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Claire Burns-Lynch Date

Demographic and Behavioral Correlates of Unstable Housing among Men who Have Sex with Men in the United States

By

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Master of Public Health

Epidemiology

_____

Jodie Guest, PhD, MPH
Committee Chair

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By

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Bachelor of Science
Temple University
2016

Thesis Committee Chair: Jodie Guest, PhD, MPH

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Demographic and Behavioral Correlates of Unstable Housing among Men who Have Sex with Men in the United States

By Claire Burns-Lynch

Introduction Men who have sex with men (MSM) and persons who experience homelessness are disproportionately affected by HIV. Risk factors for HIV, such as substance use, mental illness, and history of incarceration, are higher among those experiencing unstable housing. This analysis evaluated the association between HIV status and having experienced unstable housing in the past 12 months among MSM in the United States and assessed other factors associated with unstable housing.
Methods Data from the 2019 American Men's Internet Survey were used. Chi-square analysis was used to compare the prevalence of various demographic and behavioral characteristics between stably and unstably housed groups. Bivariate relationships between all predictors and housing status were done among the full sample and then separately stratified by HIV status. Logistic regression evaluating the association between HIV status and experiences of unstable housing was performed.
Results Housing instability was experienced by 7.6% of respondents. Unstably housed individuals were more likely to be a race other than white and younger, make under $40,000, used illicit drugs, either paid for or been paid for sexual acts, or have a mental illness. HIV status was not significantly associated with unstable housing (PR=0.92). Race, age (15-24 years), income, education, exchange sex, and mental illness were associated with unstable housing. Black race was associated with a substantial increase in risk of unstable housing (PR=3.26) among MSM living with HIV (PLHIV) compared to Black MSM not living with HIV (PR=1.48). Mental illness prevalence was higher in MSM not living with HIV (PR=2.74) compared to PLHIV (PR=1.33).
Discussion Consistent with other literature, factors significantly associated with unstable housing were: age, race, income, education, exchange sex, and mental illness. MSM, MSM of color, MSM with lower education levels, those using drugs, and those with mental illness are at increased risk of unstable housing and must be targeted by prevention measures and messaging. Limitations of the study include that homelessness, strictly defined, was uncommon in this population, potentially limiting the association between HIV status and unstable housing. Additionally, the online enrollment of participants could have resulted in an unrepresentative sample of MSM experiencing unstable housing.

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Introduction

Men who have sex with men (MSM) are disproportionately affected by HIV, accounting for 69% of HIV diagnoses in 2018.[1] MSM also experience high rates of homelessness and homelessness itself is associated with increased risk of HIV.[2] This suggests that MSM who are homeless are at an even higher risk for HIV than those with either factor alone. As the number of people who have experienced homelessness is increasing, it is important to study how this population is similar to and differs from those who have never experienced housing instability. The HIV risk behaviors of this group are likely to differ due to the challenges they experience due to unstable housing.

Many risk factors for HIV are found in greater concentrations among people experiencing homelessness. Homeless lesbian, gay, bisexual, and transgender (LGBT+) individuals experience stigma, discrimination, and victimization at higher rates than their non-LGBT+ homeless counterparts.[3,4] Rates of substance use are higher among those who identify as LGBT+ in homeless populations than among those who do not identify as sexual minorities.[5] Higher rates of incarceration are reported among young substance-using MSM, which can perpetuate negative health and relationship outcomes.[6] Prevalence of mental illnesses are also substantially elevated among LGBT+ homeless individuals.[5,7]

Similarly, homelessness is a significant risk factor for HIV infection and presents additional challenges with respect to prevention, diagnosis and treatment of HIV.[8] The seroprevalence of HIV is higher among homeless populations than in the general population, with estimates ranging from 1.8 to 20%.[8] Race is another factor that influences both risk of HIV and homelessness. Black MSM, a group with a disproportionately high burden of HIV, are also overrepresented in the homeless population. Black persons comprise approximately 40% of the US homeless population.[9] Among Black MSM, linkage to care was similar in both the homeless and non-homeless groups, however, Black MSM who were homeless were more likely to report difficulties adhering to their antiretroviral

therapy.[10] Studies have found the homeless Black MSM and veterans were actually more likely to have been tested for HIV than their stably housed counterparts[10], but additional studies among people living with HIV (PLHIV) have shown that adherence, viral suppression and clinical outcomes are worse among those who have unstable housing.[8,11]

A significant amount of research has been conducted on LGBT+ homeless youth and risk behaviors among this population have been well studied. LGBT+ individuals are overrepresented in the homeless population, accounting for an estimated 22.4 to 40% of homeless youth.[5] Homeless youth report a high prevalence of childhood sexual abuse, rejection by their families, and stigma. Among youth aged 13-25 years, risk of homelessness was higher for LGBT+ individuals and among those who were Black/African American or latino.[12] Homeless youth who identify as LGBT+ are more likely to have difficulty finding necessities such as food and temporary shelter than their heterosexual counterparts and are much more likely to engage in survival or exchange sex than heterosexual youth.[12,13,14] Survival and exchange sex are terms used when sex is traded for items necessary to live such as food, water, and shelter, or other forms of non-monetary payment.[15] The differences in experience while homeless for heterosexual and LGBT+ youth has often been attributed to trust in organizations and discrimination on the basis of sexual orientation from shelters or other service providers, highlighting the need for LGBT+ friendly shelters and organizations.[12,14]

Despite the research on LGBT+ homeless youth, there is still a gap in the literature regarding homeless LGBT+ adults. Studies have shown that LGBT+ adults are also more likely to experience violence and sexual assault than comparable non-LGBT+ homeless adults.[3] They are also more likely to have slept on the street or in jail in the past year.[3] Some studies have reported no substantive differences in reason for becoming homeless among adults between those who are LGBT+ and those who are not, but do show increased risk for domestic violence, abuse, and self-reported physical and

psychiatric conditions.[5] The needs of LGBT+ adults may not be the same as those for LGBT+ youth, so it essential that research is done to reduce the gaps in knowledge about this population.

The American Men's Internet Survey (AMIS) is an HIV behavioral survey that collects data about behavioral and demographic information from MSM aged 15 years or older.[16] Participants for AMIS are recruited online with advertisements on dating apps and social media and via email[16]. This national sample comprises a diverse group of MSM providing a more generalizable set of data to assess the factors associated with unstable housing among this vulnerable group. With the increasing number of MSM who use the internet to find sexual partners, utilizing the internet to conduct this survey increases the chances of capturing responses from this population. One study found that one quarter of homeless youth identifying as a sexual or gender minority report using apps to find partners when engaging in survival and exchange sex and the majority of homeless youth has access to the internet.[13] This analysis will compare evaluate the association between unstable housing and HIV status. It will also compare prevalence of demographic variables (e.g., race, socioeconomic status, educational level), behavioral risk factors (e.g., substance use, transactional sex, unsafe sex practices), and mental health diagnoses among MSM who reported having experienced homelessness or housing instability in the past 12 months and those who had stable housing. With additional information on risk factors among this population, we can continue to better outline particular populations for targeted prevention and intervention and understand the unique barriers and challenges that affect unstably housed MSM.

Methods

Sample

The American Men's Internet Survey is an online survey of American MSM aged 15 years or older. Participants were recruited via e-mail blasts and advertisement banners on a variety of websites. The methodology is described in further detail in the initial paper.[16] The survey was completed by 10,129 MSM. Forty-eight were excluded because they did not provide information about housing

status in the past 12 months. An additional 2,777 were excluded due to unknown HIV status. Thus, 7,304 individuals were included in the final analysis.

Due to the small number of individuals who experienced homelessness, having experienced unstable housing or homelessness in the past 12 months was considered for the outcome. Three survey questions were combined to create the outcome variable: current housing status, experiencing housing instability in the past 12 months, and experiencing homelessness in the past 12 months.

Outcome variable creation

The term 'unstably housed' was used generously to describe any respondent who reported consistent homelessness, temporary homelessness, transitional housing, or couch surfing in the past 12 months. In cases where individuals reported not having experienced homelessness or housing instability, but answers to current housing status were considered to have met the definition for homelessness or housing instability, they were categorized as having had experienced homelessness or housing instability in the past 12 months.

Statistical Analysis

A significance level of 0.05 was used for all analyses. First, the group who had experienced housing instability and the group who had not experienced housing instability in the past 12 months were compared using Chi-square statistic to detect statistically significant differences between the two groups. Second, crude analyses were done looking at the bivariate relationships between each predictor and the outcome. Third, a logistic model evaluating the association between HIV status and experiences of unstable housing was created. Backwards elimination and likelihood ratio tests were used to eliminate variables from the model. The final model fit was assessed using the Holsmer-Lenshow test. Finally, crude analyses were done looking at bivariate relationships between each predictor and the outcome, stratified by HIV Status. This method was used to identify differences in

predictors for unstable housing for those who are living with HIV compared to those who are not living with HIV.

Results

Demographics

Of the 7,304 individuals who had information on housing and HIV status, 153 indicated that they had been homeless in the past 12 months and 525 that they had experienced unstable housing in the past 12 months. 555 (7.6%) individuals indicated that they experienced housing instability in the past 12 months while 6,749 (92.4%) indicated that they did not.

Characteristics of the individuals included in the analysis are shown in *Table 1*. The average age among respondents was 36.8 years. Those with stable housing were older (average age = 37.3 years) compared to those who were unstably housed (average age = 30.9 years) ($p<0.0001$). The largest subgroup of age among unstably housed group was between 15-24 years old (46.0%), while it was 40+ years among stably housed individuals (39.0%). The sample was comprised of 5.8% non-Hispanic Black individuals, 15.0% Hispanic, and 72.1% non-Hispanic white MSM. Those who indicated another race or selected multiple races were categorized as other due to the small sample size in those groups (7.1%). While the majority of the sample was non-Hispanic white, the proportion of the sample who identified as non-Hispanic white (61.3%) was smaller among the unstably housed group compared to those who were stably housed (73.0%) ($p<0.0001$). 8.4% were living with HIV. There was no statistically significant difference between groups with respect to HIV Status or reporting having had unprotected anal sex in the past 12 months.

Those who had experienced housing instability in the past 12 months were more likely to be Black, Hispanic, or another race, more likely to be 15-24 (46% vs 27.4%), make under $20,000 (34.5% vs 11.6%), have used illicit drugs (46.7% vs 36.4%), have either paid for or been paid for sexual acts (16.5% vs 6.5%), or score 13 or above on the K-6 mental distress scale (33.3 vs 16.1) when compared

to those who had not experienced housing stability in the past 12 months. Among the sample as a whole, the majority of respondents reported income of $40,000 or more (66.3%). This was reflected in the stably housed group, where 68.8% reported income over $40,000. However, among the unstably housed group, 63.9% reported income of below $40,000 ($p<0.0001$). Educational attainment also differed between groups. While a larger percentage of individuals in the unstably housed group had some college or technical degree (43.5 vs 34.1%), substantially less of the unstably housed group had a college degree or postgraduate education (28.1% vs 53.4%) ($p<0.0001$). Among stably housed individuals, 36.4 of individuals indicated that they had used illicit drugs in the past 12 months, compared to almost half of the unstably housed group (46.7%) ($p<0.0001$). The prevalence of mental illness, measured by the K-6 mental stress scale, among the unstably housed is roughly twice that of those who are stably housed (33.3% vs 16.1%). Having any STI diagnosis in the past 12 months was unlikely overall (13.1%), though the prevalence was higher among those who were unstably housed compared to those who were not (17.1% vs 12.8%)($p=0.0038$).

Bivariate Analysis

In bivariate analysis, any individuals under 40 years old were at increased risk to have had experienced unstable housing in the past 12 months (PR=2.77, 95% CI 2.22 – 3.44, $p<0.0001$; PR=1.78, 95% CI 1.35 – 2.36, $p<0.0001$; PR=1.28, 95% CI 0.96 – 1.70, $p<0.0927$) (Table 2). Race was significantly associated with housing instability. All ethnic groups had a higher prevalence of experiencing homelessness in the past 12 months when compared to non-Hispanic white MSM ($PR_{\text{Black vs white}}$= 1.80, 95% CI: 1.30 – 2.49; $PR_{\text{Hispanic vs white}}$ = 1.55, 95% CI: 1.23 – 1.95; $PR_{\text{other vs white}}$= 1.98, 95% CI: 1.48 – 2.64). Education and income both were significantly associated with unstable housing. Anything under a college degree increased the risk of experiencing unstable housing, as did income under $75,000 a year. Those who had experienced unstable housing in the past 12 months were more likely to have engaged in exchange sex (compared to not engaging in exchange sex, PR =

2.86, 95% CI: 2.24 – 3.66). Prevalence of mental illness was higher among the unstably housed group (PR = 2.59, 95% CI: 2.11 – 3.19). Use of illicit drugs was also more prevalent among the unstably housed group (PR = 1.53, 95% CI: 1.29 – 1.82).

Multivariate Logistic Regression

After backwards elimination, many factors were associated with unstable housing (Table 4). Unprotected anal sex and any STI diagnosis in the past 12 months were both dropped from the model. HIV Status was not significantly associated with unstable housing among this sample. Behavioral factors associated with unstable housing included mental illness (PR=1.97, 95% CI: 1.56 – 2.49) and engagement in exchange sex (PR =2.36, 95% CI: 1.71 – 3.25), both increasing risk of unstable housing by around twice compared to those who were not. Only age group 15-24 was significantly associated with unstable housing when controlling for these other factors. Education was a strong predictor of experiencing unstable housing ($PR_{<HS\ diploma\ vs\ college\ degree}$=3.82, 95% CI: 2.24 – 6.53; $PR_{HS\ diploma\ vs\ college\ degree}$=2.13, 95% CI: 1.53 – 2.96; $PR_{some\ college\ vs\ college\ degree}$=1.59, 95% CI: 1.23 – 2.06). The model fit was evaluated using the Hosmer-Lemeshow statistic and no evidence of lack of fit was shown (p-value = 0.8630)

Stratified Bivariate Analysis

Though HIV status was not significantly associated with unstable housing, we looked to see if the predictors for unstable housing varied between people living with HIV compared to people who are not living with HIV. The confidence intervals among those living with HIV were wider due to the smaller (n=611) sample size. Among those who were living with HIV, Black race was associated with a substantial increase in risk of unstable housing ($PR_{Black\ vs\ white}$ = 3.26, 95% CI 1.65-6.44, p=0.0007), compared to those not living with HIV ($PR_{Black\ vs\ white}$ = 1.48. 95% CI: 1.00 – 2.19, p=0.0502). Income was a significant predictor of unstable housing among both groups, but among those who were not

living with HIV, the risk was 4x that of those whose income was over $40,000 compared to 3x among those who were living with HIV.

Discussion

The objectives of this analysis were to evaluate the association between HIV status and having experienced unstable housing in the past 12 months among US MSM and assess other factors associated with unstable housing. This sample of MSM was recruited online. Previous studies have shown that HIV and unstable housing are intertwined.[17-19] This study aimed to fill a gap in assessing predictors of unstable housing among a larger population inclusive of adult MSM. Additionally, we sought to capture as many facets of homelessness as possible, including those who were unstably housed. Our study found that prevalence of HIV was not higher among individuals who had experienced unstable housing in the past 12 months compared to those who were stably housed. Race, income, education, age, engaging in exchange sex, and experiencing mental illness were associated with unstable housing. Prevalence of mental illness was higher among those who are not living with HIV and unstably housed compared to PLHIV who were unstably housed.

HIV status was not significantly associated with unstable housing in this population. This finding is contrary to previous studies which have shown that prevalence of HIV is higher among those who are experiencing homelessness.[8,20] The lack of a consistent finding may be a result of the sample recruited for this study or the larger definition used for unstable housing that included homelessness and transient housing. This study only enrolled those with internet access as the enrollment was done online, thus potentially excluding a portion of the homeless and unstably housed population who could not access the internet to be recruited. The population was also predominately white. As there is a lower overall prevalence of HIV among those who identify as non-Hispanic white,[21] the prevalence ratios could be skewed. Additionally, homelessness in its most strict definition was uncommon in this population (2.1% in general population, 3.1% among PLHIV) and likely

impacted these results. Further research with a larger number of individuals who experienced housing instability in the past 12 months is necessary including a larger population of PLHIV.

Factors that were significantly associated with having experienced unstable housing in the past 12 months in the logistic model were age (15-24 years), race, income, education, exchange sex, and mental illness. These findings are consistent with other literature on individuals experiencing homelessness or unstable housing.[12,13,22] This provides additional evidence that these factors are associated with unstable housing and are important to understand while providing care and resources to unstably housed individuals. Use of illicit drugs, unprotected anal sex, or any STI diagnosis in the past 12 months were not significantly associated with unstable housing in this model. Education and income were the most influential variables correlated with unstable housing, further supporting the importance of these factors in addressing issues relating to homelessness.

Among MSM not living with HIV, the risk of having experienced unstable housing was three times higher among the 15-24 year age group when compared to those 40 years and older. This is consistent with the many studies that show that LGBT+ youth are at particularly increased risk for housing instability.[23,24] The association between unstable housing and individuals who identified as non-Hispanic Black was over two times higher among PLHIV compared to the association between unstable housing in non-Hispanic Black people not living with HIV. This is consistent with findings that Black individuals are at disproportionate risk for both HIV and for experiences of homelessness and unstable housing.[21,22] It was surprising that the prevalence of mental illness among unstably housed people who were not living with HIV was twice as high as the prevalence of mental illness among unstably housed PLHIV. Living with HIV has been found to be a risk factor for mental illnesses such as depression.[25] Illicit drug use also did not appear to be significantly different among unstably housed PLHIV compared to unstably housed people not living with HIV. However, another study has found

that PLHIV who are experiencing homelessness are four times as likely to inject drugs compared to those who were not experiencing homelessness.[8]

There were several limitations in this study. This population was a convenience sample gathered from an Internet survey. The types of websites that the recruitment occurred on could be different than the US MSM population at large. Those with unstable housing may also have varied access to the internet and may not be adequately represented from this methodology. Despite efforts to increase recruitment of MSM of color, the sample still was a majority white. Mental illness was determined based on the K-6 score, which is a self-administered scale and may have resulted in incorrect categorizations for mental illness. Additionally, these scores were missing for almost 10% of participants. Though the missing data did not appear to be associated with any of the other variables, this could still pose an issue for determining the actual prevalence of mental illness in the sample. Additionally, the sample size was too small to compare predictors of homelessness between PLWH and people not. Ideally models predictive of unstable housing would have been evaluated using stratified analysis based on HIV status. The small sample size for those who experienced unstable housing and were HIV positive made it impossible to include many predictors in each model, thus bivariate logistic regression only was completed. Another analysis of interest would be to separate experiences of homelessness and experiences of any other kind of unstable housing to see if predictors differ between the groups.

Many of the results add to the body of evidence detailing risk factors for homelessness, such as socioeconomic and racial factors. These data support the need for sensitivity of increased risk of unstable housing among and prevention measures specific to MSM, MSM of color, MSM with lower education levels, those using drugs, and those with issues of depression. Public health professionals may find use in noting strengths and weaknesses of the sampling methodology and take these concerns into account when recruiting a population to look into issues specifically involving experiences of

homelessness and unstable housing. Organizations and advocates that provide programs for individuals experiencing homelessness can use information on risk factors to target their messages. Race, mental illness, and drug use were all found to be important factors in predicting unstable housing and it is imperative that professionals are adequately able to support individuals of differing ages, races, and orientation.

In the AMIS study population, HIV status was not associated with housing instability, but mental illness, race, income, education, and engaging in exchange sex. This finding contradicts other studies where HIV prevalence has been higher in populations experiencing homelessness. Overall, the other predictors are supported by the literature. Further steps could include amassing a sample where there is enough to look at experiences of unstable housing and experiences of homelessness separately. The LGBT+ population is overrepresented among those who are experiencing homelessness and it is important to continue to research the predictors and unique harms that come to this population.

References

1. CDC. Diagnoses of HIV infection in the United States and dependent areas, 2018: CDC; 2019.

2. Caton CLM, Dominguez B, Schanzer B. Risk Factors for Long-Term Homelessness: Findings From a Longitudinal Study of First-Time Homeless Single Adults. Am J Public Health 2005;95:1753-9.

3. Schick V, Witte L, Misedah L, et al. Exploring Differences in the Lives and Well-Being of Sexual and Gender Minority Adults Experiencing Homelessness Relative to Their Cisgender Heterosexual Counterparts. Health Equity 2019;3:68-72.

4. Bruce D, Stall R, Fata A, Campbell RT. Modeling Minority Stress Effects on Homelessness and Health Disparities among Young Men Who Have Sex with Men. Journal of Urban Health 2014;91:568-80.

5. Flentje A, Leon A, Carrico A, Zheng D, Dilley J. Mental and Physical Health among Homeless Sexual and Gender Minorities in a Major Urban US City. J Urban Health 2016;93:997-1009.

6. Nyamathi A, Reback CJ, Salem BE, et al. Correlates of Self-Reported Incarceration Among Homeless Gay and Bisexual Stimulant-Using Young Adults. Western Journal of Nursing Research 2014;37:799-811.

7. Fraser BP, N.; Chisholm, E.; Cook, H. LGBTIQ+ Homlessness: A Review of the Literature. International Journal of Environmental Research and Public Health 2019;16:2677.

8. Wainwright JJ, Beer L, Tie Y, Fagan JL, Dean HD, Medical Monitoring P. Socioeconomic, Behavioral, and Clinical Characteristics of Persons Living with HIV Who Experience Homelessness in the United States, 2015–2016. AIDS and Behavior 2019.

9. Jones MM. Does Race Matter in Addressing Homelessness? A Review of the Literature. World Medical & Health Policy 2016;8:139-56.

10. Creasy SL, Henderson ER, Bukowski LA, Matthews DD, Stall RD, Hawk ME. HIV Testing and ART Adherence Among Unstably Housed Black Men Who Have Sex with Men in the United States. AIDS and Behavior 2019;23:3044-51.

11. Galárraga O, Rana A, Rahman M, et al. The effect of unstable housing on HIV treatment biomarkers: An instrumental variables approach. Social Science & Medicine 2018;214:70-82.

12. Morton MH, Dworsky A, Matjasko JL, et al. Prevalence and Correlates of Youth Homelessness in the United States. Journal of Adolescent Health 2018;62:14-21.

13. Srivastava A, Rusow JA, Holguin M, et al. Exchange and Survival Sex, Dating Apps, Gender Identity, and Sexual Orientation Among Homeless Youth in Los Angeles. The Journal of Primary Prevention 2019;40:561-8.

14. Tyler KA, Schmitz RM. A comparison of risk factors for various forms of trauma in the lives of lesbian, gay, bisexual and heterosexual homeless youth. Journal of Trauma & Dissociation 2018;19:431-43.

15. Walls NE, Bell S. Correlates of Engaging in Survival Sex among Homeless Youth and Young Adults. The Journal of Sex Research 2011;48:423-36.

16. Sanchez TH, Sineath RC, Kahle EM, Tregear SJ, Sullivan PS. The Annual American Men's Internet Survey of Behaviors of Men Who Have Sex With Men in the United States: Protocol and Key Indicators Report 2013. JMIR Public Health Surveill 2015;1:e3-e.

17. Williams SP, Bryant KL. Sexually Transmitted Infection Prevalence among Homeless Adults in the United States: A Systematic Literature Review. Sex Transm Dis 2018;45:494-504.

18. Aidala AA, Wilson MG, Shubert V, et al. Housing Status, Medical Care, and Health Outcomes Among People Living With HIV/AIDS: A Systematic Review. Am J Public Health 2015;106:e1-e23.

19. Robertson MJ, Clark RA, Charlebois ED, et al. HIV seroprevalence among homeless and marginally housed adults in San Francisco. Am J Public Health 2004;94:1207-17.

20. Denning P, Dinenno E. Communities in Crisis: Is There a Generalized HIV Epidemic in Impoverished Urban Areas of the United States?2010.

21. HIV and African Americans. Centers for Disease Control and Prevention, 2020.

22. Henry M, Watt, R., Mahathey, A., Ouellette, J., and Sitler, A. The 2019 Annual Homeless Assessment Report (AHAR) to Congress. In: Development USDoHaU, ed.2020.

23. Katherine H. Shelton PD, Pamela J. Taylor MD, Adrian Bonner PD, Marianne van den Bree PD. Risk Factors for Homelessness: Evidence From a Population-Based Study. Psychiatric Services 2009;60:465-72.

24. Curry SR, Morton M, Matjasko JL, Dworsky A, Samuels GM, Schlueter D. Youth Homelessness and Vulnerability: How Does Couch Surfing Fit? American Journal of Community Psychology 2017;60:17-24.

25. Living with HIV: Mental Health. Centers for Disease Control and Prevention, 2019.

Table 1. Distribution of characteristics of MSM who Completed the 2018 American Men's Internet Survey and had Known HIV Status by Housing Status in the Past 12 Months

	Total	Unstable Housing	Stable Housing	p-value (χ_2)
Entire Cohort	7,304	555	6,749	--
HIV Status				
HIV+	611 (8.4)	47 (8.5)	564 (8.4)	0.9272
HIV-	6,693 (91.6)	508 (91.5)	6,185 (91.6)	
Age				**<0.0001**
15-24	2,106 (28.8)	255 (46.0)	1,851 (27.4)	
25-29	1,081 (14.8)	88 (15.9)	993 (14.7)	
30-39	1,355 (18.6)	81 (14.6)	1,274 (18.9)	
40+	2,762 (37.8)	131 (23.6)	2,631 (39.0)	
Race/Ethnicity	Missing = 118			**<0.0001**
Black, non-Hispanic	420 (5.8)	46 (8.5)	374 (5.6)	
Hispanic	1,075 (15.0)	103 (19.0)	972 (14.6)	
White, non-Hispanic	5,180 (72.1)	332 (61.3)	4,848 (73.0)	
Other and multiple races	511 (7.1)	61 (11.3)	450 (6.8)	
Income	Missing = 473			**<0.0001**
$0-19,999	907 (13.3)	174 (34.5)	733 (11.6)	
$20,000-39,999	1,391 (20.4)	148 (29.4)	1,243 (19.7)	
$40,000-74,999	1,956 (28.6)	92 (18.3)	1,864 (29.5)	
$75,000+	2,577 (37.7)	90 (17.9)	2,487 (39.3)	
Education	Missing = 59			**<0.0001**
<HS diploma	193 (2.7)	46 (8.3)	147 (2.2)	
HS diploma or equivalent	801 (11.1)	111 (20.1)	690 (10.3)	
Some college or technical degree	2,522 (34.8)	240 (43.5)	2,282 (34.1)	
College degree or postgraduate education	3,729 (51.5)	155 (28.1)	3,574 (53.4)	
Illicit Drug Use				**<0.0001**
Yes	2,713 (37.1)	259 (46.7)	2,454 (36.4)	
No	4,591 (62.9)	296 (53.3)	4,295 (63.6)	
Exchange Sex	Missing = 99			**<0.0001**
Yes	520 (7.2)	90 (16.5)	430 (6.5)	
No	6,685 (92.8)	456 (83.5)	6,229 (93.5)	
Mental Illness	Missing = 710			**<0.0001**
Yes	1,141 (17.3)	150 (33.3)	991 (16.1)	
No	5,435 (82.7)	301 (66.7)	5,152 (83.9)	
Unprotected Anal Sex				0.1920
Yes	5,396 (73.9)	423 (76.2)	4,973 (73.7)	

No	1,908 (26.1)	132 (23.8)	1,776 (26.3)	
Any STI Diagnosis				**0.0038**
Yes	959 (13.1)	95 (17.1)	864 (12.8)	
No	6,345 (86.9)	460 (82.9)	5,885 (87.2)	

Table 2. Unadjusted associations between unstable housing and other risk factors for MSM who completed the 2018 American Men's Internet Survey by housing status in the past 12 months

	PR	95% CI	p-value for Parameter Estimate
HIV Status			
HIV+	0.986	0.722 – 1.345	0.9268
HIV-	Ref.	--	--
Age			
15-24	2.77	2.22 – 3.44	**<0.0001**
25-29	1.78	1.35 – 2.36	**<0.0001**
30-39	1.28	0.96 – 1.70	0.0927
40+	Ref.	--	--
Race			
Black, non-Hispanic	1.80	1.30 – 2.49	**0.0004**
Hispanic	1.55	1.23 – 1.95	**0.0002**
White, non-Hispanic	Ref.	--	--
Other and multiple races	1.98	1.48 – 2.64	**<0.0001**
Income			
$0-19,999	6.56	5.02 – 8.57	**<0.0001**
$20,000-39,999	3.29	2.51 – 4.31	**<0.0001**
$40,000-74,999	1.36	1.01 – 1.835	**0.0404**
$75,000+	Ref.	--	--
Education			
<HS diploma	7.22	5.00 – 10.43	**<0.0001**
HS diploma or equivalent	3.71	2.87 – 4.80	**<0.0001**
Some college or technical degree	2.43	1.97 – 3.00	**<0.0001**
College degree or postgraduate education	Ref.	--	--
Illicit Drug Use			
Yes	1.53	1.29 – 1.82	**<0.0001**
No	Ref.	--	--
Exchange Sex			
Yes	2.86	2.24 – 3.66	**<0.0001**
No	Ref.	--	--
Mental Illness			
Yes	2.59	2.11 – 3.19	**<0.0001**
No	Ref.	--	--
Unprotected Anal Sex			
Yes	1.14	0.93 – 1.40	0.1923

No	Ref.	--	--
Any STI Diagnosis			
Yes	1.41	1.12 – 1.77	**0.0040**
No	Ref.	--	--

Table 3. Results of multivariate logistic regression to detect variables predictive of unstable housing among MSM who completed the 2018 American Men's Internet Survey

	PR	95% CI	p-value for parameter estimate
HIV Status			
HIV+	0.92	0.63 – 1.35	0.6671
HIV-	Ref.	--	--
Age			
15-24	1.34	1.00 – 1.80	**0.0475**
25-29	1.33	0.94 – 1.88	0.1045
30-39	1.16	0.83 – 1.64	0.3884
40+	Ref.	--	--
Race			
Black, non-Hispanic	1.84	1.24 – 2.71	**0.0023**
Hispanic	1.03	0.77 – 1.39	0.8242
White, non-Hispanic	Ref.	--	--
Other and multiple races	1.71	1.20 – 2.43	**0.0027**
Income			
$0-19,999	4.34	3.13 – 6.03	**<0.0001**
$20,000-39,999	2.40	1.74 – 3.32	**<0.0001**
$40,000-74,999	1.37	0.98 – 1.92	0.0620
$75,000+	Ref.	--	--
Education			
<HS diploma	3.82	2.24 – 6.53	**<0.0001**
HS diploma or equivalent	2.13	1.53 – 2.96	**<0.0001**
Some college or technical degree	1.59	1.23 – 2.06	**0.0004**
College degree or postgraduate education	Ref.	--	--
Exchange Sex			
Yes	2.36	1.71 – 3.25	**<0.0001**
No	Ref.	--	--
Mental Illness			
Yes	1.97	1.56 – 2.49	**<0.0001**
No	Ref.	--	--

Table 4. Unadjusted associations of variables predictive of unstable housing, stratified by HIV status among MSM who completed the 2018 American Men's Internet Survey

	Living with HIV			Not living with HIV		
	PR	**95% CI**	**p-value**	**PR**	**95% CI**	**p-value**
Age						
15-24	0.66	0.13 – 2.42	0.5853	3.06	2.42-3.89	**<0.0001**
25-29	2.40	0.93-6.19	0.0692	1.87	1.39-2.53	**<0.0001**
30-39	1.45	0.68-3.08	0.3344	1.32	0.97-1.80	0.0810
40+	Ref.	--			--	
Race						
Black, non-Hispanic	3.26	1.65-6.44	**0.0007**	1.48	1.00-2.19	0.0502
Hispanic	1.75	0.72-4.24	0.2166	1.53	1.21-1.95	**0.0005**
White, non-Hispanic	Ref.	--		Ref.	--	
Other and multiple races	0.59	0.08-4.52	0.6102	2.06	1.52-2.76	**<0.0001**
Income						
$0-39,999	2.81	1.52-5.22	**0.0010**	4.03	3.30-4.91	**<0.0001**
$40,000 +	Ref.	--		Ref.	--	
Education						
<college degree	2.67	1.38 – 5.17	**0.0035**	2.96	2.42-3.62	**<0.001**
College degree or postgraduate education	Ref.	--		Ref.	--	
Illicit Drug Use						
Yes	1.53	0.84-2.78	0.1638	1.53	1.28-1.84	**<0.0001**
No	Ref.	--		Ref.	--	
Exchange Sex						**<0.0001**
Yes	3.42	1.70-6.88	0.0006	2.80	2.15-3.65	
No	Ref.	--		Ref.	--	
Mental Illness						**<0.0001**
Yes	1.33	0.59-2.99	0.4923	2.74	2.21-3.40	
No	Ref.	--		Ref.	--	
Any STI Diagnosis						
Yes	1.93	1.02-3.65	0.0428	1.35	1.05-1.73	**0.0210**
No	Ref.	--		Ref.	--	