8%) transwomen, with rates similar to those found among samples of men who have sex with men (Bowers et al., 2011; Carey et al., 2009; Wohl, Frye, & Johnson, 2008). Risk of HIV acquisition or transmission is often increased among methamphetamine users, generally as a result of concomitant high-risk sexual behaviors (Bowers, Branson, Fletcher, & Reback, 2012; Drumright, Patterson, & Strathdee, 2006; Koblin et al., 2006; Mimiaga et al., 2010; Reback & Shoptaw, 2011; Reback et al., 2012). Inconsistent condom use and substance use during sex (a known predictor of unprotected anal intercourse among transwomen) (Nemoto, Operario, Keatley, Han, & Soma, 2004) have both been associated with stimulant use and unstable housing among transwomen (Sevelius et al., 2009).

Marginally housed and housed transwomen displayed elevated rates of hormone misuse, relative to homeless transwomen. Data on legal, prescribed hormones were not gathered, as monitored use is not attended by the same expected increase in HIV risk. Although many transwomen seek hormone therapy and other gender enhancing procedures to acquire a physical appearance that coincides with their gender identity, it is nevertheless important to note that the housed and marginally housed transwomen also exhibited significantly higher rates of exchange sexual partners than their homeless counterparts. Given the known associations between sex work and gender enhancing procedures among transwomen (Sevelius et al., 2009), it may be that the transwomen best able to augment their gender presentation through hormone injections were also those most likely to acquire exchange partners.

HIV Transmission Risk

Many transwomen turn to sex work to afford the basic costs of living (Clements-Nolle, Wilkinson, Kitano, & Marx, 2001; Kammerer, Mason, Connors, & Durkee, 2001; Kenagy, 2005; Sausa et al. 2007). Reflecting this tendency, exchange partners were the most commonly reported partner type for the sample as a whole, with approximately 60% of all marginally housed transwomen and nearly half (49%) of all housed transwomen reporting sex with an exchange partner in the previous 30 days. Homeless transwomen reported the fewest number of exchange sex partners. Though the cause of this finding is unknown, the homeless transwomen (being younger and potentially earlier in their gender transition) may have had a harder time attracting clients than the transwomen further along in their gender transition and/or with some form of housing.

Multivariable logistic regression analyses provided adjusted probabilities of transwomen engaging in the highest risk sexual behavior: unprotected receptive or insertive serodiscordant anal intercourse. Findings revealed that when adjusting for controls and the shared influence of the covariates, homeless transwomen were estimated to be significantly more likely to engage in unprotected serodiscordant anal intercourse with a main partner than the housed transwomen. Unprotected anal intercourse with a main partner has been shown to be a means of expressing intimacy and trust among transwomen (Carballo-Diéguez et al., 2011) and may provide a means of confirming one's gender identity with their primary partner. Homeless transwomen, being the youngest and most vulnerable group,

may have felt the greatest need to confirm their gender identity with these partners and/or may have had the least leverage to negotiate consistent condom use. These factors manifest themselves as increased engagement in unprotected serodiscordant anal intercourse regardless of HIV-status, placing either the transwoman or her partner at increased risk for HIV acquisition or transmission.

Unstable housing moderated the association between HIV status and engagement in HIV sexual risk for both casual and exchange partners. Thus, while HIV-positive housed and homeless transwomen were estimated to be more likely to engage in unprotected serodiscordant anal intercourse with casual partners than their HIV-negative counterparts, marginally housed transwomen reversed this association and were estimated to be more likely to engage in unprotected serodiscordant anal intercourse with casual partners if they were HIV-negative. These results indicated that marginally housed transwomen were at elevated risk for HIV acquisition with casual partners. In contrast, housed and homeless transwomen appear to mitigate HIV acquisition risk with casual partners, instead revealing patterns of elevated transmission risk.

With exchange partners, HIV-positive housed and marginally housed transwomen were estimated to be over 16 times more likely to engage in unprotected serodiscordant anal intercourse than their HIV-negative counterparts. This association was moderated by participant housing status; however, homeless transwomen reversed this trend by exhibiting nearly equal, intermediate rates of engagement in serodiscordant anal intercourse with exchange partners regardless of HIV-status. These results indicate elevated risk for HIV transmission during sex with an exchange partner, highlighting the need for effective behavioral interventions to reduce engagement in high-risk sexual behaviors, as well as biobehavioral (e.g., post-exposure prophylaxis, pre-exposure prophylaxis) interventions to reduce community viral load.

Averaging across partner types, average adjusted rates of engagement in serodiscordant anal intercourse by HIV-negative transwomen during their three most recent sexual encounters were estimated at 4.3% for housed transwomen, 10.0% for marginally housed transwomen, and 14.0% for homeless transwomen. For HIV-positive transwomen, these estimates rose to 25.7% for housed transwomen, 17.3% for marginally housed transwomen, and 21.3% for homeless transwomen. Broadly, results demonstrated that engagement in unprotected serodiscordant anal intercourse was more common for HIV-positive transwomen than HIV-negative transwomen, perhaps because some transwomen did not engage in safer sex practices after learning of their HIV-positive serostatus. This highlights the importance of linking and retaining HIV-positive transwomen in HIV care, as antiretroviral medication adherence and viral load suppression is critical in reducing transmission. In Los Angeles County, transwomen have been highlighted as one of the primary groups that systematically fails to be linked into proper HIV care (Perez, 2011), leading to high levels of unsuppressed viral load.

This overall association between HIV-status and HIV risk behaviors was reversed, however, for marginally housed transwomen with their casual partners or for homeless transwomen with their main or exchange partners. In light of such varying risk profiles, HIV-prevention

efforts involving transwomen should be aware of the effects of housing status on HIV risk-taking, and should tailor their education and prevention efforts accordingly. A summary of the archetypal HIV risk profiles for housed, marginally housed, and homeless transwomen is shown in Table 5.

In sum, marginally housed transwomen displayed a risk profile burdened by multiple risk factors, including elevated rates of street drug use, illegal hormone injections, and risk for HIV infection or transmission through inconsistent condom use. This may provide some indication as to why the marginally housed transwomen displayed a rate of HIV infection higher than the housed or homeless transwomen and may give insight into some of the difficulties faced by transwomen as they try to move off the streets.

Limitations and Conclusions

These data were limited by their self-report nature (which can lead to recall bias and/or misreporting), the lack of biomarkers to confirm recent substance use and HIV status, the lack of an available sampling frame (which can bias the use of inferential statistics), the lack of a comparison group, and the highly specialized sample (i.e., urban high-risk transwomen recruited from a HIV prevention program). Additionally, there have been significant increases in the cost of rental properties in the Hollywood/West Hollywood area of Los Angeles County in the time encompassing the reporting period. Rental costs in this area reached their highest levels ever recorded in the fourth fiscal quarter of 2007 and have stayed elevated, ending in 2011 at 94% of that historic high (USC Lusk Center, 2012). Given that many transwomen disproportionately rely on low-cost rental properties for housing, the uniquely high rental costs in Los Angeles County during the reporting period may render data collected un-generalizable to transwomen living in other geographical locations at other times. Additionally, although a nuanced examination of variation within the marginally housed category responses is beyond the scope of these analyses, future research should attempt to isolate meaningful patterns of HIV risk within samples of marginally housed participants (e.g., Do transwomen living in a sober living facility have different risk behaviors than those living in a homeless shelter?).

Multivariable analyses were limited by the relatively low rates of engagement in unprotected serodiscordant anal intercourse during participants' three most recent sexual encounters with main (n = 28/234 encounters, 12.0%), casual (n = 26/143 encounters, 18.2%), and exchange (n = 19/242 encounters, 7.9%) partners. Although a limitation in the multivariate statistical analyses, this low rate of engagement in unprotected serodiscordant anal intercourse may be evidence for successful risk-reduction strategies utilized by these high-risk transgender women. Finally, associations revealed here can only imply correlation and not causality. However, even with these limitations, these findings suggest a new narrative surrounding transwomen, unstable housing, and HIV risk behaviors.

Findings presented here reveal that, among high-risk transwomen, stable and marginal housing statuses were attended by HIV risk factors (e.g., elevated rates of hormone misuse, sex work) different from those associated with homelessness. Given the different constellations of risk factors faced by housed, marginally housed, and homeless transwomen, HIV prevention programs should tailor their services to distinguish between

transwomen with various levels of housing status. A single one-size-fits-all intervention that fails to distinguish between transwomen who are or are not in a socioeconomic position to secure stable housing could fail to adequately address the needs of this highly vulnerable population.

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Table 1

Sociodemographic characteristics (N = 517)

Characteristic	Housed (n = 221) N (%) or Mean (SD)	Marginally housed (n = 116) N (%) or Mean (SD)	Homeless (n = 180) N (%) or Mean (SD)	Total (N = 517) N (%) or Mean (SD)	p
Race/ethnicity ^a					
Caucasian/white	34 (16.0%)	14 (13.2%)	37 (22.6%)	85 (17.6%)	$p < .001$
African American/black	42 (19.7%)	29 (27.4%)	50 (30.5%)	121 (25.1%)	
Hispanic/Latina	125 (58.7%)	53 (50%)	54 (32.9%)	232 (48.0%)	
Native American/Alaskan	6 (2.8%)	6 (5.7%)	17 (10.4%)	29 (6%)	
Multiracial/other	6 (2.8%)	4 (3.8%)	6 (3.7%)	16 (3.3%)	
Sexual identity					
Heterosexual	163 (73.8%)	84 (72.4%)	120 (66.7%)	367 (71.0%)	$p = .095$
Gay	15 (6.8%)	17 (14.7%)	19 (10.6%)	51 (9.9%)	
Bisexual	35 (15.8%)	11 (9.5%)	36 (20.0%)	82 (15.9%)	
Lesbian	8 (3.6%)	4 (3.5%)	5 (2.8%)	17 (3.3%)	
Sexual orientation					
Androphilic	163 (73.8%)	84 (72.4%)	120 (66.7%)	367 (71.0%)	$p = .095$
Gynephilic	8 (3.6%)	4 (3.5%)	5 (2.8%)	17 (3.3%)	
Bisexual	35 (15.8%)	11 (9.5%)	36 (20.0%)	82 (15.9%)	
Unknown/unclear	15 (6.8%)	17 (14.7%)	19 (10.6%)	51 (9.9%)	
HIV status					
HIV +	47 (21.3%)	37 (31.9%)	41 (22.8%)	125 (24.2%)	$p = .083$
HIV -	167 (75.6%)	76 (65.5%)	134 (74.4%)	377 (72.9%)	
Don't Know/Refuse	7 (3.2%)	3 (2.6%)	5 (2.8%)	15 (2.9%)	

Characteristic	Housed (n = 221) N (%) or Mean (SD)	Marginally housed (n = 116) N (%) or Mean (SD)	Homeless (n = 180) N (%) or Mean (SD)	Total (N = 517) N (%) or Mean (SD)	p
Age ^a Years	36.9 (10.5)	32.8 (10.5)	30.7 (10.1)	33.8 (10.7)	p < .001
Educational attainment ^b					
Less than HS	94 (42.5%)	52 (45.2%)	75 (41.9%)	221 (42.9%)	
HS graduate	64 (29.0%)	40 (34.8%)	67 (37.4%)	171 (33.2%)	p = .423
Some college	46 (20.8%)	17 (14.8%)	28 (15.6%)	91 (17.7%)	
College graduate	17 (7.7%)	6 (5.2%)	9 (5.0%)	32 (6.2%)	

^a n = 483

^b n = 515

Table 2

Substance use in the previous 30 days

Substance	Housed (n = 221) N (%)	Marginally housed (n = 116) N (%)	Homeless (n = 180) N (%)	Total (N = 517) N (%)	p
Cocaine	8 (3.6%)	6 (5.2%)	12 (6.7%)	26 (5.0%)	p = .380
Crack	4 (1.8%)	9 (7.8%)	12 (6.7%)	25 (4.8%)	p = .020
Methamphetamine	28 (12.7%)	40 (34.5%)	68 (37.8%)	136 (26.3%)	p < .001
Heroin	0 (0%)	0 (0%)	5 (2.8%)	5 (1%)	p = .020
Marijuana	33 (14.9%)	35 (30.2%)	70 (38.9%)	138 (26.7%)	p < .001
Hormones	22 (10.0%)	11 (9.5%)	6 (3.3%)	39 (7.5%)	p = .030

Table 3
Bivariate associations between housing status and sexual partner type(s) in the previous 30 days

	Housed (n = 221) N (%)	Marginally housed (n = 116) N (%)	Homeless (n = 180) N (%)	Total (N = 517) N (%)	p
Partner type					
Main partner	70 (31.7%)	42 (36.2%)	48 (26.7%)	160 (31.0%)	p = .212
Casual partner	61 (27.6%)	29 (25.0%)	47 (26.1%)	137 (26.5%)	p = .867
Exchange partner	108 (48.9%)	69 (59.5%)	74 (41.1%)	251 (48.6%)	p = .014

Table 4
Multivariate logistic regression of unprotected receptive or insertive serodiscordant anal intercourse on housing status, HIV status, and sociodemographics

			Probability of engaging in unprotected SdAI	
Partner type	Predictor	AOR (SE)	HIV- transwomen	HIV+ transwomen
Main partner(s) (n = 137; 234 acts of anal intercourse)			<i>p</i> (95% CI)	<i>p</i> (95% CI)
	Housed	Ref. Cat.	3% (1 - 12%)	11% (1 - 61%)
	Marginally housed	1.87 (2.0)	5% (1 - 19%)	16% (4 - 47%)
	Homeless	9.21 (8.5) [*]	21% (9 - 40%)	17% (5 - 44%)
	Transwoman is HIV+	4.37 (6.2)	-	-
	Marginally housed × HIV+	0.83 (1.4)	-	-
	Homeless × HIV+	0.19 (.3)	-	-
Casual partner(s) (n = 91; 143 acts of anal intercourse)				
	Housed	Ref. Cat.	7% (2 - 20%)	33% (12 - 65%)
	Marginally housed	4.07 (3.7)	23% (8 - 50%)	12% (2 - 51%)
	Homeless	2.06 (1.8)	13% (4 - 35%)	42% (13 - 78%)
	Transwoman is HIV+	6.73 (6.4) [*]	-	-
	Marginally housed × HIV+	0.07 (.1) [†]	-	-
	Homeless × HIV+	0.72 (1.0)	-	-
Sex work partner(s) (n = 138; 242 acts of anal intercourse)				
	Housed	Ref. Cat.	3% (1 - 9%)	33% (12 - 65%)
	Marginally housed	0.69 (0.8)	2% (0 - 12%)	24% (8 - 54%)
	Homeless	3.01 (2.4)	8% (3 - 23 %)	6% (1 - 29%)
	Transwoman is HIV+	16.29 (14.4) ^{**}	-	-
	Marginally housed × HIV+	0.82 (1.2)	-	-
	Homeless × HIV+	0.04 (0.1) [*]	-	-

Note: Statistical controls are race/ethnicity, age, and sexual identity.

^{*}
p .05;

^{**}
p .01; all significance tests 2-tailed

[†]
p = .064

Table 5
Summary of HIV risk behaviors by housing status

HIV risk behaviors	Housed	Marginally housed	Homeless	Total (out of 9)
Street drug use	Low/moderate (1.5)	High (3)	High (3)	7.5
Hormone injections	High (3)	High (3)	Low (1)	7
Sex work	High (3)	High (3)	Moderate (2)	8
Sexual risk: HIV acquisition	Low (1)	High (3)	High (3)	7
Sexual risk: HIV transmission	High (3)	High (3)	High (3)	9
Total (out of 15)	11.5	15	12	