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Risky sexual behavior and STI testing among teens experiencing homelessness

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ABSTRACT

Teens who experience homelessness are more likely to engage in risky sexual behavior, though less is reliably known about sexually transmitted infection (STI) testing rates in this group. We tested for differences in sexual behaviors and STI/HIV testing based on student homelessness and intersecting factors using data from the 2019 Youth Risk Behavior Survey administered in 7 states and 3 school districts. Students who experienced homelessness were more likely to report risky sexual behavior. Race moderated this link, suggesting that Asian students who experienced homelessness were at greater risk. Homelessness was linked to a greater likelihood of having been tested for STIs/HIV among those who seemed to be in groups recommended for testing. Student sex and lesbian, gay, and bisexual (LGB) identity did not moderate associations between homelessness and risky sexual behavior or STI/HIV testing. The overall sample demonstrated low STI testing rates, indicating a continued need to improve testing rates for all youth at risk for STIs/HIV.

1. Introduction

Sexually transmitted infections (STIs), including human immunodeficiency virus (HIV), are a public health problem that disproportionately affects marginalized adolescents in the United States (Caccamo et al., 2017; Min et al., 2021; Mojola & Everett, 2012). Youth who experience homelessness are at a particularly high risk of contracting STIs, a disparity likely to have been exacerbated in 2020 and 2021 by reduced access to health care, screening, and other supports during the COVID-19 pandemic (Herbers et al., 2021; Lindberg et al., 2020). Few studies have assessed factors that may influence STI infection rates among youth who experience homelessness. Additionally, little is known about STI testing rates among youth who experience homelessness, despite their potential for increased risk. This study addresses these gaps in the literature, using data from the 2019 Youth Risk Behavior Survey (YRBS) to assess relations among homelessness, risky sexual behavior, and STI testing among teenagers attending public high schools.

1.1. Youth homelessness and STIs

Youth homelessness is a widespread problem in the United States, with recent estimates ranging from about 3% to 13.5% of 13–17 year-olds (Cutuli et al., 2020; Hatchimonji et al., 2021; Morton et al., 2018). Homelessness occurs when a person lacks a fixed, regular, and adequate nighttime residence, such as when a teen stays doubled-up with family or friends, sleeps in a shelter, or is unsheltered (42 U.S.C. § 11,431 et seq.) Youth homelessness is associated with increased risk for a host of negative outcomes including academic underachievement, sexual victimization and partner violence, substance abuse, risk-taking, and physical and mental health problems (Cutuli et al., 2020; Edidin et al., 2012; Kim et al., 2009; Rew et al., 2002; Terry et al., 2010).

Health problems among youth experiencing homelessness are exacerbated by structural disadvantage that is multifaceted, interrelated, and cumulative. For example, youth experiencing homelessness are at higher risk for engaging in risky sexual behaviors, such as having unprotected sex, having multiple partners, and exchanging sex for shelter or to meet

Abbreviations: HIV, Human immunodeficiency virus; LGB, Lesbian, Gay, or Bisexual; LGBT, Lesbian, Gay, Bisexual, or Transgender; STD, Sexually Transmitted Disease; STI, Sexually Transmitted Infection; YRBS, Youth Risk Behavior Survey.

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other basic needs (Cutuli et al., 2020; Tevendale et al., 2009), which likely contributes to the high rates of STIs among this population. Students experiencing homelessness are also more likely to report being sexually active and first having sex 2–3 years earlier than their housed counterparts, on average (Cauce et al., 2000; Rice et al., 2013; Rotheram-Borus et al., 1992).

Relatedly, students experiencing homelessness also face higher risk for contracting STIs, including chlamydia, gonorrhea, and HIV (Pfeifer & Oliver, 1997). STI prevalence estimates among youth experiencing homelessness are higher than the general population, ranging from 6% to 32% (Caccamo et al., 2017). HIV infection rates, specifically, are approximately 3–9 times higher among youth experiencing homelessness compared to their housed counterparts (Aidala et al., 2005; Cauce et al., 2000). The longer youth remain unstably housed, the more likely they are to engage in sexual-risk behaviors that increase their rates of STI transmission (Caccamo et al., 2017). These higher rates of sexual risk-taking among teens who experience homelessness reflect systematic health and prevention disparities rather than individual characteristics associated with the identity of youth experiencing homelessness (Corliss et al., 2011; Rice et al., 2013). Because STIs can have negative implications for long-term health, it is important to understand the factors that may contribute to the high rates of infection among youth who experience homelessness.

Youth experiencing homelessness face unique challenges that prevent them from receiving quality health care and, notably for this study, create significant barriers to STI testing, diagnosis, and treatment (Aidala et al., 2005; Grennan et al., 2020). Additionally, youth who live within shelter environments during episodes of homelessness may not receive appropriate sexual health information as many shelters discourage staff from discussing sex and abortion services or providing safe sex supplies such as condoms (Grennan et al., 2020).

1.2. Teen homelessness and intersecting sociodemographic contexts

The population of youth experiencing homelessness is heterogenous with respect to the experiences and situations that have contributed to their homelessness. For example, some teens experience chronic childhood instability (e.g., neglect, family homelessness, living with an adult with substance abuse issues, witnessing violence in the home, familial abuse) that eventuates in youth homelessness as a continuation of this pattern of instability during adolescence (MacLean et al., 1999; Ringwalt et al., 1998). Other teens are kicked out or run away from home for behavior problems or because they identify as lesbian, gay, bisexual, transgender, or questioning (LGBTQ) and meet rejection from their family (Durso & Gates, 2012; Morton et al., 2018; Rosario et al., 2012; Thompson et al., 2010). Consequently, teens from marginalized groups are consistently overrepresented among youth who experience homelessness. This includes teens who identify as LGBTQ, those from low-income groups, and those from racial and ethnic minority groups that face systemic disadvantage (Edwards, 2020; Jones, 2016; Rice et al., 2013).

Rates of sexual risk-taking and STI testing differ by LGBTQ identity, sex, and race among youth who are experiencing homelessness (Keuroghlian et al., 2014; Williams & Bryant, 2018). For example, apart from homelessness, males who identify as gay, bisexual, and other men who have sex with men are at much higher risk for new HIV infection than heterosexual persons (Centers for Disease Control and Prevention [CDC], 2019). Intersections of LGBTQ identity and homelessness often coincide with higher rates of risky behaviors that further exacerbate disparities in HIV and other STIs. Individuals who are experiencing homelessness and identify as LGBTQ are more likely than their heterosexual counterparts to be involved in prostitution or survival sex (Keuroghlian et al., 2014; Van Leeuwen et al., 2006; Walls & Bell, 2011), to have an early onset of sexual experience (Moon et al., 2000), to be physically or sexually victimized, to have unprotected sexual intercourse, and to have multiple sex partners (Cochran et al., 2002). LGBTQ adolescents who are experiencing homelessness are also more likely to reside with a stranger or on the streets than in a shelter, which may be attributed to perceived or actual stigma related to their sexual identity and can increase the risk of STI acquisition (Rice et al., 2013).

Clear sex differences exist with regard to sexual risk-taking and STI rates among youth experiencing homelessness. Estimates of STI prevalence among female youth who are experiencing homelessness range from 16.7% to 46%, whereas rates in males range from 9% to 13.1% (Caccamo et al., 2017). Among youth who are experiencing homelessness, females are less likely to use condoms and more likely to contract STIs than males (Caccamo et al., 2017; MacKellar et al., 2000; Tevendale et al., 2009). Tevendale et al. (2009) found that 19% of females reported STDs in the last month compared with only 2% of males. Males experiencing homelessness are more likely than females experiencing homelessness to engage in anal and anonymous sex, to have an earlier sexual initiation, and to have more partners (Caccamo et al., 2017; Tevendale et al., 2009).

Rates of sexual risk-taking also differ among racial subgroups of youth experiencing homelessness. For example, Halcón and Lifson (2004) found that Black youth were more likely to utilize protection than their counterparts of other races, while White youth were less likely to utilize protection than other groups. This study also found that the likelihood of having sex with multiple partners was higher among non-White youth than among White youth. With regard to STI acquisition rates, Teruya et al. (2010) found that STI rates were highest among Black/African American women, followed by White women, then Hispanic/Latina women. These findings are contradictory, and further research is needed to elucidate differences in sexual risk-taking and STI rates among racial subgroups who are experiencing homelessness.

Youth who identify with multiple minority statuses interact with several overlapping systems of oppression, and as a result, they are particularly vulnerable to negative outcomes. Race, sexual orientation, and gender identity are interconnected such that the disadvantage of each individual minority status is compounded, and many individuals have multiple marginalization and discrimination experiences (Walby, et al., 2012). When considering STI infection rates, people with multiple minority identities are at the highest risk. For example, racial and ethnic minority females have the highest rates of STIs (Min et al., 2021). Additionally, HIV diagnosis rates are 5 and 3 times higher, respectively, among Black and Hispanic men who have sex with men than White men who have sex with men (Mojola & Everett, 2012).

1.3. STI testing among youth experiencing homelessness

Early detection of STIs can decrease infection transmission and improve long-term health outcomes. Therefore, professional healthcare associations recommend that youth engage in routine screening (American Academy of Pediatrics & Society for Adolescent Health and Medicine, 2014). STI screening recommendations vary depending on patients' specific risk factors and local infection rates; however, general guidelines from the CDC include annual HIV testing among all individuals ages 13–64, and chlamydia and gonorrhea testing for sexually active females under the age of 25 (American Academy of Pediatrics & Society for Adolescent Health and Medicine, 2014). Males are at a lower risk of chlamydia and gonorrhea-related infection complications, so recommendations for routine screening only apply for high-risk groups including males who have sex with males, substance users, and persons who exchange sex for drugs or money.

Studies examining STI testing rates among youth who are experiencing homelessness and housed youth have yielded mixed findings. For example, Clemenzie-Allen et al. (2019) found that individuals experiencing homelessness who are HIV-positive have 34% lower odds of receiving chlamydia and gonorrhea screening than HIV-positive, housed individuals. In contrast, several other studies demonstrate that over 50% of youth experiencing homelessness have been tested for either HIV or STIs, which is higher than their housed counterparts (Goodman &

Berecochea, 1994; Gwadz et al., 2010; Tyler & Melander, 2010; Young & Rice, 2011). A handful of studies have assessed predictors of STI testing rates among populations experiencing homelessness. For example, Ober et al. (2012) assessed predictors of HIV/STI testing among youth experiencing homelessness in Los Angeles County and found that youth who self-identified as gay, were Hispanic, injected drugs, had more depressive symptoms, or used drop-in center services were more likely than their counterparts to be tested. Findings related to sexual risk-taking and STI testing rates are varied. While some studies have found that testing rates were higher among youth experiencing homelessness who engage in sexual risk-taking (Goodman & Berecochea, 1994), others found that sexual risk-taking was unrelated to testing rates (Ober et al., 2012). Demographic differences in STI testing exist as well, with higher testing rates among females and older youth (Goodman & Berecochea, 1994; Solorio et al., 2006; Tyler & Melander, 2010), African American and mixed-race youth, and males who identify as bisexual or gay (Solorio et al., 2006). Many of these studies utilized convenience samples or were geographically limited, however, indicating a need for further research with larger and more representative samples to improve the generalizability of these findings.

1.4. Current study

Although previous findings have highlighted disparities in sexual health and risk-taking behaviors between adolescents experiencing homelessness and housed adolescents, research comparing STI testing rates is inconsistent and sparse. Moreover, youth experiencing homelessness are diverse in their backgrounds and lived experiences, necessitating an analysis of the nuances in STI testing among subpopulations of youth experiencing homelessness that is currently lacking in the literature. We utilized the large sample size, complex sampling design, and wealth of housing, behavioral, and healthcare data available in the 2019 Youth Risk Behavior Survey (YRBS) to better understand the associations among homelessness, sexual risk-taking, and STI testing among the diverse subpopulations of youth experiencing homelessness.

2. Method

Analyses considered combined data from 7 states and 3 school districts: Arkansas; California; Connecticut; Massachusetts; Michigan; New Hampshire; Pennsylvania; Albuquerque, NM; Palm Beach, FL; and Seattle, WA. These are all of the geographies with available data that meet the following criteria: all included on their YRBS two standard questions about homelessness, two standard questions about STD and HIV testing, and standard demographic items; all had response rates that allowed for use of the complex sampling design, and all had complete data from at least 70% of students for the logistic regression models. We chose to apply a threshold of 70% complete data to balance the concern that higher rates of missingness might bias results by failing to adequately represent the districts and states' populations against the concern that requiring higher rates of complete data might bias results by constraining generalizability across multiple geographies. More information regarding YRBS methods are available elsewhere (Underwood et al., 2020) and briefly explained below.

2.1. Participants

Participants attending public schools in each geography were selected using a two-stage cluster sample design. Schools were selected based on enrollment size. Students in randomly-selected, required class periods completed the YRBS as an anonymous paper-and-pencil survey. For analyses using the general sample, 27,966 of 35,400 (79%) students who completed a YRBS form in relevant geographies provided complete data and were included in models predicting risky sexual behavior. These observed data were used to represent 2,561,863 students when the complex sampling design is applied, per CDC methodology for the YRBS. For analyses of the subsample of students for whom STI/HIV testing would be recommended, 10,951 of 13,194 (83%) students who completed a YRBS form provided complete data and were included in analyses, representing a population of 1,112,606 students when the complex sampling design is applied, per CDC methodology for the YRBS.

2.2. Variables

Demographic information reported by students includes age, race, ethnicity, and sex. They also reported on other key constructs, including lesbian, gay, bisexual (LGB) status, homelessness, victimization, sexual behaviors, and risk indicators for HIV/sexually transmitted infections. There was a high degree of standardization across geographies for most questions, though there was some variation. This is noted where relevant.

2.2.1. Age

Students reported their age in whole years. Response options were bounded by "12 years or younger" and "18 years old or older." These were coded as "12" and "18," respectively, and the variable was treated as continuous.

2.2.2. Race/Ethnicity

We combined students' description of race and ethnicity into 5 categories. The first group was Hispanic/Latino ethnicity and any race. Students in the remaining four groups were based on race and non-Hispanic/Latino: Asian/Asian American; Black/African American; White; and Other race which included Native American/Alaskan Native and Multiple Races.

2.2.3. Sex

Students responded to a single item with two response options: "Male" and "Female.".

2.2.4. Lesbian, gay, and bisexual identity

Students reported on their sexual orientation with the item, "Which of the following best describes you?" containing the possible responses, "Heterosexual (straight)"; "Gay or Lesbian"; "Bisexual"; "Not sure." We considered students to identify as LGB if they selected gay or lesbian or bisexual. We did not categorize "Not sure" responses as necessarily questioning a sexual identity because of the possibility of miscategorizing students who did not understand the question, who had an unlisted sexual identity, or who were at a point in their development where they did not yet acknowledge or have a specific conceptualization of their sexual identity (see CDC, 2020).

2.2.5. Homelessness

We operationalized homelessness using the McKinney-Vento definition federally required of education agencies (42 U.S.C. § 11,431 et seq.). Students could indicate a homeless situation on two items. The first asked about nighttime residence: "During the past 30 days, where did you usually sleep?" with the response options: "In my parent's or guardian's home; In the home of a friend, family member, or other person because I had to leave my home or my parent or guardian cannot afford housing; In a shelter or emergency housing; In a motel or hotel; In a car, park, campground, or other public place; I do not have a usual place to sleep; Somewhere else." All responses indicated homelessness except "In my parent's or guardian's home" and "Somewhere else." The second question asked, "During the past 30 days, did you ever sleep away from your parents or guardians because you were kicked out, ran away, or were abandoned?" We considered students who responded, "Yes" to have experienced homelessness.

2.2.6. Sexual victimization

The survey included three items indexing sexual victimization, including questions about ever being physically forced to have

unwanted sex, being forced by a dating partner to have unwanted sex in the past 12 months, and being forced by anyone to do sexual things in the past 12 months. Students who endorsed any item were considered to have experienced sexual victimization.

2.2.7. Sexual behaviors

Students reported on six aspects of sexual behavior: age of first sexual experience, the number of sexual partners in the past three months and during their life, whether they used alcohol or drugs before the last time they had sexual intercourse, whether they used a condom the last time they had sexual intercourse, and whether they used any reliable method to prevent pregnancy the last time they had sexual intercourse. These items also included a response option to indicate that the teen had never had sex, which informed a separate indicator.

2.2.8. Risky sexual behavior composite

We operationalized a construct of risky sexual behavior found in the literature by combining two existing standards: (a) no method to prevent the transmission of sexually transmitted infections during intercourse, or (b) a high frequency of partners (Silverman et al., 2001). YRBS items asked about the number of lifetime sexual partners and condom use. We considered students who either had four or more sexual partners or did not use a condom the last time they had intercourse to have engaged in risky sexual behavior (e.g., Cutuli et al., 2020).

2.2.9. Recommended STI/HIV testing

We categorized cases based on recommendations for STI/HIV screening (American Academy of Pediatrics & Society for Adolescent Health and Medicine, 2014; LeFevre, 2014; Sieving et al., 2019; U.S. Preventive Services Task Force, 2019; Workowski & Bolan, 2015), limited to information available on the YRBS. This included recommendations for HIV screening for all sexually active females, teens with multiple sexual partners, male teens who have sex with males or with both males and females, and hard drug use. Geographies differed on which items they included on their YRBS that asked about hard drug use. Teens who indicated that they ever used any of the following were considered to be using hard drugs: abusing prescription pain medication (not Massachusetts nor New Hampshire), cocaine (not California, New Hampshire, nor Seattle), inhalants (not Massachusetts, New Hampshire, Albuquerque, nor Seattle), heroin (not California), methamphetamine, or any injected substance (not Massachusetts, New Hampshire, nor Seattle).

2.2.10. STI/HIV testing

Two items asked about whether each teen was tested for STI/HIV. One asked, "Have you ever been tested for HIV, the virus that causes AIDS? (Do **not** count tests done if you donated blood.)" The second asked, "During the past 12 months, have you been tested for a sexually transmitted disease (STD) other than HIV, such as chlamydia or gonorrhea?".

2.3. Analyses

We first report bivariate associations between homelessness and other study variables, including demographic factors, individual aspects of sexual behavior, a risky sexual behavior composite, and STI/HIV testing. We evaluated these using binary logistic regression (categorical variables) or general linear models (continuous variables). We then tested for effects of homelessness and of homelessness moderated by demographic factors (race/ethnicity, sex, and LGB identity) using separate binary logistic regression models predicting risky sexual behavior. We repeated these models predicting HIV or other STI testing for the subset of students who indicated behaviors that placed them into any risk group recommended for HIV or other STD testing.

All analyses utilized the complex sampling design using data combined across states and districts for the 2019 administration of the YRBS (Underwood et al., 2020). Variables provided by the CDC allowed us to account for stratification, clustering, and unequal selection probabilities in all analyses. We weighted estimates and adjusted standard errors to account for the complex sample design of the data in all analyses using the CSPLAN ANALYSIS and associated complex samples analysis functions of SPSS.

3. Results

Demographic characteristics and significant differences from bivariate tests of association are presented in Table 1. Homelessness was related to a lower likelihood of reporting female sex, and Asian/Asian American race (relative to non-Hispanic/Latino, White students). Students experiencing homelessness were more likely to be Hispanic/Latino ethnicity, to be non-Hispanic, Black/African American race, to identify as LGB, to have been sexually victimized, to be sexually active, and to exhibit risky sexual behavior.

Among sexually active students, those experiencing homelessness engaged in several risky sexual behaviors at higher rates than their

Table 1
Characteristics and results of bivariate association tests.

	Homeless	Not Homeless	Total
Female Sex **	41.1%	50.2%	49.0%
	(3.0%)	(1.0%)	(0.8%)
Age in years, *M*, StdErr	15.92	15.86	15.86
	(0.12)	(0.06)	(0.06)
LGB Identity ***	19.4%	11.6%	12.2%
	(1.9%)	(0.5%)	(0.5%)
Race/Ethnicity			
- Hispanic / Latino ***	49.7%	31.7%	33.6%
	(6.6%)	(3.2%)	(3.3%)
- Asian *	2.1%	7.8%	7.0%
	(0.8%)	(1.2%)	(1.1%)
- Black / African-American ***	13.7%	7.9%	8.9%
	(2.1%)	(0.6%)	(0.7%)
- Other race	5.4%	6.3%	6.1%
	(1.5%)	(0.5%)	(0.5%)
- White [a]	29.2%	46.2%	44.4%
	(4.1%)	(2.8%)	(2.7%)
Sexual victimization ***	48.8%	16.3%	19.5%
	(6.8%)	(1.6%)	(2.5%)
Homelessness	–	–	9.3%
			(1.2%)
Sexually Active ***	60.8%	31.9%	33.8%
	(4.2%)	(1.3%)	(1.3%)
Risky sexual behavior ***	41.3%	16.3%	17.9%
	(3.6%)	(1.0%)	(1.1%)
Among sexually active:			
- Age of sexual initiation, *M*, SD ***	14.20	14.93	14.85
	(0.17)	(0.04)	(0.05)
- Number of lifetime partners, *M*, SD***	3.13 (0.18)	2.17 (0.04)	2.27 (0.05)
- Number of partners in the past 2 months, *M*, SD *	2.04 (0.08)	1.86 (0.02)	1.87 (0.02)
- Drank alcohol/Used drugs last sexual encounter ***	35.9%	16.4%	18.6%
	(3.6%)	(1.4%)	(1.5%)
- Condom use last sexual encounter **	45.1%	58.3%	57.1%
	(5.4%)	(1.4%)	(1.5%)
- Pregnancy prevention last sexual encounter †	66.5%	72.8%	72.0%
	(3.9%)	(1.1%)	(1.1%)
Recommended for STI/HIV testing based on risk ***	80.6%	39.9%	43.6%
	(4.1%)	(1.9%)	(2.4%)
Among those recommended for STD/HIV testing:			
- Any STD testing ***	46.7%	22.4%	25.9%
	(3.4%)	(1.4%)	(1.6%)
- HIV testing ***	41.0%	18.0%	21.0%
	(4.7%)	(1.2%)	(1.4%)
- Other STD testing ***	34.6%	17.4%	19.7%
	(3.4%)	(1.3%)	(1.3%)

Notes: Statistics refer to % (StdErr) unless otherwise noted. [a] Denotes reference group; *** p <.001; ** p <.01; * p <.05; † p <.10.

housed peers. Among sexually active students, students experiencing homelessness were less likely to have used a condom during the last sexual encounter, and they demonstrated a non-significant trend of a lower likelihood of having used some form of pregnancy prevention during their last sexual encounter. Homelessness was also associated with a higher likelihood of having used alcohol or drugs before the last sexual encounter, a younger average age of first sexual experience, and a higher average number of sexual partners in the past 3 months and in their lifetimes.

Students experiencing homelessness were more likely to be part of a high-risk group recommended for STI/HIV testing according to practice guidelines. Among this high-risk subgroup, students experiencing homelessness were more likely to have been tested for HIV or another STI compared to non-homeless students who also met the practice-guidelines for recommended testing.

In a logistic regression model considering all students, homelessness predicted risky sexual behavior when controlling for effects of race/ethnicity, sex, age, LGB identity, and sexual victimization. This effect was moderated by race, with Asian/Asian American students who experienced homelessness showing greater odds of sexual risk taking. Odds for students experiencing homelessness from each other race/ethnicity group did not significantly depart from the odds for White students experiencing homelessness. The relation between homelessness and sexual risk taking was not moderated by LGB identity or by sex. See Table 2.

Separate logistic regression models tested relations between homelessness and STI/HIV testing as well as potential modifiers. These models considered only students who reported behaviors that would signify risk and meet practice guidelines for STI or HIV testing. Homelessness predicted higher odds of STI/HIV testing when considered as a main effect, controlling for effects of race/ethnicity, sex, age, LGB identity, and sexual victimization. See Table 3. Separate models revealed no significant moderation of this relation by LGB identity, sex, or race.

4. Discussion

The current findings affirm that high school students who experience homelessness are more likely to engage in risky sexual behaviors. Students experiencing homelessness were more likely to report being sexually active, engaging in sexual risk-taking, and having been sexually victimized. They were also more likely to report having been tested for STI/HIV than their housed peers. Students experiencing homelessness were more likely than their housed peers to report experiences that signify risk for poor sexual health.

Among sexually active students, those who were experiencing homelessness, on average, engage in riskier sexual behaviors than non-homeless peers including earlier age of first sex, more lifetime partners, more recent partners. They were also more likely to have used alcohol or drugs before their last sexual encounter and were less likely to have used a condom the last time they had sex. These findings are consistent with previous work demonstrating that students experiencing homelessness face complex risk factors and stressors that increase their likelihood of engaging in practices that may result in STI/HIV infection (Piche et al., 2018).

Prior studies also have demonstrated that youth experiencing homelessness frequently underutilize general healthcare services due to distrust of providers and poor coordination of assistance (Prock & Kennedy, 2020; Slesnick et al., 2009). However, in our study, homelessness predicted higher odds of STI/HIV testing, including among the highest-risk group. The YRBS data did not permit us to test any comprehensive explanation for why this pattern occurred. For example, the questions regarding STI/HIV testing within the YRBS were dichotomous (e.g., tested vs. not tested) and generally without items indexing access to or utilization of health care, limiting our ability to discern teens' reasoning for undergoing testing. However, we believe that the higher rates of testing among youth experiencing homelessness could be partly attributed to the fact that this population may exhibit clearer or more numerous risk factors for STI/HIV, which may make the need for testing more apparent to physicians. Additionally, the free STI/HIV testing provided in some homeless shelters and drop-in centers may have contributed to the higher rates of testing among youth experiencing homelessness (Ober et al., 2012).

While this finding is potentially encouraging, reported rates of STI/HIV testing were very low, regardless of housing status. Nearly 81% of students experiencing homelessness and 40% of housed students met practice guidelines for recommending STI/HIV testing. However, only 47% and 22% of those who met these practice guidelines actually underwent testing, respectively, corresponding to 25.9% of the entire subset of students meeting the practice guidelines. Because early detection and care of STIs/HIV is important for ameliorating long-term health problems, this finding signifies a need for increased intervention among sexually active high school students in the United States (Shafii & Levine, 2020).

Table 2
Logistic regression models predicting risky sexual behavior composite.

	Risky Sexual Behavior			
	Model 1.a	Model 1.b	Model 1.c	Model 1.d
Race/Ethnicity	**	**	**	
- Hispanic / Latino	1.10 (0.86–1.41)	1.11 (0.87–1.41)	1.10 (0.86–1.41)	1.08 (0.83–1.40)
- Asian	0.51 (0.34–0.75)	0.51 (0.34–0.76)	0.51 (0.34–0.76)	0.45 (0.28–0.71)
- Black / African-American	1.17 (0.93–1.48)	1.17 (0.93–1.48)	1.17 (0.93–1.48)	1.18 (0.93–1.51)
- Other race	1.01 (0.72–1.42)	1.01 (0.72–1.42)	1.01 (0.72–1.42)	0.95 (0.65–1.39)
- White[a]	–	–	–	–
Sex (Male is reference)	0.85 (0.68–1.06)	0.85 (0.68–1.07)	0.87 (0.69–1.09) †	0.84 (0.68–1.05)
Age (continuous)	1.70 (1.57–1.83) ***	1.70 (1.57–1.83) ***	1.70 (1.58–1.83) ***	1.70 (1.58–1.83) ***
LGB	1.43 (1.16–1.78) ***	1.50 (1.21–1.88)	1.44 (1.17–1.77) ***	1.44 (1.16–1.78) ***
Sexual victimization	2.75 (2.23–3.33) ***	2.72 (2.23–3.33) ***	2.73 (2.24–3.34) ***	2.74 (2.24–3.34)***
Homelessness	2.75 (2.00–3.78) ***	3.00 (2.00–4.51) ***	3.05 (1.93–4.82) ***	2.18 (1.59–2.97) ***
Homeless × LGB	–	0.62 (0.20–1.98)[b]	–	–
Homeless × Sex	–	–	0.78 (0.44–1.37)[c]	–
Homeless × Race/Ethnicity	–	–	–	*
- Hispanic/Latino and homeless	–	–	–	1.35 (0.64–2.87)
- Asian and homeless	–	–	–	11.65 (1.84–73.87)
- Black/African Am., homeless	–	–	–	1.06 (0.49–2.30)
- Other race and homeless	–	–	–	2.21 (0.46–10.52)

Note: Coefficients refer to odds ratios and 95% confidence intervals. *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$.
[a] Denotes reference group; [b] OR (95% CI) of LGB and homeless group; [c] OR (95% CI) of female and homeless group.

Table 3
Logistic regression models predicting STI/HIV testing.

	STI/HIV Testing			
	Model 2.a	Model 2.b	Model 2.c	Model 2.d
Race/Ethnicity	**	**	**	***
- Hispanic / Latino	1.32 (1.03–1.70)	1.32 (1.03–1.70)	1.32 (1.03–1.70)	1.25 (0.95–1.67)
- Asian	0.99 (0.46–2.17)	0.99 (0.45–2.17)	1.00 (0.46–2.17)	1.05 (0.47–2.34)
- Black / African-American	1.67 (1.16–2.42)	1.67 (1.16–2.41)	1.67 (1.16–2.41)	1.39 (0.97–1.98)
- Other race	0.66 (0.40–1.11)	0.66 (0.40–1.11)	0.66 (0.40–1.10)	0.73 (0.42–1.26)
- White b	–	–	–	–
Sex (Male is reference)	0.92 (0.72–1.18)	0.92 (0.72–1.18)	0.95 (0.71–1.28)	0.93 (0.72–1.19)
Age (continuous)	1.23 (1.09–1.38) ***	1.23 (1.09–1.38) ***	1.23 (1.09–1.38) ***	1.22 (1.09–1.38) ***
LGB	0.93 (0.69–1.27)	0.94 (0.66–1.35)	0.93 (0.69–1.26)	0.93 (0.68–1.27)
Sexual victimization	1.85 (1.47–2.33) ***	1.85 (1.48–2.32) ***	1.86 (1.48–2.34) ***	1.85 (1.47–2.34) ***
Homelessness	2.09 (1.45–3.01) ***	2.11 (1.41–3.17) **	2.27 (1.41–3.64) ***	1.59 (1.11–2.28)
Homeless × LGB	–	0.95 (0.38–2.35)[b]	–	–
Homeless × Sex	–	–	0.83 (0.49–1.40)[c]	–
Homeless × Race/ Ethnicity	–	–	–	
- Hispanic/ Latino and homeless	–	–	–	1.45 (0.77–2.71)
- Other race and homeless	–	–	–	0.59 (0.19–1.87)
- Asian and homeless	–	–	–	0.34 (0.05–2.57)
- Black/African Am. and homeless	–	–	–	2.41 (1.15–5.09)

Note: Models include only students where STI/HIV testing is indicated; Coefficients are odds ratios and 95% confidence intervals.
*** p <.001; ** p <.01; * p <.05; † p <.10; [a] Reference group; [b] OR (95% CI) of LGB and homeless group;
c OR (95% CI) of female and homeless group.

4.1. Subgroup analyses

Consistent with our expectations and with prior research, sexual and racial minorities were overrepresented among youth experiencing homelessness (e.g., see Herbers & Cutuli, 2018). Of students who reported experiencing homelessness, approximately seven out of 10 were racial or ethnic minorities (71%), and nearly one out of five identified as LGB (19%). Asian students experiencing homelessness appeared to be at greater risk for sexual risk-taking than White students experiencing homelessness. However, the number of Asian students who were experiencing homelessness was relatively small (2.1%), and this finding should be interpreted with caution unless and until it is replicated in other studies.

Contrary to our hypothesis, the intersecting identities of LGB identity and homelessness, female and homelessness, and racial minority and homelessness did not predict unique risk in risky sexual behavior or STI/HIV testing. Other research using previous administrations of the YRBS analogously found that the risk associated with homelessness across a variety of outcomes was not moderated by LGB identity, though both LGB status and homelessness imparted independent main effects of greater risk (Cutuli et al., 2020). This pattern also occurred in the 2019 YRBS data: teens who identified as LGB and experienced homelessness were more likely to show risky sexual behavior, but the contributions of these factors was additive.

Not all marginalized groups were at higher risk for poor sexual health. It is important to note that non-White racial groups and Hispanic/Latino ethnicity were not associated with higher likelihood of risky sexual behavior relative to White students, nor was male or female sex. The significant differences that emerged for race/ethnicity can largely be attributed to Asian students who showed a lower likelihood, on average, for risky sexual behavior when controlling for other factors. Meanwhile, the sole significant moderation effect suggested that Asian students who experienced homelessness were more likely to show risky sexual behaviors, implying a different relation between homelessness and sexual risk behaviors for this group. Additional research is needed to understand the nature and process of this association, which may include a dataset with a larger number of participants who identify as Asian and experience homelessness, as well as analytic efforts to disaggregate the heterogenous racial category of "Asian" students (Dong & Simon, 2018; Srinivasan & Guillermo, 2000). Though this interaction effect emerged for risky sexual behavior, there was no corresponding interaction apparent for this group with respect to STI/HIV testing.

This study must be considered within the context of its limitations. First, practice guidelines recommending STI/HIV testing did not directly align with the questions included in the YRBS survey, which affected our operationalization of these behaviors. For example, although injecting drugs is an HIV risk, some YRBS sites did not specifically inquire about injection rates among youth experiencing homelessness. As a result, we only included drug injection in a category signifying any hard drug use among the subset of geographies that included that item. In addition, many states in the YRBS dataset did not inquire about gender orientation, an important dimension of identity, resulting in an inability to identify transgender youth in the present study. Meanwhile, operationalization of sexual identity was limited to four possible responses, limiting our ability to consider other ways that teens might identify. Additionally, data from district and state surveys were combined in the present study. This may mask any differences between these types of geographies as both teen homelessness and its relation to both STI/HIV and to sexual health services may vary between geographies that are districts versus states. Further research and additional data are necessary to understand any such differences.

Furthermore, inferences regarding directionality of our findings are hindered by the cross-sectional nature of the YRBS data. To better inform interventions, future studies should collect more detailed information regarding specific factors that may drive the disparities in STI/HIV testing highlighted in this study. Another limitation of this study involves our utilization of a variable-centered approach to assess predictors of STIs/HIV among various subgroups of youth who are experiencing homelessness. Although the variable-centered approach yielded important findings regarding the relations among variables of interest in the study, person-centered analyses, which divide participants into subgroups based on different configurations of risk, may better capture the heterogeneity in risks and protective factors of youth experiencing homelessness (Herbers et al., 2020). Additionally, the YRBS data did not allow us to distinguish between consensual acts of sexual risk-taking and risky sexual behavior that resulted from sexual victimization. However, we attempted to mitigate this issue by controlling for victimization in our analyses. Further, our finding that Asian students who experienced homelessness were at greater risk for reporting risky sexual behavior should be interpreted with caution as our sample size was small for this subgroup (2.1%). Future studies with larger samples of Asian students experiencing homelessness are warranted to corroborate our results. Despite these limitations, we utilized data from a diverse sample of high school students to enhance our understanding of previously understudied STI/HIV testing rates among youth experiencing homelessness in the U.S.

4.2. Implications

The findings from this study have several potential policy implications. Youth homelessness is associated with engagement in high rates of largely preventable risky sexual behaviors that increase risk of STI/HIV acquisition. As such, enhanced interventions aimed at reducing STI/HIV risk behaviors among youth experiencing homelessness are warranted. To be effective, these services should utilize a holistic service provision approach to address the broad contextual factors that contribute to the high rates of sexual risk-taking among this population. Additionally, a primary goal of these services should be to enhance protective factors that support adaptive functioning among youth experiencing homelessness.

Encouragingly, our findings demonstrated that students experiencing homelessness, who had the highest risk for STI/HIV acquisition, were the most likely to undergo testing. Nonetheless, the very low STI/HIV testing rates in the overall sample indicate a need for improving rates for STI/HIV testing for all youth.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

Aidala, A., Cross, J. E., Stall, R., Harre, D., & Sumartojo, E. (2005). Housing status and HIV risk behaviors: Implications for prevention and policy. *AIDS and Behavior, 9*(3), 251–265. https://doi.org/10.1007/s10461-005-9000-7

American Academy of Pediatrics & Society for Adolescent Health and Medicine. (2014). Screening for nonviral sexually transmitted infections in adolescents and young adults. *Pediatrics, 134*(1), 302–311. https://doi.org/10.1542/peds.2014-1024

Caccamo, A., Kachur, R., & Williams, S. P. (2017). Narrative review: Sexually transmitted diseases and homeless youth-What do we know about sexually transmitted disease prevalence and risk? *Sexually Transmitted Diseases, 44*(8), 466–476. https://doi.org/10.1097/OLQ.0000000000000633

Cauce, A. M., Paradise, M., Ginzler, J. A., Embry, L., Morgan, C. J., Lohr, Y., & Theofelis, J. (2000). The characteristics and mental health of homeless adolescents: Age and gender differences. *Journal of Emotional and Behavioral Disorders, 8*(4), 230-239. doi: 10.1177%2F106342660000800403.

Centers for Disease Control and Prevention. (2019). *Diagnoses of HIV infection in the United States and dependent areas 2019: Special focus profiles.* https://www.cdc.gov/hiv/library/reports/hiv-surveillance/vol-32/content/special-focus-profiles.html#msm.

Centers for Disease Control and Prevention (2020). *How to analyze YRBS sexual minority data.* https://www.cdc.gov/healthyyouth/data/yrbs/pdf/2019/2019_Analyze_sexual_minority_data.pdf.

Clemenzi-Allen, A. A., Hartogensis, W., Cohen, S. E., Gandhi, M., Geng, E., & Christopoulos, K. (2019). Evaluating the impact of housing status on gonorrhea and chlamydia screening in an HIV primary care setting. *Sexually Transmitted Diseases, 46*(3), 153-158. https://doi. org/10.1097/OLQ.0000000000000939.

Cochran, B. N., Stewart, A. J., Ginzler, J. A., & Cauce, A. M. (2001). Challenges faced by homeless sexual minorities: Comparison of gay, lesbian, bisexual, and transgender homeless adolescents with their heterosexual counterparts. *American Journal of Public Health, 92*(5), 773–777. https://doi.org/10.2105/AJPH.92.5.773

Corliss, H. L., Goodenow, C. S., Nichols, L., & Austin, S. B. (2011). High burden of homelessness among sexual-minority adolescents: Findings from a representative Massachusetts high school sample. *American Journal of Public Health, 101*(9), 1683–1689. https://doi.org/10.2105/AJPH.2011.300155

Cutuli, J. J., Treglia, D., & Herbers, J. E. (2020). Adolescent homelessness and associated features: Prevalence and risk across eight states. *Child Psychiatry & Human Development, 51*(1), 48–58. https://doi.org/10.1007/s10578-019-00909-1

Dong, X., & Simon, M. A. (2018). Achieving health equity in Asian populations. *Gerontology & geriatric medicine, 4*, 2333721418778169. doi: 10.1177/2333721418778169.

Durso, L. E., & Gates, G. J. (2012). Serving our youth: Findings from a national survey of services providers working with lesbian, gay, bisexual, and transgender youth who are experiencing homelessness or at risk of becoming homeless. *The Williams Institute.* https://escho larship.org/uc/item/80x75033.

Edidin, J. P., Ganim, Z., Hunter, S. J., & Karnik, N. S. (2012). The mental and physical health of homeless youth: A literature review. *Child Psychiatry and Human Development, 43*(3), 354–375. https://doi.org/10.1007/s10578-011-0270-1

Edwards, E. J. (2020). Young, Black, successful, and homeless: Examining the unique academic challenges of Black students who experienced homelessness. *Journal of Children and Poverty, 26*(2), 125–149. https://doi.org/10.1080/10796126.2020.1776688

Goodman, E., & Berecochea, J. E. (1994). Predictors of HIV testing among runaway and homeless adolescents. *Journal of Adolescent Health, 15*(7), 566–572. https://doi.org/10.1016/1054-139X(94)90140-X

Grennan, T., Edward, J., & Chown, S. (2020). Sexually transmitted infections and sexual healthcare of homeless and street-involved youth. In C. Walf & G. Charles (Eds.), *Clinical care for homeless, runaway, and refugee youth: Intervention approaches, education and research directions*. Springer Nature Switzerland AG. doi: 10.1007/978-3-030-40675-2_12.

Gwadz, M. V., Cleland, C. M., Quiles, R., Nish, D., Welch, J., Michaels, L. S., … Leonard, N. R. (2010). CDC HIV testing guidelines and the rapid and conventional practices of homeless youth. *AIDS Education and Prevention, 22*(4), 312–327. https://doi.org/10.1521/aeap.2010.22.4.312

Halcón, L. L., & Lifson, A. R. (2004). Prevalence and predictors of sexual risks among homeless youth. *Journal of Youth and Adolescence, 33*(1), 71–80. https://doi.org/10.1023/A:1027338514930

Hatchimonji, D. R., Flatley, C. A., Treglia, D., & Cutuli, J. J. (2021). *High school students experiencing homelessness: Findings from the 2019 Youth Risk Behavior Surveillance System (YRBSS).* Nemours Children's Health. *System.*

Herbers, J., & Cutuli, J. (2018). Homelessness. In M. Bornstein (Ed.), *The SAGE encyclopedia of lifespan human development* (pp. 1052–1053). SAGE Publications Inc.

Herbers, J. E., Cutuli, J. J., Keane, J. N., & Leonard, J. A. (2020). Childhood homelessness, resilience, and adolescent mental health: A prospective, person-centered approach. *Psychology in the Schools, 52*(12), 1830–1844. https://doi.org/10.1002/pits.22331

Herbers, J. E., Hayes, K. R., & Cutuli, J. J. (2021). Adaptive systems for student resilience in the context of COVID-19. *School Psychology, 36*(5), 422.

Jones, M. M. (2016). Does race matter in addressing homelessness? A review of the literature. *World Medical and Health Policy, 8*(2), 139–156. https://doi.org/10.1002/wmh3.189

Keuroghlian, A. S., Shtasel, D., & Bassuk, E. L. (2014). Out on the street: A public health and policy agenda for lesbian, gay, bisexual, and transgender youth who are homeless. *American Journal of Orthopsychiatry, 84*(1), 66–72. https://doi.org/10.1037/h0098852

Kim, M. J., Tajima, E. A., Herrenkohl, T. I., & Huang, B. (2009). Early child maltreatment and risk of delinquency and victimization in adolescence: A mediational model. *Social Work Research, 33*(1), 19–28. https://doi.org/10.1093/swr/33.1.19

LeFevre, M. L. (2014). Screening for chlamydia and gonorrhea: U.S. Preventive Services Task Force recommendation statement. *Annals of Internal Medicine, 161*(12), 902–910. https://doi.org/10.7326/M14-1981

Lindberg, L. D., Bell, D. L., & Kantor, L. M. (2020). The sexual and reproductive health of adolescents and young adults during the COVID-19 pandemic. *Perspectives on Sexual and Reproductive Health, 52*(2), 75–79. https://doi.org/10.1363/psrh.12151

MacKellar, D. A., Valleroy, L. A., Hoffmann, J. P., Glebatis, D., Lalota, M., McFarland, W., … Janssen, R. S. (2000). Gender differences in sexual behaviors and factors associated with nonuse of condoms among homeless and runaway youths. *AIDS Education and Prevention, 12*(6), 477–491.

MacLean, M. G., Paradise, M. J., & Cauce, A. M. (1999). Substance use and psychological adjustment in homeless adolescents: A test of three models. *American Journal of Community Psychology, 27*(3), 405–427. https://doi.org/10.1023/A:1022286111098

Min, J., Faerber, J., Skolnik, A., & Akers, A. (2021). Racial/ethnic disparities in female sexual health from adolescence to young adulthood: How adolescent characteristics matter? *Journal of Pediatric and Adolescent Gynecology, 34*(3), 404–411. https://doi.org/10.1016/j.jpag.2020.11.005

Mojola, S. A., & Everett, B. (2012). STD and HIV risk factors among U.S. young adults: Variations by gender, race, ethnicity, and sexual orientation. *Perspectives on Sexual and Reproductive Health, 44*(2), 125–133. https://doi.org/10.1363/4412512

Moon, M. W., McFarland, W., Kellogg, T., Baxter, M., Katz, M., MacKellar, D., & Valleroy, L. A. (2000). HIV risk behavior of runaway youth in San Francisco: Age of onset and relation to sexual orientation. *Youth and Society, 32*(2), 184-201. doi: 10.1177%2F0044118X00032002003.

Morton, M. H., Dworsky, A., Matjasko, J. L., Curry, S. R., Schlueter, D., Chavez, R., & Farrell, A. F. (2018). Prevalence and correlates of youth homelessness in the United States. *Journal of Adolescent Health, 62*(1), 14–21. https://doi.org/10.1016/j.jadohealth.2017.10.006

Ober, A. J., Martino, S. C., Ewing, B., & Tucker, J. S. (2012). If you provide the test, they will take it: Factors associated with HIV/STI testing in a representative sample of

homeless youth in Los Angeles. *AIDS Education and Prevention, 24*(4), 350–362. https://doi.org/10.1521/aeap.2012.24.4.350

Pfeifer, R., & Oliver, J. (1997). A study of HIV seroprevalence in a group of homeless youth in Hollywood. *CA. Journal of Adolescent Health, 20*(5), 339–342. https://doi.org/10.1016/S1054-139X(97)00038-4

Piche, J., Kaylegian, J., Smith, D., & Hunter, S. J. (2018). The relationship between self-reported executive functioning and risk-taking behavior in urban homeless youth. *Behavioral Sciences, 8*(1), 6. https://doi.org/10.3390/bs8010006

Prock, K. A., & Kennedy, A. C. (2020). Characteristics, experiences, and service utilization patterns of homeless youth in a transitional living program: Differences by LGBQ identity. *Children and Youth Services Review, 116*, Article 105176. https://doi.org/10.1016/j.childyouth.2020.105176

Rew, L., Fouladi, R. T., & Yockey, R. D. (2002). Sexual health practices of homeless youth. *Journal of Nursing Scholarship, 34*(2), 139–145. https://doi.org/10.1111/j.1547-5069.2002.00139.x

Rice, E., Barman-Adhikari, A., Rhoades, H., Winetrobe, H., Fulginiti, A., Astor, R., … Kordic, T. (2013). Homelessness experiences, sexual orientation, and sexual risk taking among high school students in Los Angeles. *Journal of Adolescent Health, 52*(6), 773–778. https://doi.org/10.1016/j.jadohealth.2012.11.011

Ringwalt, C. L., Grenne, J. M., Robertson, M., & McPheeters, M. (1998). The prevalence of homelessness among adolescents in the United States. *American Journal of Public Health, 88*(9), 1325–1329. https://doi.org/10.2105/AJPH.88.9.1325

Rosario, M., Schrimshaw, E. W., & Hunter, J. (2006). A model of sexual risk behaviors among young gay and bisexual men: Longitudinal associations of mental health, substance abuse, sexual abuse, and the coming-out process. *AIDS Education and Prevention, 18*(5), 444–460. https://doi.org/10.1521/aeap.2006.18.5.444

Rotheram-Borus, M. J., Meyer-Bahlburg, H. F. L., Koopman, C., Rosario, M., Exner, T. M., Henderson, R., … Gruen, R. S. (1992). Lifetime sexual behaviors among runaway males and females. *Journal of Sex Research, 29*(1), 15–29. https://doi.org/10.1080/00224499209551631

Shafii, R., & Levine, D. (2020). Office-based screening for sexually transmitted infections in adolescents. *Pediatrics, 145*(S2), S219–S224. https://doi.org/10.1542/peds.2019-2056K

Sieving, R. E., O'Brien, J. R. G., Saftner, M. A., & Argo, T. A. (2019). Sexually transmitted diseases among US adolescents and young adults: Patterns, clinical considerations, and prevention. *Nursing Clinics, 54*(2), 207–225. https://doi.org/10.1016/j.cnur.2019.02.002

Silverman, J. G., Raj, A., Mucci, L. A., & Hathaway, J. E. (2001). Dating violence against adolescent girls and associated substance use, unhealthy weight control, sexual risk behavior, pregnancy, and suicidality. *JAMA, 286*(5), 527–579. https://doi.org/10.1001/jama.286.5.572

Slesnick, N., Dashora, P., Letcher, A., Erdem, G., & Serovich, J. (2009). A review of services and interventions for runaway and homeless youth: Moving forward. *Children and Youth Services Review, 31*(7), 737–742. https://doi.org/10.1016/j.childyouth.2009.01.006

Solorio, M. R., Milburn, N. G., Weiss, R., & Batterham, P. J. (2006). Newly homeless youth STD testing patters over time. *Journal of Adolescent Health, 39*(3), 443e9-443e.16. doi: 10.1016/j.jadohealth.2005.12.017.

Srinivasan, S., & Guillermo, T. (2000). Toward improved health: Disaggregating Asian American and Native Hawaiian/Pacific Islander data. *American journal of public health, 90*(11), 1731–1734. https://doi.org/10.2105/ajph.90.11.1731

Terry, M. J., Bedi, G., & Patel, N. D. (2010). Healthcare needs of homeless youth in the United States. *Journal of Pediatric Sciences, 2*(1), 17–28. https://doi.org/10.17334/jps.28639

Teruya, C., Longshore, D., Andersen, R. M., Arangua, L., Nyamathi, A., Leake, B., & Gelberg, L. (2010). Health and health care disparities among homeless women. *Women & Health, 50*(8), 719–736. https://doi.org/10.1080/03630242.2010.532754

Tevendale, H. D., Lightfoot, M., & Slocum, S. L. (2009). Individual and environmental protective factors for risky sexual behavior among homeless youth: An exploration of gender differences. *AIDS and Behavior, 13*(1), 154–164. https://doi.org/10.1007/s10461-008-9395-z

Thompson, S. J., Bender, K., Windsor, L., Cook, M. S., & Williams, T. (2010). Homeless youth: Characteristics, contributing facts, and service options. *Journal of Human Behavior in the Social Environment, 20*(2), 193–217. https://doi.org/10.1080/10911350903269831

Tyler, K., & Melander, L. (2010). The effect of drug and sexual risk behaviours with social network and non-social network members on homeless youths' sexually transmissible infections and HIV testing. *Sexual Health, 7*(4), 434–440. https://doi.org/10.1071/SH09113

Underwood, J. M., Brener, N., Thornton, J., Harris, W. A., Bryan, L. N., Shanklin, S. L., … Dittus, P. (2020). Overview and methods for the Youth Risk Behavior Surveillance System- United States, 2019. *Morbidity and Mortality Weekly Report Supplements, 69*(1), 1–10. https://doi.org/10.15585/mmwr.su6901a1

U.S. Preventive Services Task Force. (2019). Screening for HIV infection: US preventive services task force recommendation statement. *JAMA, 321*(23), 2326–2366. https://doi.org/10.1001/jama.2019.6587

Van Leeuwen, J. M., Boyle, S., Salomonsen-Sautel, S., Baker, D. N., Garcia, J. T., Hoffman, A., & Hopfer, C. J. (2006). Lesbian, gay, and bisexual homeless youth: An eight-city public health perspective. *Child Welfare, 285*, 151–170.

Walby, S., Armstrong, J., & Strid, S. (2012). Intersectionality: Multiple inequalities in social theory. *Sociology, 46*(2), 223-240. doi: 10.1177%2F0038038511416164.

Walls, N. E., & Bell, S. (2011). Correlates of engaging in survival sex among homeless youth and young adults. *Journal of Sex Research, 48*(5), 423–436. https://doi.org/10.1080/00224499.2010.501916

Williams, S. P., & Bryant, K. L. (2018). Sexually transmitted infection prevalence among homeless adults in the United States: A systematic literature review. *Sexually Transmitted Diseases, 45*(7), 494-504. https://doi. org/10.1097/OLQ.0000000000000780.

Workowski, K. A., & Bolan, G. A. (2015). Sexually transmitted diseases treatment guidelines, 2015. *Morbidity and Mortality Weekly Report, 64*, 1–137.

Young, S. D., & Rice, E. (2011). Online social networking technologies, HIV knowledge, and sexual risk and testing behaviors among homeless youth. *AIDS and Behavior, 15*(2), 253–260. https://doi.org/10.1007/s10461-010-9810-0