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## Associations Between Neighborhood Problems and Sexual Behaviors Among Black Men Who Have Sex with Men in the Deep South: The MARI Study

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### Abstract

There is a disproportionately high HIV incidence among Black men who have sex with men (MSM) despite equal or lower levels of HIV risk behaviors compared to White MSM. Due to high levels of racial segregation in the U.S., Black MSM have an elevated likelihood of living in neighborhoods that contain psychosocial stressors, which, in turn, may increase behaviors promoting HIV infection. We examined associations between perceived neighborhood problems and sexual behaviors among Black MSM in the Deep South, a population at highest risk of HIV. Data came from the MARI Study, which included Black MSM ages 18–66 years recruited from the Jackson, MS, and Atlanta, GA, metropolitan areas ( $n = 377$ ). Participants completed questions about neighborhood problems (e.g., excessive noise, heavy traffic/speeding cars and trash/litter) and sexual behaviors (e.g., condomless sex and drug use before or during sex). We used Poisson's regression model with robust standard errors to estimate the adjusted prevalence ratio (aPR; 95% confidence intervals [CI]) of neighborhood problems (coded as tertiles [tertile 1 = low neighborhood problems, tertile 2 = medium neighborhood problems, tertile 3 = high neighborhood

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**Ethical Approval** All procedures performed in studies involving human participants were in accordance with ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individuals included in the study.

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problems] as well as continuously) with sexual behaviors, after adjustment for sociodemographic characteristics and other variables. About one-fourth of the sample reported at least one neighborhood problem, with the most common (31.6%) being no/poorly maintained sidewalks, which indicates an infrastructural problem. In multivariable models, compared to those in the lowest tertile, those reporting more neighborhood problems (tertile 2: aPR = 1.49, 95% CI = 1.04, 2.14 and tertile 3: aPR = 1.53, 95% CI = 1.05, 2.24) reported more drug use before or during sex ( $p$  for trend = .027). Neighborhood problems may promote behaviors (e.g., drug use before or during sex) conducive to HIV infection. Structural interventions could improve community infrastructure to reduce neighborhood problems (e.g., no/poorly maintained sidewalks and litter). These interventions may help to reduce HIV incidence among Black MSM in the Deep South.

### Keywords

HIV/STI; Gay men's health; Men who have sex with men; Black/African-American; Deep South; Sexual orientation

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### Introduction

Gay, bisexual, and other men who have sex with men (MSM) comprise the largest group of individuals in the U.S. living with HIV (Centers for Disease Control and Prevention, 2015; Singh, Song, Johnson, McCray, & Hall, 2018). Stark racial disparities in HIV incidence continue to persist among MSM. The estimated lifetime risk of HIV infection for Black MSM is 50% compared to 20% for Latino MSM and 9% for White MSM (Hess, Hu, Lansky, Mermin, & Hall, 2017). Moreover, stark racial disparities persist among MSM across HIV prevention and care continuum metrics (Fallon, Park, Ogbue, Flynn, & German, 2017; Hoots et al., 2016; Millett, Flores, Peterson, & Bakeman, 2007). These disparities disproportionately affect Black MSM in the Deep South compared with other parts of the country (Lieb et al., 2011; Oster et al., 2011; Reif et al., 2014, 2015).

Nearly two decades of research and the interventions that followed has focused on sexual and drug use behaviors to address the HIV epidemic, including among Black MSM. These studies and interventions are often limited because they do not address the broader contexts in which Black MSM live, have sex or use drugs. Because individual-level behaviors cannot explain Black–White disparities in HIV infection among MSM (Millett et al., 2007), research is needed to understand how other factors might contribute to these disparities. Some studies have begun to examine how network-level factors influence HIV in Black MSM (Fujimoto, Flash, Kuhns, Kim, & Schneider, 2018; Hermanstyn et al., 2018, 2019; Hickson et al., 2017; Latkin et al., 2017; Schneider, Michaels, & Bouris, 2012; Tieu et al., 2015). Moving beyond studies of individual-level and network-level factors, a focus on neighborhood environments is important—as neighborhood contexts are known determinants of health disparities (Duncan & Kawachi, 2018). For this reason, it is necessary to better understand neighborhood factors in relation to HIV risk among Black MSM.

While a growing literature has identified a number of salient neighborhood determinants among MSM (Bauermeister, Connochie, Eaton, Demers, & Stephenson, 2017; Bauermeister, Eaton, & Stephenson, 2016; Bauermeister et al., 2015; Buttram & Kurtz, 2013; Carpiano,

Kelly, Easterbrook, & Parsons, 2011; Frye et al., 2010, 2017; Kelly, Carpiano, Easterbrook, & Parsons, 2012; Mauck, Sheehan, Fennie, Maddox, & Trepka, 2018; Mills et al., 2001; Phillips et al., 2015; Pierce, Miller, Morales, & Forney, 2007; Raymond et al., 2014; Stevens et al., 2017), neighborhood-level sociodemographic characteristics (e.g., neighborhood-level poverty and HIV prevalence) have generally been examined and shown to be associated with HIV risk in MSM. Importantly, little research has explored the neighborhood characteristics of HIV risk among Black MSM specifically. Furthermore, only a handful of neighborhood-focused studies have been conducted in the Deep South and have focused on specific neighborhood determinants (e.g., neighborhood problems) of HIV risk in MSM.

A larger body of research has shown that neighborhood problems (e.g., presence of litter and noise) are associated with multiple health problems (Duncan & Kawachi, 2018; Steptoe & Feldman, 2001) and may be linked to behaviors promoting HIV infection in at least three important ways. First, in line with the social ecological model (Bronfenbrenner, 1979) and broken windows theory (Sampson & Raudenbush, 2004), neighborhood problems may serve as stressors that promote engagement in unhealthy behaviors (e.g., illicit drug use) to cope with adverse environments (Boardman, Finch, Ellison, Williams, & Jackson, 2001). As a result, individuals exposed to these areas may be more prone to adopt maladaptive coping behaviors (Gallo, Bogart, Vranceanu, & Matthews, 2005), including MSM populations (Bauermeister et al., 2016; Frye et al., 2006). Second, neighborhoods with deteriorated conditions may lack social cohesion and collective efficacy that may offer protections against individual-level unhealthy behaviors and poor health (Bjornstrom, Ralston, & Kuhl, 2013; Brown et al., 2009; Burdette, Wadden, & Whitaker, 2006; Kleinmans & Bolt, 2014). Thus, insufficient or absence of social monitoring and non-kin ties due to neighborhood disorder may promote risk behaviors conducive to HIV infection. Moreover, living in these types of neighborhoods may lead to a feeling of hopelessness for the future. This feeling, in turn, may not encourage an individual to preserve their health through the enactment of preventive behaviors, placing these individuals at increased risk of HIV infection. Lastly, neighborhood problems may be indicative of widespread disinvestment of residential environments which may limit availability to material resources that might mitigate engagement in unhealthy behaviors and the services necessary to support healthy coping. Given the long-standing history of racial residential segregation in the U.S. (Kramer, 2018), neighborhood problems may be particularly salient among Black MSM because they have an elevated likelihood of living in neighborhoods that contain psychosocial stressors. This, in turn, can put them at an increased risk of behaviors promoting HIV infection (Duncan, Kim, Al-Ajlouni, & Callander, 2019; Kramer, 2018).

Because the majority of neighborhood and HIV-related studies have been conducted among MSM populations in urban and non-Southern areas such as New York City and San Francisco, the MARI Study (which is a study of Black MSM in the Deep South) presents a unique opportunity to explore neighborhood environmental influences on sexual behaviors in an understudied region and highly marginalized population (Hickson et al., 2015). The purpose of this study was to examine associations between perceived neighborhood problems and sexual behaviors among a sample of Black MSM in the Deep South. We focus on perceived neighborhood problems because in general subjective indicators of neighborhoods are most strongly associated with health outcomes and behaviors than

objective indicators of neighborhoods (Duncan & Kawachi, 2018). We recognize that a more context-specific and nuanced understanding of how neighborhood factors may contribute to HIV risk behaviors among Black MSM in the Deep South can serve to inform and promote effective neighborhood-based structural interventions and contextually relevant HIV prevention and interventions programs.

## Method

### Participants

The Ecological Study of Sexual Behaviors and HIV/STI among African-American MSM in the Southeastern US [known locally as the MARI Study because of the long study title, has no acronymic definition and should not be confused with the Minority HIV/AIDS Research Initiative (MARI) at the Centers for Disease Control and Prevention] is a two-city study initiated in the summer of 2013 to typify the HIV environmental riskscape among Black MSM in Jackson, MS, and Atlanta, GA, and to investigate the determinants of HIV risk and sexual behaviors (Hickson et al., 2015). Participants were recruited through (1) the distribution of printed advertisements at local colleges and universities, adult bookstores, bars and clubs, as well as community-based organizations (CBOs) servicing Black MSM; (2) face-to-face recruitment from local bars and clubs frequented by Black MSM as well as HIV prevention interventions, community events and other activities conducted by local CBOs; (3) Facebook, a social networking website/ application (“app”); (4) Jack’d, a geosocial-networking app; and (5) word-of-mouth referrals from participants and CBO staff not affiliated with the study. Eligibility criteria included a self-report of African-American or Black race, male sex at birth, being 18 years or older, residence in the Jackson, MS, or Atlanta, GA, metropolitan statistical areas (MSAs) and oral or anal sex with another man in the six months prior to study enrollment. Participants were compensated \$35 (which later increased to \$50 to increase participation). Assessments lasted on 1.5 h on average. The current analyses are based on data collected from 386 Black MSM in the dataset collected by the end of 2015 (222 in Jackson and 164 in Atlanta). The MARI Study research protocols were approved by the Sterling Institutional Review Board, and all participants provided written informed consent. The secondary analyses reported here were determined to be exempt by the Columbia University Mailman School of Public Health Institutional Review Board.

### Measures

**Neighborhood Problems**—We collected data using audio computer-assisted survey interviewing (ACASI). Participants completed questions about neighborhood problems using questions from validated and previously used scales (Echeverria, Diez-Roux, Shea, Borrell, & Jackson, 2008; Elo, Mykyta, Margolis, & Culhane, 2009; Gebreab et al., 2016). We measured the occurrence of six types of neighborhood problems which are frequently employed in the fields of social science and public health as indicators of neighborhood stress, physical and social neighborhood disorder and neighborhood disinvestment: excessive noise, heavy traffic or speeding cars, lack of access to adequate food and/or shopping, lack of parks and playgrounds, trash and litter, and no sidewalks or poorly maintained sidewalks (Christian et al., 2015; Ross & Mirowsky, 1999; Sampson &

Raudenbush, 1999). Responses ranged from not really a problem (1) to a very serious problem (4). The internal consistency of responses to the six questions was assessed by Cronbach's alpha. The scale demonstrated high internal consistency (Cronbach's alpha = 0.90). Items were summed and total scores ranged from 6 to 24, with a higher score representing more neighborhood problems. Neighborhood problems have been analyzed as a composite score in the past research (Echeverría et al., 2008). We calculated a summary score of neighborhood problems and categorized that into tertiles based on the distribution of scores (tertile 1 = low neighborhood problems, tertile 2 = medium neighborhood problems, tertile 3 = high neighborhood problems). The tertiles were created based on the distribution; tertile 1:  $M$  6.55 (range, 6–8); tertile 2:  $M$  11.13 (range, 9–13); and tertile 3:  $M$  17.97 (range, 14–24). Neighborhood problems were also coded as continuously.

**Sexual Behaviors**—Self-reported sexual behaviors assessed in this study included alcohol or drug use before or during sex (yes or no), in separate questions; any condomless (inconsistent condom use: most of the time, about half the time, rarely or occasionally, or never) anal sex with casual sexual partners in the 12 months prior to enrollment in the current study; the number of casual male sexual partners in the past 12 months (continuous); having participated in a sex party or orgy (yes or no); and having asked last main and casual sexual partner's HIV status (yes or no).

**Covariates**—Consistent with past research (Duncan et al., in press; McNair et al., 2018), selected covariates included age, Hispanic/Latino ethnicity, gender identity (male, female or transgender), sexual orientation (gay/homosexual, bisexual, straight/heterosexual, questioning or other), socioeconomic status, history of incarceration, HIV status (HIV-negative, HIV-positive, unknown) and MARI study site (Jackson and Atlanta). Education, annual household income and current employment status were used to characterize socioeconomic status.

### Statistical Analysis

Of the 386 Black MSM in the dataset, 377 were included in the analytic sample of Black MSM who responded to all of the neighborhood problems questions. First, we conducted descriptive statistics for sociodemographic characteristics and sexual behaviors. After estimating the overall distribution of these variables, we computed these distributions by tertiles of neighborhood problems. Chi-square tests were used for categorical variables. We used Fisher's exact test when cell counts were  $< 5$ . The ANOVA test was used for continuous variables. To estimate the relationship between neighborhood problems with sexual behaviors, we used modified Poisson's regression models (Poisson's regression models with robust standard errors) to calculate prevalence ratio (PR; 95% confidence intervals [CI]). We used prevalence ratios because odds ratios can overestimate an association when the prevalence of the outcome is high, e.g.,  $> 20\%$  (Behrens, Taeger, Wellmann, & Keil, 2004; McNutt, Wu, Xue, & Hafner, 2003; Thompson, Myers, & Kriebel, 1998). Regression models were adjusted for sociodemographic characteristics and other variables (mentioned previously). We also tested for linear trends sexual behaviors by tertiles of neighborhood problem scores using logistic regression. All data were analyzed using Stata version 14.0 (StataCorp, College Station, TX).

## Results

Table 1 shows sociodemographic characteristics and sexual behaviors overall and across tertiles of neighborhood problem scores. The mean age was 30.40 years ( $SD = 11.21$ ), and 2.1% identified as Hispanic/Latino. Fewer than half (41.6%) reported having a high school diploma or less, and 56.2% reported being currently unemployed. Almost 40% reported a history of incarceration. About a half (49.1%) reported any alcohol use before or during sex, and 36.6% reported any drug use before or during sex. About 37% reported any condomless anal sex with casual partner in past 12 months, and 18.3% reported having had 6 or more casual male partners in the past 12 months. More than a half (50.4%) reported having asked last casual partner's HIV status. In addition, 16.3% reported attending a sex party or orgy in the past 12 months.

About one-fourth of the sample reported neighborhood problems, with the most common (31.6%) being no/poorly maintained sidewalks (data not shown). Neighborhood problems were associated with being Latino/Hispanic, sexual orientation, history of incarceration and annual household income (all  $p$ s < .05). For example, those reporting a high history of incarceration reported more neighborhood problems where the prevalence of history of incarceration in tertile 1 of neighborhood problems was 25.9%, 42.1% in tertile 2 of neighborhood problems and 47.4% in tertile 3 of neighborhood problems ( $p = .001$ ). Moreover, higher levels of neighborhood problems were associated with any drug use before or during sex ( $p < .05$ ) (Table 1).

Multivariable models showed that neighborhood problems were associated with any drug use before or during sex (Table 2). Compared to tertile 1, those reporting more neighborhoods problems in tertile 2 (aPR = 1.49, 95% CI = 1.04, 2.14) and tertile 3 (aPR = 1.53, 95% CI = 1.05, 2.24) reporting more drug use before or during sex ( $p$  for trend = .027). In addition, for each unit increase in neighborhood problems, the prevalence of drug use before or during sex increased by 3% (aPR = 1.03, 95% CI = 1.00, 1.06). Neighborhood problems were not associated with any of the other sexual behaviors assessed in the study.

## Discussion

Results from the study suggest that neighborhood problems may be factors that promote HIV infection via drug use before or during sex among Black MSM in the Deep South. Moreover, neighborhood problems were not associated our measures of condomless anal intercourse, group sex and/or any other aspect of sexual health examined in the present study, which deserves further study. To our knowledge, this is the first study to examine associations between neighborhood problems with sexual health behaviors among Black MSM in the Deep South.

Our study builds on past research on neighborhoods and sexual health behaviors in minority populations (Duncan et al., 2019, in press). For example, prior research has shown that neighborhood problems are associated with sexual behaviors in general and MSM populations. One recent study found that neighborhood violence was associated with drug use and sexual risk behaviors among a sample of Black MSM in Chicago, including rates of

condomless anal intercourse in the previous 6 months (Quinn, Voisin, Bouris, & Schneider, 2016). Existing studies suggest that stress may be one pathway in the association between neighborhood problems and HIV infection among Black MSM—as neighborhood problems may be associated with stress (Steptoe & Feldman, 2001). For example, to alleviate stress, Black MSM may engage in drug use–sex as a coping mechanism. Consequently, when Black MSM are stressed due to neighborhood-level factors it could lead to sexual risk behaviors, including drug use before or during sex, as a coping mechanism. These behaviors, in turn, increase risk of HIV infection.

### Future Research

Future studies on neighborhood problems and sexual behaviors should utilize study designs permitting causal inference, such as quasi-experimental and longitudinal study designs, and causal analytic methods such as marginal structural models and fixed effects analysis (Schmidt, Nguyen, & Osypuk, 2018). For example, neighborhood revitalization to reduce neighborhood problems can be examined in relation to sexual health behaviors (South, Kondo, Cheney, & Branas, 2015). Furthermore, in addition to self-reported information on neighborhood problems, future research can examine neighborhood problems using more objective measures such as crime statistics and foreclosures, which we plan to do in future studies. Additional studies are needed to assess pathways (e.g., biological stress, fatigue and coping mechanisms) through which neighborhood problems might influence risk of HIV infection and other aspects of HIV prevention such as pre-exposure prophylaxis (PrEP) uptake among Black MSM. This research can define neighborhoods in various ways. In light of spatial misclassification (Duncan et al., 2014b; Duncan, Regan, & Chaix, 2018b), real-time geospatial methodology, including the use of global positioning system (GPS) technology (called “activity space neighborhoods”) to define more realistic neighborhoods, could serve to better represent neighborhood contexts tailored to individual lived experiences. The use of GPS-defined neighborhoods in research is beginning to be conducted among MSM populations (Duncan et al., 2016). For example, we have recently demonstrated the feasibility of collecting GPS data from Black MSM in the Deep South (Duncan et al., 2018a) and in forthcoming studies are linking GPS-derived neighborhood activity spaces to HIV risk behaviors such as condomless anal sex and PrEP uptake in MSM populations, including Black MSM.

### Study Limitations

This study is subject to limitations. First, this is a cross-sectional analysis, given the study’s design. Consequently, causal relationships cannot be ascertained. Second, non-probability recruitment methods were utilized, so this sample may not be generalizable to the larger population of Black MSM in the Deep South. Of note, we sampled Black MSM from two urban areas in the Deep South. Therefore, it is unclear whether similar findings might occur among Black MSM in rural areas of the Deep South. However, sampling from two metropolitan areas is a strength because we included two metropolitan areas in the Deep South with a high prevalence of HIV among Black MSM. Third, same-source bias is a potential concern as the neighborhood-level data and sexual behaviors were determined via self-report. We did not examine objective neighborhood data such as census measures of segregation or crime statistics, and therefore, same-source bias is a concern. We also know

that the self-reported sexual behaviors data are subject to socially desirable reporting. However, our use of the ACASI minimizes these concerns. In addition, the time period for the assessment of the neighborhood problems was not time delimited, while the sexual health behaviors were often time limited, including within the last year. Residual confounding is also possible, including because we did not have data on PrEP use in the context of condomless sex, duration in the neighborhood or neighborhood poverty. In addition, the MARI survey did not include network-level variables. Finally, the present study focuses on residential neighborhood-level factors, while emerging research demonstrates that people, including MSM, are exposed to a multitude (e.g., residential, work, socializing) of neighborhood environments in their daily lives (termed “spatial polygamy”) (Duncan et al., 2018b). As spatial polygamy can be significant in MSM populations (Duncan, Kapadia, & Halkitis, 2014a; Duncan et al., 2014b; Tobin, Latkin, & Curriero, 2014). we might have underestimated the salience of neighborhood problems on HIV and related behaviors among Black MSM in our sample.

## Conclusions

Although neighborhood problems remain understudied among Black MSM, our study makes an important step toward understanding their HIV-related impacts for this population. Our findings suggest that structural interventions that improve community infrastructure to reduce neighborhood problems (e.g., trash and litter) could help to alleviate the incidence of HIV among Black MSM in the Deep South. Because neighborhood problems are the by-product of historical disinvestment in urban environments, particularly racially and economically segregated residential areas (Kramer, 2018), interventions that add these factors may also be helpful in HIV elimination among Black MSM. However, future studies on neighborhood problems and sexual behaviors utilizing study designs permitting causal inference such as quasi-experimental and longitudinal study designs as well as using causal analytic methods such as marginal structural models and fixed effects analysis are needed.

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**Table 1** Selected sociodemographic characteristics and sexual behaviors across tertiles of neighborhood problem scores in the MARI Study, 2013–2015 (*N* = 377)

Sociodemographic characteristics	Total	Tertile 1 ( <i>n</i> = 135)	Tertile 2 ( <i>n</i> = 126)	Tertile 3 ( <i>n</i> = 116)	<i>p</i> value <sup>a</sup>
Neighborhood problems, mean (SD)	11.59 (5.07)	6.55 (0.77)	11.13 (1.39)	17.97 (3.19)	
Age ( <i>M</i> ), mean (SD)	30.40 (11.21)	28.80 (10.09)	31.46 (12.27)	31.11 (11.12)	.114
Latino/hispanic, <i>n</i> (%)	8 (2.12)	1 (0.74)	1 (0.79)	6 (5.17)	<b>.026</b>
Gender					
Male	355 (94.16)	130 (96.30)	118 (93.65)	107 (92.24)	.374
Female/transgender	22 (5.84)	5 (3.70)	8 (6.35)	9 (7.76)	
Sexual orientation, <i>n</i> (%)					
Gay/homosexual	253 (67.11)	106 (78.52)	84 (66.67)	63 (54.31)	< <b>.001</b>
Bisexual	97 (25.73)	25 (18.52)	35 (27.78)	37 (31.90)	
Other*	27 (7.16)	4 (2.96)	7 (5.56)	16 (13.79)	
Education, <i>n</i> (%)					.145
High school diploma	157 (41.64)	48 (35.56)	50 (39.68)	59 (50.86)	
Some college	144 (38.20)	55 (40.74)	52 (41.27)	37 (31.90)	
Bachelor degree and above	76 (20.16)	32 (23.70)	24 (19.05)	20 (17.24)	
Currently unemployed, <i>n</i> (%)	212 (56.23)	67 (49.63)	76 (60.32)	69 (59.48)	.154
History of incarceration, <i>n</i> (%)	143 (37.93)	35 (25.93)	53 (42.06)	55 (47.41)	<b>.001</b>
Annual household income, <i>n</i> (%)					
Less than \$5000	148 (39.26)	35 (25.93)	57 (45.24)	56 (48.28)	<b>.003</b>
\$5000–\$15,999	107 (28.38)	46 (34.07)	34 (26.98)	27 (23.28)	
\$16,000 and above	113 (29.97)	50 (37.04)	35 (27.78)	28 (24.14)	
Jackson, MS, study site, <i>n</i> (%)	220 (58.36)	89 (65.93)	72 (57.14)	59 (50.86)	.051
HIV-infected (previously and newly diagnosed), <i>n</i> (%)	144 (38.20)	47 (34.81)	43 (34.13)	54 (46.55)	.057
Sexual behaviors					
Any alcohol or drug use before or during sex, <i>n</i> (%)					
Alcohol use before or during sex	185 (49.07)	55 (40.74)	70 (55.56)	60 (51.72)	<b>.045</b>
Drug use before or during sex	138 (36.60)	33 (24.44)	53 (42.06)	52 (44.83)	<b>.001</b>
Any condomless anal sex with casual partners, <i>n</i> (%)					
Past 12 months	140 (37.14)	44 (32.59)	48 (38.10)	48 (41.38)	.282

Sociodemographic characteristics	Total	Tertile 1 (n = 135)	Tertile 2 (n = 126)	Tertile 3 (n = 116)	p value <sup>a</sup>
6 Casual male partners, past 12 months, n (%)	69 (18.30)	25 (18.52)	23 (18.25)	21 (18.10)	.995
Asked last casual partner's HIV status, n (%)	190 (50.40)	66 (48.89)	72 (57.14)	52 (44.83)	.238
Sex party or orgy, past 12 months, n (%)	59 (15.65)	16 (11.85)	21 (16.67)	22 (18.97)	.293

Bold values indicate statistical significance ( $p$  value < 0.05)

\* Other = straight/heterosexual (13); questioning (6); do not identify (8)

<sup>a</sup> Chi-square statistic or Fisher's exact test, as appropriate

Multivariable Poisson’s regression analyses of the associations between neighborhood problems and sexual behaviors in the MARI Study

**Table 2**

Variables	Tertile 2 aPR (95% CI)	Tertile 3 aPR (95% CI)	p for trend	Total score PR (95% CI)
Any alcohol or drug use before or during sex				
Alcohol use before or during sex	1.24 (0.95, 1.61)	1.19 (0.90, 1.58)	.196	1.00 (0.98, 1.03)
Drug use before or during sex	1.49 (1.04, 2.14)*	1.53 (1.05, 2.24)*	.027	1.03 (1.00, 1.06)*
Any condomless anal sex with casual partners				
Past 12 months	0.98 (0.81, 1.19)	1.02 (0.83, 1.25)	.840	1.00 (0.98, 1.02)
6 Casual male partners, past 12 months	1.09 (0.64, 1.85)	0.93 (0.53, 1.62)	.844	0.99 (0.95, 1.03)
Asked last casual partner’s HIV status	1.08 (0.87, 1.33)	0.94 (0.74, 1.21)	.670	0.99 (0.97, 1.01)
Sex party or orgy, past 12 months	1.14 (0.61, 2.15)	1.28 (0.70, 2.35)	.437	1.03 (0.98, 1.08)

PR prevalence ratio, CI confidence interval

Adjusted for age, Latino ethnicity, sexual orientation, gender identity, education, incarceration, household income, employment, HIV status and study site

Tertile 1 served as the referent group

\*  $p < .05$