

# Residential Status as a Risk Factor for Drug Use and HIV Risk Among Young Men Who Have Sex with Men

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**Abstract** There is growing behavioral and epidemiological evidence to suggest that young men who have sex with men (YMSM) are at high risk for becoming HIV-infected. Unfortunately, relatively little research has been conducted to examine the range of individual, social, and community-level factors that put these young men at increased risk. To address existing gaps in the literature, the Healthy Young Men's (HYM) Study was launched in Los Angeles to examine the range of factors associated with HIV risk and protective behaviors within an ethnically diverse sample of 526 YMSM recruited using a venue-based stratified probability sampling design. In this paper we present findings that demonstrate that YMSM who experience residential instability, who have been forced to leave their home because of their sexuality, and/or who are precariously housed are at significantly greater risk for drug use and involvement in HIV risk-related behaviors.

**Keywords** Adolescents · Youth · Gay · Bisexual · Drugs · Housing · Homeless · HIV risk

## Introduction

Three decades into the HIV epidemic, various segments of the US population remain at exceedingly high risk for infection despite a growing research base and considerable efforts toward prevention. One such group for whom rates of HIV infection have remained stable over time is young men who have sex with men (YMSM) (Centers for Disease Control and Prevention, 2005a). Nationally, unprotected anal intercourse is the leading route of HIV transmission among YMSM, ages 13–19, accounting for 46% of cumulative HIV cases and 34% of cumulative AIDS cases. Among 20- and 24-year-old YMSM, the figures rise to 55% and 63%, respectively (Centers for Disease Control and Prevention, 1997). HIV prevalence studies conducted in large urban areas provide further evidence for the magnitude of the epidemic within this population, with prevalence rates ranging from 7% to 9% among men under age 25 (Centers for Disease Control and Prevention, 2000; Katz et al., 1998; Ruiz, Facer, & Sun, 1998) and more recently 14% among 18- to 29-year olds (Centers for Disease Control and Prevention, 2005b). If that rate of new infection continues throughout young adulthood, half of all gay men who are now 18 years old will be HIV positive by the time they are 30 (DeCarlo, 1998).

While certainly not a homogenous group, YMSM in general have been found to be at increased risk for HIV infection and other sexually transmitted infections (STIs) (Centers for Disease Control and Prevention, 1997), as well as drug use (Kipke et al., *in press*), sexual victimization (Balsam, Rothblum, & Beauchaine, 2005), school problems (Gibson, 1989; Gonsiorek, 1988; Remafedi, 1987, 1990; Savin-Williams, 1994),

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and serious mental health problems, such as depression and suicide (Allen & Glick, 1996; Gibson, 1989; Remafedi, Farrow, & Deisher, 1991; Savin-Williams, 1994; Massachusetts, 2001). For adolescents in general, late adolescence and early adulthood is developmentally a period during which young people experiment with behaviors that bring increased risk, such as drug use and sexually risky behaviors (Arnett, 1992, 2000; Bachman, Johnston, O'Malley, & Schulenberg, 1996). It is a time when young people begin to explore new roles and relationships; establish more intimate attachments and sexual relationships with both male and female peers; and begin to define their sexual identity, both privately and publicly. For many YMSM, however, adolescence is a time of rejection from family and friends, stigmatization, and social isolation (D'Augelli & Herschberger, 1993; Gonsiorek, 1988; Hetrick & Martin, 1987; Hunter & Mallon, 1999; Savin-Williams, 1989, 1990; Telljohann & Price, 1993; Uribe & Harbeck, 1992). While connectedness with family has repeatedly been found to be highly protective against drug use and other risky behaviors among young people (Flaherty & Richman, 1986; Kobak & Sceery, 1988; Sarason, Pierce, Bannerman, & Sarason, 1993; Sneed, Morisky, Rotheram-Borus, Ebin, & Malotte, 2001; Sroufe & Fleeson, 1986), YMSM often find themselves feeling very disconnected and isolated from their families because of their sexual identity (D'Augelli & Herschberger, 1993; Gonsiorek, 1988; Hetrick & Martin, 1987; Hunter & Mallon, 1999; Savin-Williams, 1989, 1990; Telljohann & Price, 1993; Uribe & Harbeck, 1992). Moreover, the struggle to develop and integrate a positive adult identity, a primary developmental task for all adolescents, becomes an even greater challenge for YMSM given the disapproval, discrimination, and homophobia many of them experience in every arena of their lives (i.e., from their families, peers, racial/ethnic community, and/or faith community) (D'Augelli & Herschberger, 1993; Gonsiorek, 1988; Hetrick & Martin, 1987; Hunter & Mallon, 1999; Ryan & Futterman, 1997; Savin-Williams, 1989, 1990; Telljohann & Price, 1993; Uribe & Harbeck, 1992). Because of their sexual minority status, many YMSM experience and witness various forms of victimization, which may in turn put them at increased risk for involvement in sexual risk behaviors and mental health problems (Balsam et al., 2005).

Although limited in nature, there is some evidence to suggest that YMSM are also at increased risk for running away from home and/or being forced from their home because of the conflict that they experience with their parents regarding their sexuality (Gibson, 1989; Remafedi, 1987; Savin-Williams, 1994), and that

residential instability may put these young people at even greater risk for HIV infection and other negative health outcomes, such as illicit drug use and STIs (Clatts, Goldsamt, Yi, & Gwadz, 2005; Kipke, Montgomery, Simon, & Iverson, 1997b; Lankenau, Clatts, Wile, Goldsamt, & Gwadz, 2004; Rew, Fouladi, & Yockey, 2002; Rotheram-Borus, Mahler, Koopman, & Langabeer, 1996). Studies of homeless youth also report that as many as 35% of youth living on the streets self-identify as gay, lesbian, or bisexual (Johnson De Rosa, Montgomery, Hyde, Iverson, & Kipke, 2001). Unfortunately, limited research has explicitly sought to examine the residential history and stability of YMSM, and the association between residential instability and YMSM's involvement in risky behaviors, such as illicit drug use and HIV sexual risk behaviors. Moreover, limited information is available regarding the percentage of YMSM who are forced to leave their home prematurely because of their sexuality.

In this paper we present findings from analyses performed to examine the relationships between residential status, residential instability, illicit drug use, and HIV risk behaviors within a large and ethnically diverse sample of YMSM recruited using a venue-based probability sampling design as part of the Healthy Young Men's (HYM) Study.

## Methods

### Participants in the Study

A total of 526 subjects were recruited into the study between February of 2005 and January of 2006. Young men were eligible to participate in the study if they were: (a) 18- to 24 years old; (b) self-identified as gay, bisexual, or uncertain about their sexual orientation and/or reported having had sex with a man; (c) self-identified as Caucasian, African American, or Latino of Mexican descent; and (d) a resident of Los Angeles County and they anticipated living in Los Angeles for at least 6 months.

### Procedures

Using a stratified probability sampling design, young men were recruited at public venues using the sampling design developed by the Young Men's Study (MacKellar, Valleroy, Karon, Lemp, & Janssen, 1996) and later modified by the Community Intervention Trials for Youth study (Muhib et al., 2001). Public venues included settings and events at which YMSM were observed to spend time or "hang out", such as

bars, coffee houses, parks, beaches, and high-traffic street locations; social events such as a picnic or baseball game sponsored by a youth serving community-based agency; and special events such as gay pride festivals. Systematic field observations were first conducted to identify the public venues. During these observations, Type I and II enumerations of young men attending these types of venues were first conducted at different days and times (also see Kipke et al., *in press*). Type I enumerations were conducted by a single study team member in high-traffic venues known to be frequented by large numbers of YMSM. During Type I enumerations, a study team member systematically counted young men who appeared to meet the study's age and race/ethnic eligibility criteria as they entered during a predefined intercept area during a 60 min venue observation period. Type II enumerations were also conducted when the formative research indicated the number of young men attending a venue was questionable or too small to warrant a Type I enumeration. Typically, Type II enumerations were conducted by two study team members working in tandem to count and interview a sample of young men. One team member—the enumerator—counted (clicked) all young men who appeared to meet the study eligibility criteria and entered a predefined intercept area at the venue during two 60 min enumeration periods separated by a one hour time period. The second team member, using a standardized screening instrument, briefly screened a sample of the young men clicked by the enumerator to determine whether they met the study eligibility criteria.

The attendance estimates derived from the Type I and II enumerations were then used to construct a list of four-hour venue-day-time (VDT) sampling periods. For Type I enumerations, only VDTs that had attendance estimates of at least 16 eligible men were included in the monthly sampling frame, to take into account the assumption that as much as 50% of the young men counted might not meet the study eligibility criteria when screened. For Type II enumerations, only VDTs that had a minimum of 8 eligible men were included. Forty-one Type I and 47 Type II enumerations were conducted over a 3-month period, using the enumeration procedures described above. The enumerations yielded a total of 80 VDTs that met the sampling frame inclusion criteria, and represented 36 different venues. Each month, 16–24 VDTs were randomly selected with an equal probability from the updated sampling frames to create monthly sampling calendars. Three to four researchers conducted recruitment during each 4 h sampling event using the monthly sampling calendars.

Young men who entered the venues and appeared to be eligible for the study (e.g., they appeared to be 18–24 years of age) were systematically counted (using a “clicker”) and invited to participate in a brief screening interview, conducted in both English and Spanish, to determine their eligibility. A single researcher or pair of researchers were assigned the task of systematically counting and identifying young men to be screened; these same individuals continued to play this role throughout the course of a recruitment event in an effort to make sure that young men were not approached multiple times. Visual cues, such as facial features and clothing, were used to track those young men who entered, exited, and then reentered the venue multiple times during the course of a sampling event. If a young man was found to meet the study criteria, he was provided with a detailed description of the study. Informed consent and contact information was obtained from those who expressed an interest in participating in the study. All interviews were then scheduled within 2 weeks of the time of recruitment. Young men were stratified to one of the three ethnic groups—African American, Caucasian, and Latino of Mexican descent—based on their reported ethnicity.

In an effort to minimize sampling bias that might be introduced with seasonal variations in attendance patterns at the venues, recruitment was conducted over the course of a 12-month period. A total of 4,648 young men were screened at 203 sampling events, of which 1,371 (30%) met the study eligibility criteria. Of those eligible, 938 (68%) expressed an interest in participating in the study and 526 (38%) actually attended their baseline appointment and were enrolled in the study cohort. Reasons for not agreeing to participate in the study included not having enough time, not planning to stay in Los Angeles, and not feeling comfortable participating in a study related to HIV risk and drug use.

At the time of recruitment, participants were given an appointment date, time and location during which they would participate in the interview, and were provided with information about how to contact the study team. If a participant was unable to commit to an appointment date and time at recruitment, the interviewer obtained a phone number and/or email address and then contacted the participant the following day to schedule a date and time for the assessment. The survey was administered at a location convenient to the participant, either the project office or at a Starbucks café with T-mobile high-speed WiFi wireless Internet service. Before administering the survey, the interviewer reviewed the informed consent, the purpose of the study, and the participation requirements.

The survey was administered in both English and Spanish using computer-assisted interview (CAI) technologies and an on-line testing format. CAI technologies have increasingly been found to improve both the quality of the data being collected and the validity of subjects' responses, particularly to questions of a sensitive nature, such as drug use and sexual behavior (Kissinger et al., 1999; Ross, Tikkanen, & Mansson, 2000; Turner et al., 1998). The CAI software used in this study incorporated sound files that allowed the respondent to silently read questions on the computer screen and/or listen to the questions read through headphones and enter their responses directly into the computer. Administration of the survey required 1 to 1 1/2 h to complete, and participants received \$35 to compensate them for their time and effort. The research received approval from the Committee of Clinical Investigations at Childrens Hospital Los Angeles.

## Measures

The survey instrument was developed to assess a wide range of demographic, developmental, and psychosocial constructs, as well as behaviors such as HIV risk and illicit drug use. The survey was developed using validated measures, scales developed for use in our own previous research (Kipke, Montgomery, Simon, & Iverson, 1997a), and new scales designed specifically for this study. The survey was then pilot tested with a sample of 51 YMSM who met the study criteria, and psychometric analyses were performed, including tests of inter-item reliability, internal consistency using Cronbach's alphas, factor analyses to determine whether factor loadings were consistent with theoretically derived categories, and analyses to compare comparable scales to determine which performed best with our targeted sample. Revisions were then made yielding a final draft that was ultimately used for data collection.

## Independent Variables

*Demographic variables.* Participants were asked to report their age; race/ethnicity; place of birth; immigration status; employment status; their sexual identity and whether they are attending school.

*Residential variables.* Participants were asked if they had ever lived on the streets; where they were currently residing (with family, own apartment, college dorm, with a friend, with a boyfriend/lover, or no regular place to stay); and if they had ever been forced to move

from their family or friend's home because of their sexuality.

## Dependent Variables

*HIV status and STIs.* HIV infection was assessed by asking participants if they had ever been HIV tested, if they had returned for their test result, and if they had ever been told by a test counselor, a doctor, or other health care provider that they were HIV-positive. Participants were also asked if they had ever been told by a doctor or health care provider that they had one of the following STIs: gonorrhea, syphilis, chlamydia, genital herpes, HPV/genital warts, hepatitis, scabies, and crabs. Respondents that reported a prior STI were asked the number of times that they had been diagnosed with each STI.

*Drug use.* Participants were asked if they had ever and more recently (i.e., past 3 months) used alcohol, marijuana, and other drugs, including crack, cocaine, crystal/methamphetamine, ecstasy, poppers, GHB, Ketamine, and "other forms of speed", LSD, PCP, heroin, mushrooms, and prescription drugs without a physician's order (i.e., anti-anxiety, depressants, anti-depressant/sedatives, opiate/narcotics, and attention deficit disorder medications). They were also asked if they had ever engaged in injection drug use (IDU). In order to examine the relationship between residence status, stability, and more serious forms of illicit drug use, we chose to exclude alcohol and marijuana from our analyses given that both of these substances are readily available and commonly used within the general population of adolescents and young adults. In addition, we chose to examine recent use of a subset of drugs called "club drugs" given that club drug use appears to be highly associated with HIV risk-related sexual behaviors (Halkitis, Parsons, & Stirratt, 2001; Koblin et al., 2003; Reback, 1997; Reback, Larkins, & Shoptaw, 2004; Stall & Ostrow, 1989; Thiede et al., 2003; Weber et al., 2003), and thus is believed to be fueling recent waves of HIV infection among MSM (Eichenthal, 2001; Guss, 2000; Halkitis, Fischgrund, & Parsons, 2005; Halkitis et al., 2001; Halkitis, Parsons, & Wilton, 2003; Patterson & Semple, 2003; Reback et al., 2004). For the purpose of this study, club drugs were defined to include: cocaine, crystal/methamphetamine, ecstasy, poppers, GHB, Ketamine, and "other forms of speed."

*HIV risk behaviors.* Respondents were asked about their sexual activity during the past 3 months, including number of sexual partners, if they had engaged in anal insertive and/or receptive sex, and if they had used a

condom. They were also asked if they had exchanged a sexual act or favor for something like money, drugs, or a place to stay at some point during their lifetime and within the past 6 months.

### Data Analyses

Descriptive analyses were first performed to examine sample distributions of demographic characteristics, drug use patterns, and variables describing previous and current residential status and related experiences. Analyses conducted to examine the multivariate normality of continuous variables indicated that the distribution of the continuous dependent variable—i.e., number of sex partners in the last 3 months—was highly skewed. We therefore used a logarithmic transformation (Log10) of the variable before using it in the bivariate and multiple regression analyses. Pearson chi-square tests were then calculated to assess whether previous experience of living on the streets and being forced to move because of one's sexuality would differ based on demographic characteristics and current residential status. Next a series of simple or univariate logistic regression analyses were performed to investigate the extent to which each of the demographic and residential status variables were crudely associated with each of the dichotomous HIV-risk related behaviors (e.g., engaged in unprotected receptive anal intercourse, participated in sex exchange in the last 6 months) and recent drug use behaviors. Bivariate linear regression analyses were used to examine the association between each of the independent variables and the continuous dependent variable (i.e., the number of sex partners in the last 3 months). The Fisher exact test of significance was used to examine the bivariate associations between HIV status, IDU, sex exchange in the last 6 months, and a dichotomized current residential variable (where 1 = not having a regular place to stay and 0 = having a regular place to stay). The residential variable was dichotomized due to the small occurrence of HIV-positive, IDU, and sex exchange in the last 6 months within the four categories of current residential status. Given the number of analyses conducted and in an effort to minimize the potential for Type I error, we used a more conservative alpha ( $p \leq .01$ ) to evaluate the significance of relationships between independent variables and dependent variables from the bivariate analyses. These results were in turn used to evaluate multivariate model inclusion.

Multivariate analyses were performed to evaluate how each independent variable uniquely contributed to the prediction of the dependent variable, while

accounting for the effects of other predictors in the model. Based on the findings from the bivariate-level analyses, separate multiple logistic regression models were built for the following dependent variables: recent drug use (use of any drug except alcohol and marijuana within the past 3 months), recent club drug use (use of a subset of drugs as previously discussed), and ever diagnosed with an STI. Multiple linear regression models were built for number of sexual partners in the last 3 months. We chose not to examine the dependent variables IDU, HIV-positive, and sex exchange in the last 6 months at the multivariate level because the values of events per parameter for these variables are low (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996) due to the small occurrence of these events.

While all of the independent variables currently examined are theoretically derived and identified based on previous research, only those found to be significant at  $p < .05$  or nearly significant at  $p < .10$  with each of the dependent variables at the bivariate level were used for building each of the final multiple regression models (Hosmer & Lemeshow, 2000). In fitting each of the multiple regression models, correlations and collinearity diagnostics were examined to ensure that there is no evidence of multicollinearity among the variables entered. The Hosmer–Lemeshow goodness-of-fit test was used to assess model fit for each of the multiple logistic regression models. To assess overall model fit for multiple linear regression analyses, we used the *F*-test to examine the significance of  $R^2$ , which measures the amount of variance in the dependent variable that is uniquely or jointly explained by the independent variable(s). To determine the final model for each of the multivariate analyses, we retained theoretically significant independent variables unless their inclusion compromised the stability of the model and the model's overall fit.

## Results

### Sample Characteristics

As summarized in Table 1, a total of 526 YMSM were enrolled in the study, including 195 (37%) Caucasian, 126 (24%) African American, and 205 (39%) Latino YMSM of Mexican descent. The average age was 20.1 years, with 39% of the sample being 18–19 years of age. Among the respondents who were of Mexican descent, 30% had been born outside of the US. Eighty-one percent self-identified as gay or some other same-sex sexual identity, 16% identified as bisexual, and 1% identified as straight or heterosexual. In contrast, 71%

**Table 1** Description of the study sample ( $N = 526$ )

Variables	Categories	$n$ (%)
Age	18–19 yrs	206 (39)
	20–21 yrs	196 (37)
	22+ yrs	124 (24)
Race/ethnicity	African American	126 (24)
	Mexican descent	205 (39)
	Caucasian	195 (37)
Immigration Residence	Born in other country	82 (16)
	Family	281 (53)
	Own place/apartment/ dorm	191 (36)
	With friends/partner	36 (7)
Employment	No regular place/other	18 (3)
	In school	113 (22)
	In school, employed	142 (27)
	Employed, not in school	201 (38)
	Not employed, not in school	70 (13)
Sexual identity	Gay	391 (74)
	Other same-sex identity	38 (7)
	Bisexual	85 (16)
	Straight	3 (1)
	DK/RF	9 (2)
Sexual attraction	Males only	371 (71)
	Males and females	144 (27)
	Females only	6 (1)
	Neither, don't know, missing	5 (1)
HIV status	Positive	15 (3)
	Negative	420 (80)
	Don't know	90 (17)
Diagnosed with STI (ever)		132 (25)
Sex exchange	Ever	85 (16)
	Past 6 months	33 (6)
Street economy (ever) <sup>a</sup>		110 (21)
Living on the street (ever)		36 (7)
Unprotected receptive anal intercourse (past 3 months)		188 (36)
Number of sex partners (past 3 months)		$M = 3.37,$ $SD = 7.15$

<sup>a</sup> Street economy refers to getting money for engaging in a variety of activities from drug dealing, prostituting, panhandling, mugging, to stealing and selling items on the street

of the sample reported being sexually attracted to males exclusively, 27% to both males and females, and 1% to females exclusively. A quarter (25%) of the sample had been diagnosed with at least one STI in their lifetime, while 3% reported that they had tested HIV+, 80% reported being HIV–, and 17% reported that they did not know their HIV status. Remarkably, 16% reported having exchanged sex for money or something else in their lifetime, with 6% reporting sex exchange within the past 6-months. Thirty-six percent reported experiencing unprotected receptive anal sex within the past 3 months, and the mean number of partners reported within that time frame was 3.37.

#### Drug Use, STIs, and HIV Risk Behaviors

Nearly all participants (91%) reported lifetime use of alcohol, 64% reported lifetime use of marijuana, and

50% of respondents reported having ever used a drug other than marijuana. Of those who had ever used a drug (not including marijuana), 58% reported use within the previous 3 months and 49% within the past 30 days. Club drugs and prescription drugs were the most popular drugs used, with 41% reporting lifetime use of club drugs (24% reported use of cocaine, 20% reporting use of crystal methamphetamine, 22% reported use of ecstasy), and 36% reporting lifetime use of prescription drugs without a physician's order (17% reported use of an opiate/narcotic, 14% reported use of an anti-anxiety, 8% anti-depressants/sedatives). In contrast, lifetime use of other drugs, such as crack (5%), LSD (5%), and heroin (2%) was low. Only 2% reported having ever engaged in IDU. The mean age of initiation of alcohol and marijuana was 16.5 and 16.8, respectively, with the mean age of initiation of any club drug being 18.3 years, the mean age of

**Table 2** Lifetime and recent illicit drug use and injection drug use

Drugs	Lifetime use <i>n</i> (%)	Use past 3 months <sup>a</sup> <i>n</i> (%)
<i>Cocaine</i>	124 (24)	51 (41)
<i>Crystal/methamphetamine</i>	103 (20)	45 (44)
<i>Ecstasy</i>	114 (22)	41 (36)
<i>GHB</i>	26 (5)	8 (31)
<i>Poppers, nitrates</i>	78 (15)	30 (39)
<i>Ketamine</i>	34 (76)	7 (21)
<i>Other forms of speed</i>	47 (9)	9 (20)
Viagra	30 (6)	8 (27)
Anti-anxiety (Valium, Xanax)	74 (14)	24 (32)
Depressants (Nembutal, Seconal)	26 (5)	3 (12)
Anti-depressants/sedatives	41 (8)	9 (22)
Opiates/narcotics (Vicodin, Oxycontin, Codiene)	90 (17)	34 (38)
Attention deficit disorder	52 (10)	15 (29)
Crack	25 (5)	5 (20)
LSD	26 (5)	3 (12)
CP	8 (2)	2 (25)
Mushrooms	80 (15)	16 (20)
Heroin	8 (2)	4 (50)
Other inhalants (NO <sub>2</sub> , paint)	55 (11)	15 (27)
Rohypnol	3 (1)	2 (67)
Other drugs	29 (6)	12 (40)
Injection drug use (IDU)	12 (2)	

Note: Drugs shown in italics are grouped together as “club drugs” in the present analyses

<sup>a</sup> The denominator is lifetime drug user

initiation of use of any prescription drug being 18.3, and the mean age of first injecting drugs was 18 years. Please see Table 2 for lifetime and recent (past 3 months) use of specific drugs.

### Residential Status

Over half (53%) of the respondents reported living at home with their family, 36% lived in their own apartment or in a college dorm, 7% lived with a friend or sexual partner, and 3% reported having no regular place to stay. Moreover, 7% of respondents reported having ever lived on the streets and 17% reported that they had been forced to move from a friend's or family's home because of their sexuality, as presented in Table 3. The amount of time spent on the streets among those who had lived on the street, ranged from 2 weeks to 10 years, with the mean length of time on the streets being 52 months. Results from chi-square analyses revealed a trend that African American respondents were more likely to have ever lived on the streets, and yet they were also less likely to have been forced to move because of their sexuality. Respondents who reported currently having no regular

place to stay were also significantly more likely to have ever lived on the street ( $\chi^2(3) = 113.61, p \leq .001$ ) and a trend that suggests that they were forced to move because of their sexuality.

### Bivariate-level Analyses

Simple odds ratios demonstrating crude relationships between independent variables and recent drug use, as well as club drug use are presented in Table 4. These odds ratios revealed that respondents who had ever lived on the streets were significantly more likely to report recent drug use as compared to those who had not (OR = 2.45, CI = 1.24, 4.86,  $p \leq .01$ ). In addition, respondents who currently live in their own apartment/college dorm were significantly more likely to report recent drug use as compared to those who lived with their family (OR = 1.78, CI = 1.18, 2.69,  $p \leq .01$ ). Although not reaching significance at the level of  $p \leq .01$ , there were a number of trends suggesting that respondents who had ever been forced to move because of their sexuality, as well as those who lived with a friend or sexual partner or who had no regular place to stay were more likely report recent drug use as compared to respondents who lived at home with their family. In contrast, African American (OR = 0.36, CI = 0.21, 0.61,  $p \leq .001$ ) and Latino (OR = 0.54, CI = 0.35, 0.83,  $p \leq .01$ ) respondents were significantly less likely than Caucasian respondents to report recent drug use. This same pattern of risk was also found for recent club drug use, although in these analyses, respondents who had no regular place to stay were significantly more likely to report recent club drug use (OR = 3.7, CI = 1.39, 9.84,  $p \leq .01$ ) than those living at home with family.

Odds ratios for residential status by sexual risk behaviors revealed that respondents who had ever lived on the streets (OR = 3.43, CI = 1.32, 8.94,  $p \leq .01$ ) and those who did not have a regular place to stay (OR = 6.59, CI = 2.2, 19.8,  $p \leq .01$ ) were significantly more likely to have engaged in sex exchange within the past 6 months,<sup>1</sup> as presented in Table 5. Younger (OR = 0.18, CI = 0.11, 0.32,  $p \leq .001$ ) and Latino (OR = 0.49, CI = 0.30, 0.79,  $p \leq .01$ ) respondents were also significantly less likely to have been diagnosed with an STI, while respondents who currently lived in their own apartment/college dorm were significantly more likely to have been diagnosed with an STI (OR = 1.89, CI = 1.24, 2.88,  $p \leq .01$ ). In addition, respondents who

<sup>1</sup> These unadjusted odds ratio should be interpreted with caution because of the small number of respondents who reported being HIV-positive.

**Table 3** Comparison of demographic and residential variables by ever having lived on the streets and ever forced to move because of sexuality

	Total sample	Ever lived on the street		Ever forced to move because of sexuality	
	<i>N</i> = 526	<i>n</i> = 36		<i>n</i> = 90	
	%	%	$\chi^2$ (df)	%	$\chi^2$ (df)
Age					
22+ yrs	24	10	1.53 (2)	21	4.58 (2)
20–21 yrs	37	7		16	
18–19 yrs	39	4		16	
Race/ethnicity					
Caucasian	37	4	8.30 (2)*	20	1.46 (2)
Mexican descent	39	7		17	
African American	24	12		14	
Current residence					
Living with family	53	2	<b>113.61 (3)***</b>	14	9.47 (3)*
Own apartment/dorm	36	7		20	
Living with friend, partner	7	14		17	
No regular place to stay	3	67		39	

Note: Pearson  $\chi^2$  significance test was used; Bolded  $\chi^2$  denotes significance at  $p \leq .01$

\*  $p \leq .05$ ; \*\*\*  $p \leq .001$

**Table 4** Unadjusted odds ratios for drug use

	Drug use <sup>a</sup> (past 3 months)				Club drug use <sup>b</sup> (past 3 months)				IDU (ever)			
	<i>n/N</i>	(%)	OR	(95% CI)	<i>n/N</i>	(%)	OR	(95% CI)	<i>n/N</i>	(%)	OR	(95% CI)
Age												
22+ yrs	43/124	(35)	1		38/124	(31)	1		2/124	(2)	1	
20–21 yrs	52/196	(27)	.68	(.40–1.06)	42/196	(21)	.62 <sup>+</sup>	(.37–1.03)	5/196	(3)	1.61	(.31–8.41)
18–19 yrs	53/206	(26)	.65 <sup>+</sup>	(.42–1.11)	41/206	(20)	.56*	(.34–.94)	5/206	(2)	1.52	(.29–7.94)
Race/ethnicity												
Caucasian	74/194	(38)	1		58/194	(30)	1		5/194	(3)	1	
Mexican descent	51/205	(25)	<b>.54**</b>	(.35–.83)	43/205	(21)	.62*	(.40–.98)	6/205	(3)	1.15	(.34–3.82)
African American	23/127	(18)	<b>.36***</b>	(.21–.61)	20/127	(16)	<b>.44**</b>	(.25–.77)	1/127	(1)	0.3	(.04–2.60)
Ever lived on streets												
No	131/490	(27)	1		104/490	(21)	1		9/490	(2)	1	
Yes	17/36	(47)	<b>2.45**</b>	(1.24–4.86)	17/36	(47)	<b>3.32***</b>	(1.67–6.62)	3/36	(8)	4.85*	(1.25–18.77)
Ever forced to move												
No	114/435	(26)	1		93/435	(21)	1		7/435	(2)	1	
Yes	34/91	(37)	1.68*	(1.04–2.70)	28/91	(31)	1.63*	(.99–2.70)	5/91	(6)	3.55*	(1.10–11.44)
Current residence												
Living with family	62/281	(22)	1		50/281	(18)	1		10/497	(2)	1	
Own apartment/dorm	64/191	(34)	<b>1.78**</b>	(1.18–2.69)	52/191	(27)	1.73*	(1.11–2.69)				
Living with friend, partner	14/36	(39)	2.25*	(1.09–4.65)	11/36	(31)	2.03 <sup>+</sup>	(.94–4.40)				
No regular place to stay	8/18	(44)	2.83*	(1.08–7.47)	8/18	(44)	<b>3.7**</b>	(1.39–9.84)	2/18 <sup>c</sup>	(11)	6.21 <sup>+</sup>	(1.28–30.7)

Note: Bolded OR denotes significance at  $p \leq .01$

<sup>+</sup>  $p < .10$ ; \*  $p \leq .05$ ; \*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

<sup>a</sup> Drugs used with exception of marijuana

<sup>b</sup> Club drug use and drug use are not mutually exclusive categories

<sup>c</sup> The categories for current residence were collapsed into “no regular place to stay” and “have a regular place to stay” in order to increase cell sizes in the calculation of the unadjusted odds ratio for variable IDU; Fisher exact test of significance was used for analyses of these variables

had ever lived on the streets (OR = 7.58, CI = 2.41, 23.80,  $p \leq .001$ ) and who did not have a regular place to stay (OR = 12.36, CI = 3.44, 44.48,  $p \leq .001$ ) were

significantly more likely to report being HIV-positive as compared to those living with their family.<sup>1</sup> Moreover, respondents who had ever been forced to move



**Table 5** Unadjusted odds ratios for sexual risk behaviors, STI, and HIV

	Unprotected receptive anal intercourse <sup>a</sup> (past 3 months)				Sexual partners (past 6 months)				STI (ever)				HIV+							
	n/N	(%)	OR	(95% CI)	M	SD	B	(95% CI)	n/N	(%)	OR	(95% CI)	n/N	(%)	OR	(95% CI)	n/N	(%)	OR	(95% CI)
<b>Age</b>																				
22+ yrs	39/86	(45)	1		4.77	10.52			7/124	(6)	1		52/124	(42)	1		8/110	(7)	1	
20–21 yrs	72/142	(51)	1.24	(.72–2.12)	4.25	7.48	–0.04	(–12–04)	9/196	(5)	0.8	(.29–2.22)	56/196	(29)	0.55*	(.35–.89)	5/160	(3)	0.41	(.13–1.29)
18–19 yrs	77/142	(54)	1.43	(.83–2.44)	3.45	5.35	–0.06	(–15–01)	17/206	(8)	1.5	(.61–3.74)	21/206	(12)	<b>0.18***</b>	(.11–.32)	2/165	(1)	0.16*	(.03–.75)
<b>Race/ethnicity</b>																				
Caucasian	78/141	(55)	1		3.75	4.77			13/194	(7)	1		29/194	(29)	1		3/155	(3)	1	
Mexican descent	66/138	(48)	0.74	(.46–1.19)	3.74	6.41	–0.04	(–11–03)	9/205	(4)	0.64	(.27–1.53)	34/205	(17)	<b>0.49**</b>	(.30–.79)	4/168	(2)	1.24	(.27–5.61)
African American	44/91	(48)	0.76	(.44–1.28)	5.26	12.57	–0.04	(–12–04)	11/127	(9)	1.32	(.57–3.05)	42/127	(33)	1.22	(.75–1.97)	8/112	(7)	3.9*	(1.01–15.04)
Ever lived on streets																				
No	169/343	(49)	1		3.59	5.06			27/490	(5)	1		122/490	(25)	1		10/404	(2)	1	
Yes	19/27	(70)	2.45*	(1.04–5.74)	10.21	21.46	0.14*	(.02–.26)	6/36	(17)	<b>3.43***</b>	(1.32–8.94)	10/36	(28)	1.16	(.54–2.48)	5/31	(16)	<b>7.58***</b>	(2.41–23.80)
Ever forced to move																				
No	154/300	(51)	1		3.64	5.20			24/435	(6)	1		102/435	(23)	1		11/365	(3)	1	
Yes	34/70	(48)	0.9	(.53–1.51)	5.85	13.75	<b>0.10**</b>	(.02–.18)	9/91	(10)	1.88	(.84–4.19)	90/91	(33)	1.61+	(.98–2.62)	4/70	(6)	1.95	(.60–6.31)
<b>Current residence</b>																				
Living with family	98/194	(51)	1		3.62	5.59			28/480	(6)	1		56/281	(20)	1		11/408	(3)	1	
Own apartment/dorm	71/136	(52)	1.07	(.69–1.66)	3.45	3.99	0.06+	(–01–.12)					61/191	(32)	<b>1.89**</b>	(1.24–2.88)				
Living with friend, partner	10/24	(42)	0.7	(.30–1.65)	4.11	6.07	0.03	(–09–.15)					9/36	(25)	1.34	(.60–3.01)				
No regular place to stay	9/16	(56)	1.26	(.45–3.82)	17.43	29.34	<b>0.31***</b>	(.14–.48)	5/18 <sup>b</sup>	(28)	<b>6.59**</b>	(2.20–19.80)	6/18	(33)	2.01	(.72–5.59)	4/16 <sup>b</sup>	(25)	<b>12.36***</b>	(3.44–44.48)

Note: Bolded OR or B denotes significance at  $p \leq .01$

+  $p < .10$ ; \*  $p \leq .05$ ; \*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

a Among respondents who had ever engaged in anal intercourse

b The categories for current residence were collapsed into “no regular place to stay” and “have a regular place to stay” in order to increase cell sizes in the calculation of the unadjusted odds ratio for variables sex exchange in the last 6 months and HIV status; Fisher exact test of significance was used for analyses of these variables

because of their sexuality ( $F(1, 483) = 6.5, p \leq .01; B = 0.104, CI = 0.02, 0.18$ ) and/or who had no regular place to stay ( $F(3, 481) = 4.7, p \leq .001; B = 0.31, CI = 0.14, 0.48$ ) reported a significantly greater number of sexual partners during the past 3 months than respondents who had never been forced to leave their home or who currently lived with their family.

Multivariate Analyses

Results from the multiple logistic and multiple linear regression analyses again revealed that African American (OR = 0.31, CI = 0.17, 0.55,  $p \leq .001$ ) and Latino (OR = 0.59, CI = 0.37, 0.94,  $p \leq .05$ ) respondents were significantly less likely to report recent drug use, as presented in Table 6. African American respondents were again found to be significantly less likely to report recent use of club drugs (OR = 0.39; CI = 0.21, 0.72,  $p \leq .01$ ), while respondents who had ever lived on the streets were significantly more likely to report recent use of club drugs (OR = 2.79, CI = 1.21, 6.45,  $p \leq .05$ ). As was the case at the univariate level, younger (OR = 0.21, CI = 0.12, 0.38,  $p \leq .001$ ) and Latino (OR = .57, CI = .34, .97,  $p \leq .05$ ) respondents were significantly less likely to report that they had ever been diagnosed with an STI. At the multivariate level, similar to what was found at the univariate level, having ever been forced to move because of their sexuality ( $F(5, 479) = 3.69, p \leq .05; B = 0.08, CI = 0.00, 0.16$ ) and/or having no regular place to stay ( $F(5, 479) = 3.69, p \leq .01; B = 0.27, CI = 0.08, 0.47$ ) was associated with a significantly greater number of sexual partners during the past 3 months. The results demonstrated an acceptable overall fit for all of the multiple logistic regression models presented (the  $p$  value for Hosmer–Lemeshow Goodness-of-fit  $\chi^2$  statistics range from 0.31 to 0.96). Results from the multiple linear regression model also suggested that the independent variables included in the model significantly contributed to explaining the variance for number of sex partners during the last 3 months.

Discussion

During the developmental period that is now being called “emerging adulthood” (Arnett, 2000), young people are still very much in need of their family’s support, both emotional and financial. Without this support, they are vulnerable to a wide range of risks and poor health outcomes (Flaherty & Richman, 1986; Kobak & Sceery, 1988; Sarason et al., 1993). In this

**Table 6** Multivariate regression analyses of residential status as a predictor of drug use and HIV risk behaviors

	OR	(95 CI)
<b>A. Multiple logistic regression models</b>		
Model 1: Recent drug use (past 3 months)		
Age		
22+ yrs	1.00	
20–21 yrs	0.80	(.48–1.35)
18–19 yrs	0.80	(.47–1.33)
Race/ethnicity		
Caucasian	1.00	
Latino of Mexican descent	<b>0.59*</b>	(.37–.94)
African American	<b>0.31***</b>	(.17–.55)
Ever lived on the street		
No	1.00	
Yes	2.17 +	(.94–4.98)
Forced to move because of sexuality		
No	1.00	
Yes	1.39	(.84–2.29)
Current residence		
Living with family	1.00	
Own apartment	1.35	(.85–2.14)
Living with friend, partner	1.96 +	(.91–4.20)
No regular place to stay	2.07	(.61–6.4)
<i>Hosmer–Lemeshow goodness-of-fit <math>\chi^2</math> (8, 526) = 9.42, p = 0.31</i>		
Model 2: Recent club drug use (past 3 months)		
Age		
22+ yrs	1.00	
20–21 yrs	0.71	(.41–1.21)
18–19 yrs	0.68	(.39–1.18)
Race/ethnicity		
Caucasian	1.00	
Latino of Mexican descent	0.69	(.42–1.14)
African American	<b>0.39**</b>	(.21–.72)
Ever lived on streets		
No	1.00	
Yes	<b>2.79*</b>	(1.21–6.45)
Ever forced to move because of sexuality		
No	1.00	
Yes	1.29	(.76–2.20)
Current residence		
Living with family	1.00	
Own apartment/dorm	1.31	(.80–2.15)
Living with friend, partner	1.69	(.75–3.8)
No regular place to stay	2.12	(.63–7.14)
<i>Hosmer–Lemeshow goodness-of-fit <math>\chi^2</math> (8, 526) = 2.53, p = 0.96</i>		
Model 3: STI (ever)		
Age		
22+ yrs	1.00	
20–21 yrs	<b>0.63**</b>	(.39–1.02)
18–19 yrs	<b>0.21***</b>	(.12–.38)
Race/ethnicity		
Caucasian	1.00	
Latino of Mexican descent	<b>0.57*</b>	(.34–.97)
African American	1.25	(.74–2.12)
Ever forced to leave because of sexuality		
No	1.00	
Yes	1.58 +	(.93–2.67)
Current residence		
Living with family	1.00	
Own apartment/dorm	1.16	(.72–1.86)
Living with friend, partner	1.01	(.43–2.37)
No regular place to stay	1.02	(.34–3.08)

**Table 6** continued

<i>Hosmer–Lemeshow goodness-of-fit</i> $\chi^2$ (8, 526) = 3.53, $p = 0.90$		
	B(SE)	(95 CI)
B. Multiple linear regression model		
Model 4: # of Sex partners (past 3 months)		
Ever lived on streets		
Yes	0.02(.07)	(-.12–.16)
Ever forced to move because of sexuality		
Yes	<b>0.08*</b> (.04)	(.00–.16)
Current residence		
Living with family		
Own apartment/dorm	0.05(.03)	(-.02–.11)
Living with friend, partner	0.02(.06)	(-.10–.15)
No regular place to stay	<b>0.27**</b> (.10)	(.08–.47)
$R^2 = .04$ ; $F(5, 479) = 3.69$ , $p = .003$		

Note: Bolded OR or B denotes significance at  $p \leq .05$

+  $p < .10$ ; \*  $p \leq .05$ ; \*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

B = Unstandardized regression coefficient; SE(B) = Standard error of B; OR = odds ratio; CI = confidence interval; Multiple regression simultaneously adjusted for variables included in the model

study of YMSM, we found that a sizable percentage of the sample had experienced some type of residential instability at some point in their lives, with 17% having been forced to move from their family's or friend's home because of their sexuality, 7% had ever lived on the streets, and 3% currently had no regular place to stay. These measures of residential instability were in turn found to be significantly associated with HIV risk-related behaviors (i.e., recent club drug use, number of sexual partners and history of STIs). Furthermore, living at home with family was found to be protective against risk behaviors, such as number of sexual partners.

While these findings speak to the importance of residential status as a risk (or protective) factor for illicit drug use and HIV risk, there are a number of limitations of this study that need to be acknowledged. First, the findings rely on respondents' self-reported behaviors, which cannot be independently verified. Self-report data regarding respondents' involvement in risky behaviors may have underestimated the true prevalence given that many of these behaviors, such as drug use, are illegal and socially undesirable. We expect though that the use of audio-assisted CAI may have minimized the underreporting in these behaviors. A second limitation is that this study did not collect biological samples to verify HIV status and relied on self-reported HIV status. Recent studies that did collect biological samples, using the same recruitment methodology, found high rates of unrecognized HIV infection among YMSM, especially YMSM of color (Bingham et al., 2003; Centers for Disease Control and Prevention, 2005a). In addition, the small number of

occurrences in some of our variables of interest (e.g., HIV-positive status, IDU, not having a regular place to stay) limited our ability to test more complex relationships between residential status, residential stability, and sexual risk and drug use behaviors. Moreover, the data are cross-sectional and therefore do not contain information about the temporal relationship between residential history and stability, drug use, and HIV risk behaviors. Thus, no statements can be made about the causal relationship between these variables. Finally, although this sample is likely to be representative of YMSM who can be recruited through gay-identified venues, this sample certainly is not representative of the larger YMSM population. Indeed, drug use behaviors may be elevated within this segment of the YMSM population given that they were primarily recruited from gay bars and clubs where they might have increased access to illicit drugs, particularly club drugs. Future research should continue to use venue- and non-venue-based sampling techniques that bring comparable rigor to further evaluate risk and protective behaviors among YMSM.

Despite these limitations, this study provides further evidence that YMSM are vulnerable to residential instability, which may in turn serve as an important source of risk. Indeed, respondents who had ever lived on the street were more than twice as likely to report recent use of an illicit drug and nearly three times more likely to report recent club drug use. Moreover, respondents forced to leave their home were significantly more likely to report having had a greater number of sexual partners within the past 3 months. Finally, respondents who were precariously housed (i.e., without a regular place to say) similarly reported having had a significantly greater number of sexual partners during the past 3 months.

These findings are consistent with other studies that report that as many as 35% of youth living on the streets self-identify as gay, lesbian, or bisexual, and that youth who are living on the streets are at exceedingly high risk for drug use (Kipke et al., 1997b; Rice, Milburn, & Rotheram-Borus, 2005), drug abuse (Cochran, Steward, Ginzler, & Cauce, 2002; Kipke et al., 1997a), and involvement in HIV risk behaviors (Cochran et al., 2002; Kipke et al., 1997b; Rotheram-Borus, Rosario, Van Rossem, Reid, & Gillis, 1995), although this is the first study to examine the residential status and associated risks within a large, ethnically diverse sample of YMSM.

These findings have important implications with respect to both future research and prevention efforts needed to ensure that these young people do not end up on the streets or precariously housed. Indeed, future

research is needed to longitudinally track the residential trajectories of these young people, as well as the circumstances that result in residential instability so that prevention interventions can be better targeted to specific segments of this population in order to prevent residential instability and associated risk. One strategy for prevention might be to target interventions to the parents and families of young gay, lesbian, bisexual, transsexual, and questioning youth in an effort to ameliorate the conflict that can arise as an adolescent begins to explore same-sex relations. By introducing such interventions early, one could potentially prevent these youth from prematurely leaving their homes and becoming homeless or precariously housed. Another strategy is to target the interventions directly to youth, by identifying and intervening with youth early on, before they become homeless, to ensure that they do not experience gaps in residential stability. Regardless of the particular intervention approach, without such efforts, YMSM will remain vulnerable to a wide range of risks, including risk for HIV infection.

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