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## Substance Use and Risky Sexual Behavior Among Homeless and Runaway Youth

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### Abstract

**Purpose**—To (a) characterize human immunodeficiency virus (HIV)-related risk behaviors of homeless youth; (b) determine whether substance use is associated with risky sexual behavior in this population; and, if so, (c) explore explanations for this relationship.

**Methods**—A purposive sample of 327 homeless youth (ages 14–21 years) in Washington, DC, were surveyed in 1995 and 1996. Survey items were adapted from items used in a national study of adult substance use and sexual behavior and measured global (lifetime) and event-specific (most recent sexual encounter) behaviors.

**Results**—Sexual activity with many partners, “survival” sex, and substance use were common. However, needle use was rare, and consistent condom use was evident in half the sample. Nearly all correlations between global measures of substance use and risky sex were statistically significant, but only a few of the event-specific correlations were significant. Marijuana use during the most recent sexual encounter was associated with nonuse of condoms, but this relationship disappeared in the multivariate model. However, crack use during the last encounter was associated with condom use; this relationship remained significant in the multivariate model. Lack of motivation to use condoms, longer histories of sexual activity and homelessness, symptoms of drug dependency, not discussing HIV risks with partner, and being female were also associated with nonuse of condoms.

**Conclusions**—Homeless youth do use condoms, even within the context of substance use and casual sex. Results suggest that prevention and targeted intervention efforts have had some positive effect on this population, but young homeless women are in need of targeted prevention. Finally, additional research is needed to investigate the observed relationship between crack use and condom use in this sample.

### Keywords

Drug use; Alcohol use; High-risk sexual behavior; HIV; AIDS; Homeless youth; Adolescents; Condom use; Event-level relationships; Gender differences

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Since the discovery of human immunodeficiency virus (HIV) 15 years ago, effective prevention remains the greatest hope for arresting its spread. To this end, research has focused on identifying the specific populations for targeting interventions, as well as the behavioral, situational, and cultural factors that influence sexual behaviors and may be amenable to intervention.

The use of alcohol or drugs in conjunction with sex is commonly believed to lead to sexual risk taking, but empirical studies of the associations between substance use and high-risk sexual behaviors have yielded contradictory findings (1,2). Studies have found that alcohol or drug use is positively associated with (3–10), is not related to (11–13), and inhibits high-risk sexual behavior (14). The inconsistency of findings may be due in part to differences in the types of substances and HIV-related risk behaviors examined, the study approaches chosen and their methodological rigor, and characteristics of the populations studied. The purpose of this study was to examine the nature of the relationship between substance use and risky sexual behavior within a population at elevated risk of infection with HIV, homeless and runaway youth (ages 14–21 years).

Homeless and runaway youth are an appropriate group in which to examine substance use and high-risk sexual behaviors because of their high levels of sexual activity (15–17), tendencies to engage in risky behaviors such as exchanging sex for money or drugs (15,16,18,19), and high rates of substance use (15,18,19). An estimated 2.3% of homeless and runaway youth are currently infected with HIV (20), and rates in New York City (21) and San Francisco (22) have been reported to be as high as 5.3% and 8.2%, respectively.

Despite high prevalences of substance use, sexual risk behaviors, and HIV among homeless and runaway youth, very few studies have explored the role of drug use in influencing high-risk sexual behavior in this population (15,23). The focus of most previous research has been on the prevalence of “survival” sex (i.e., the exchange of sex for money, drugs, or a place to stay), where drug use and sexual behavior are often explicitly linked (15,18,19,24,25). A few studies have examined the relationships between general measures of substance use and high-risk sexual behavior among homeless and runaway youth, studies that are termed “global association” studies (2). For example, Kipke et al. showed that risky sexual behaviors such as survival sex, multiple sexual partners, and lack of condom use cluster with substance-use behaviors in their sample of street youth in Los Angeles (18), but they did not attempt to determine whether substance abuse and risky sexual behaviors occurred at the same time in this population.

Similarly, global association studies of a variety of other populations [e.g., gay men, residents of innercity neighborhoods, and clients of substance abuse treatment centers and sexually transmitted diseases (STD) clinics] have shown associations between general measures of substance use (e.g., lifetime behaviors) and nonuse of condoms (3–5,10), although some have found no associations (11–14). The major limitation of these studies is that they do not assess the use of substances in conjunction with sexual activity, and therefore are unable to provide evidence of a direct association between substance use and risky sexual behavior.

Studies of the use of substances during discrete sexual events (e.g., last sexual encounter), which can determine whether substance use and sexual activity are temporally paired, have been termed “event-specific studies” (2). These types of studies have also yielded conflicting findings, including: no differences in condom use in sexual events involving and not involving substance use (11–13); increased prevalence of intoxication during sex in “unsafe” encounters (6–9), and negative relationships between intoxication and communication about condom use (26) and planning of the first sexual experience (10).

Research on the association between substance use and risky sex has evolved to the point of hypothesizing that where this relationship exists, it may be explained by other underlying or predisposing third factors that influence both substance use and high-risk sexual behavior, such as propensity toward risk taking, sensation seeking, Problem Behavior Syndrome, or situation-specific rituals or factors (1,2). Leigh and Stall also suggested this association may be “an artifact of the relationship between the total amount of sex and the total amount of risky

behavior” (2, p. 1036). Trocki emphasized the importance of considering situational factors (e.g., environment and frame of mind) in which these behaviors occur together (27). In fact, it is likely that any link between substance use and risky sex is the result of a complex interplay of personal/background, behavioral, situational, and cultural factors.

The overall purpose of this study was to characterize the HIV-related risk behaviors of homeless and runaway youth, to determine whether substance use influences high-risk sexual behaviors in this population, and if so, to explore potential explanations for this association. Altogether, four research questions were addressed in this study: (a) What are the prevalences of substance use and risky sex in this sample of homeless and runaway youth? (b) What are the global associations between different types of substances and a variety of high-risk sexual behaviors? (c) What are the event-specific associations between different types of substances and different types of risky sexual behaviors? and (d) What factors, if any, may weaken event-specific associations between substance use and nonuse of condoms?

## Methods

### Sample

Youth ages 14–21 years who were homeless or runaway on the night before the survey were eligible for the study. “Homeless” was defined as having spent the previous night with a stranger or in a shelter, public place, hotel room rented with friends, or other nondomicile. “Runaway” was defined as having spent the previous night away from home without the permission of parents or guardians. Almost all youth met the first screening criterion and most met both criteria; consequently, we use the term “homeless” throughout this article to refer to youth who were identified as either or both homeless or runaway.

A purposive sampling strategy was used to collect a sample of 327 homeless youth identified in multiple service and street sites in Washington, DC, from July 1995 to January 1996. Service sites included shelters and service organizations (other than health clinics) targeted to adolescents and young adults. These sites were identified through directories of emergency and youth services and through information given by service providers. Referrals from service providers were followed up until no new sites were identified. The final set of sites at which youth were identified included a youth shelter, an adult shelter, two family shelters, a community center for Hispanic youth, and two outreach programs. Approximately 35% of the sample were identified at these sites.

Youth also were identified on the streets. These youth met the screening criteria for being homeless or runaway, but they generally did not make use of emergency shelters. Instead, they tended to be living marginally on the streets, often within their own neighborhoods, but moving between residences of families and friends and makeshift shelters. Approximately 65% of the sample were identified on the streets.

Field interviewers who had experience with homeless youth or other disadvantaged populations were selected for the study and trained to screen and interview eligible youth. They attempted to screen all youth making use of the service sites over the 6-month data collection period, and they screened and interviewed eligible street youth, choosing a variety of locations across the city, over the same time period. After screening eligible youth, interviewers obtained informed consent for study participation. They described the voluntary nature of the study, the types of questions that would be asked, and assurances of confidentiality. Youth also were provided with contact information, in case of any concerns, for the institutional review board that approved the study. After obtaining informed consent, interviews were conducted in private locations in service sites and improvised private street locations (e.g., on benches or steps). Although refusal rates were not tallied, the field interviewers reported that very few eligible

youth refused to participate in the interview. The interview lasted approximately 30 min, and respondents were given a \$10 incentive for completing it.

A slight majority of the sample was female, more than 80% were African-American, the mean age was approximately 17 years, two thirds came from families on public assistance, and more than one half were enrolled in some type of school at the time of the interview. Nearly 80% had run away at some point in their lives, and almost one half had been “kicked out” of their homes (“throwaway”). The mean age of first homeless experience was 15 years.

## Measures

A combination of global and event-specific measures of substance use and sexual behavior are included in the analysis reported in this article. These were adapted from questionnaire items developed for a national survey of adult substance use and sexual behavior (11). All measures were coded to show positive relationships between substance use and high-risk sex (i.e., higher codes were given to substance use vs. nonuse, and to nonuse or infrequent use of condoms compared with more frequent use). Global substance use measures include lifetime use of different types of substances (e.g., alcohol, marijuana, crack cocaine, hallucinogens, heroin) and needles; and lifetime number of alcohol and drug-dependency symptoms (e.g., use interfered with activities, had to use greater amounts to get the same effect). Global sexual behavior measures include lifetime measures of: number of sexual partners (“vaginal,” “oral,” “anal,” and “total”); age at first sex (any type); frequency of getting high while having sex (“never,” “sometimes,” “most of the time,” “all of the time”); experiences with “survival sex” (“trading sex for money, drugs, and/or food or a place to stay”), sex with partners known and not known (“regular partner whom the respondent has sex with on an ongoing basis,” “casual partner whom the respondent knows and has sex with occasionally,” “onetime partner whom the respondent had sex with once and does not plan to have sex with again”); sex with partners with known risks [“partner with STD,” “intravenous drug use (IVDU),” “HIV”]; homosexual and bisexual encounters, for male respondents only; general level of worry about getting acquired immunodeficiency syndrome (AIDS) (“very,” “somewhat,” “only a little,” “not at all”); ways that knowledge about HIV and AIDS has affected sex life (condom use); and general frequency of condom use (“always,” “most of the time,” “sometimes,” and “never”).

All of the questionnaire items associated with these measures were close-ended, with the exception of the ways that knowledge about HIV and AIDS had affected the respondents’ sex life. This measure was created from two items. The first item asked respondents if what they know about HIV or AIDS had affected their sex life in any way. If respondents answered “yes” to this item, they were then asked an open-ended item about the exact ways their sex life had been affected. One frequently mentioned way was using a condom. In the measure created from these two items, respondents who said “no” to the lead item or who did not mention condom use in the open-ended item were coded 0 and others were coded 1. It may be true that some respondents were using condoms regardless of their knowledge about HIV and were given a code of 0, but the purpose of this measure was to focus on those who were motivated to use a condom specifically because of what they knew about HIV. For ease of presentation, we refer to this measure as “not motivated to use a condom.”

Event specific items tapped details about respondents’ most recent sexual encounters. Respondents were asked, during their last sexual encounter, if they: drank alcohol; used any type of drug, as well as specific types of drugs (e.g., marijuana and crack); knew their partner (“regular partner,” “casual partner,” “onetime partner,” and “new partner” with whom the respondent had sex for the first time and planned to have sex with again”); had planned to have sex; talked with their partner about the risk of getting AIDS; and used a condom.

## Data Analysis Procedures

Percentages of respondents who engaged in substance use and risky sexual behaviors are presented in response to the first research question about the prevalences of these behaviors. Tetrachoric and poly-choric correlations showing the associations between global measures and between event-specific measures of substance use and risky sexual behavior are examined in response to the second and third research questions about global and event-specific associations between substance use and risky sex. We use tetrachoric and polychoric correlation coefficients to estimate the standard  $r$  coefficient because  $r$  assumes that data are continuous and normally distributed, and all of our measures are categorical. Polychoric correlations estimate  $r$  when variables are divided into any number of categories, and tetrachoric correlations estimate coefficients when both variables are dichotomous (28). Finally, logistic regression models predicting condom nonuse during the most recent sexual encounter are tested in response to the fourth research question about factors that may explain relationships between event-specific substance use and condom nonuse.

Models are tested only for substances found to have a statistically significant bivariate association with event-specific condom nonuse. Groups of measures included as potential third-factor and control variables are: (a) relative exposure to risk (i.e., lifetime number of partners, frequency of having sex while high, survival sex, age when had first sexual intercourse, and number of dependency symptoms); (b) situational factors (i.e., how well partner was known to respondent, whether respondent talked to partner about the risk of AIDS, and whether respondent planned to have sex); (c) general attempts at risk reduction (i.e., degree of worry about getting AIDS, motivation to use condoms in response to knowledge about AIDS); and (d) demographic characteristics (i.e., gender, race, public assistance, school attendance, age when first homeless). It is expected that some of these measures will weaken any bivariate event-specific associations between substance use and condom nonuse.

## Results

### Prevalences of Substance Use and Risky Sex

Frequencies for the global and event-specific measures are presented in Table 1. Substances with the largest percentages of lifetime users are included in the table. Approximately three quarters of respondents had ever used alcohol and marijuana, 16% had used crack cocaine, nearly one third had used hallucinogens, 7% had used heroin, and only 4% had used needles. Because of the small percentage of needle users, this measure is not included in subsequent analyses.

More than one quarter of respondents reported three or more symptoms of alcohol or drug dependency, which meets the threshold for diagnosis as drug or alcohol dependent according to DSM-IV (1994) criteria (29). Nearly all the respondents had ever had sexual intercourse (vaginal, oral, and/or anal), and a substantial minority had had intercourse with 20 or more partners during their lifetimes. Anal intercourse and survival sex were fairly common, with equal numbers giving and receiving sex.

Onetime sexual encounters were common, and sex with partners known to be risky, mostly those with STDs, was also reported by a substantial minority (Table 1). Male–male sexual activity was not uncommon (see Table 1). Nearly half of respondents did not increase their frequency of condom use specifically because of their knowledge about HIV transmission, and the same proportion only sometimes or never used a condom when they had sex.

Of the 289 respondents who reported having had a sexual encounter, slightly fewer said that they had used alcohol compared to some type of illegal drug during their most recent sexual

encounter. Of those who reported use of some type of drug, the vast majority reported using marijuana, and the next most frequently mentioned drug was crack cocaine.

A substantial minority said they had sex with a new or onetime partner; many did not plan to have sex that time; and the majority did not talk with their partners about HIV risk. Finally, more than 35% did not use a condom during this encounter. This measure will serve as the dependent variable in analyses reported later.

### Global Associations

Tetrachoric correlations and polychoric correlations between the global measures of substance use and risky sexual behavior are reported in Table 2. Nearly all of the correlations between risky sex and substance use were significant at the 0.05 level or better. The exceptions were correlations between some of the substance use measures and gay/bisexual sex and frequency of condom use.

The strongest pairwise correlation for nearly all of the substances is with the extent to which sexual partners were known to respondents. Those who ever used each substance were more likely than those who had not used to have had sex with casual or onetime partners. Giving sex for money, drugs, and/or food or shelter is strongly correlated with lifetime crack use. Other measures that have particularly high correlations with at least some of the substance use measures are number of partners for vaginal sex and for oral sex. Number of partners for anal sex is not as highly correlated with the substance use measures.

The global measure of marijuana use has some of the strongest correlations with the risky sex measures. Marijuana use is strongly correlated with having sex with higher risk partners (partners with HIV and who were IVDU) in addition to having greater numbers of partners for vaginal and oral sex, having sex with partners less well known to the respondents, and giving sex in exchange for money, drugs, and/or food or shelter. On the other hand, symptoms of dependency have some of the weakest correlations with the sex measures.

Of all the risky sex measures, frequency of condom use has the weakest (and sometimes nonsignificant) correlations with the substance use measures. Users of alcohol, marijuana, and hallucinogens, as well as those with more symptoms of dependency, were somewhat more likely than others to use condoms infrequently or not at all, but these relationships are considerably weaker than those with other measures of risky behavior.

### Event-Specific Associations

Correlations between event-specific measures of substance use and risky sex during the most recent sexual encounter are presented in Table 3, in which only half of the pairwise correlations are statistically significant. The extent to which the partner was known to the respondent is significantly and moderately correlated with each of the substance use measures. Those who used the substance in question during their last sexual encounter were more likely than those who used no substances to have been with a casual, new, or onetime sexual partner.

Nonuse of a condom during this encounter was significantly associated with marijuana and crack cocaine use but in opposite directions. Those who used marijuana were less likely to use a condom, but those who used crack were more likely than those who used no substances to use a condom. In fact, those who used crack during their last sexual encounter were also more likely than nonusers to have planned to have sex and to have talked to their partners about the risks of HIV. In addition, crack use had some of the strongest correlations with each of the risk measures.

## Potential Third-Factor Explanations

Because the event-specific measure of nonuse of condoms is significantly associated with marijuana and crack use (although in opposite directions), these are the substance use measures used to predict nonuse of condoms in logistic regression models. The independent measures of substance use in these models included respondents who had used the drug in question (marijuana or crack) during their last sexual encounter (coded 1) compared to those who had used no substances (coded 0). Respondents who had used more than one drug (e.g., marijuana and alcohol) during their last encounter were excluded from the models so that any effect from marijuana or crack would be pure.

Owing to the relatively small sample sizes in the models, each of the four groups of potential explanatory measures (relative exposure to risk, situational factors, attempts at risk reduction, and demographics) was modeled separately with each of the substance use measures. Hence, eight models were run altogether with four groups of predictor variables for each substance. Those measures that were found to be significant predictors of condom nonuse in the groups of models for marijuana or crack use were included in one large model for each of the two substances. The results for these two models are presented in Table 4. Blank rows in this table mean that this particular measure was not found to be significant for this substance in the separate models for each group of potential explanatory measures.

As expected, the effect of marijuana use on nonuse of condoms during the last sexual encounter lost its statistical significance when the potential explanatory measures were included in the model. The strongest predictor of nonuse of condoms in this model is a general lack of motivation to use condoms even with knowledge about HIV transmission. In other words, those who were not motivated to use condoms in general were also four times less likely than others to use a condom in this particular encounter. Other significant predictors of nonuse of condoms in the marijuana model were age when first had sex (with each year increase in age, respondents were 1.2 times more likely to have used a condom) and not talking about HIV risk with the partner (more than three times more likely than those who did talk about risk to not use a condom). Predictors that were significant at the 0.10 level were the extent to which the partner was known to the respondent (for each unit decrease in the amount the partner was known, respondents were 1.5 times more likely to have used a condom) and gender (males were almost two times more likely than females to have used a condom). Although race, school status, age first away from home, and dependency symptoms were significant predictors of nonuse of condoms in the separate models, these effects did not remain when the predictors were combined into one model.

Unlike the marijuana model, the effect of crack use on condom use remained significant when potential explanatory measures were added to the model. In fact, those who used crack during their last sexual encounter were 20 times more likely to have used a condom than were those who used no substances.

The crack model also showed that those with dependency symptoms were more likely to not use a condom during their last sexual encounter (1.34 times more likely with each additional symptom). Significant at the 0.10 level were lack of motivation for condom use, age first away from home, and gender. Those who were not motivated to use a condom were more than two times more likely than those who were to not use a condom during their last encounter. The older the respondent was when first away from home, the more likely it was that he or she used a condom. Finally, as in the marijuana model, males were nearly two times more likely than females to report using a condom during their last sexual encounter.

## Discussion

As shown in other studies of homeless and runaway youth (18,19,30), this sample of youth in Washington, DC, is at elevated risk for HIV/AIDS in terms of high-risk sexual behavior, especially large numbers of partners, casual sexual contacts, survival sex, and infrequent condom use. On the other hand, the risk of acquiring HIV/AIDS through intravenous drug use appears to be very low in our sample. Apart from intravenous drug use, drug and alcohol use was quite common especially marijuana, hallucinogens, and crack cocaine. These results suggest that drug use in our sample of homeless youth puts them at risk for acquiring HIV only to the extent that such use is related to risky sexual behavior.

Interestingly, marijuana seems to be important in several ways. First, the prevalence of use, in general, and during the last sexual encounter were quite high. Second, marijuana use had some of the strongest bivariate relationships with measures of risky behaviors. Third, marijuana was one of the few types of drugs to have an event-specific bivariate relationship with nonuse of condoms during the last sexual encounter. However, when other potential explanatory measures were added to a multivariate model predicting event-specific nonuse of condoms, the effect of marijuana use was no longer significant.

These results suggest that it may be appropriate to consider marijuana use as a risk factor or marker, but not a direct cause, of risky sexual behavior in this population. Efforts to reduce the prevalence of marijuana use, while desirable for other reasons, will likely not by themselves reduce the risk of HIV. Other factors are operating in this subgroup of marijuana users, and additional research focusing on the relevant characteristics of this subgroup would be helpful for designing targeted intervention.

Bivariate correlations and logistic regression results involving crack cocaine use during the last sexual encounter were quite unexpected. In general, bivariate relationships suggest that those who had used crack were more careful than were those who had used no drugs during their last sexual encounter. The unexpected positive relationship with condom use also held up in the multivariate model. Those who had used crack were 20 times more likely to use a condom during their last sexual encounter than were those who had used no drugs. These results are tempered by the fact that they are based on only 19 respondents who had used crack during this encounter. Nevertheless, they suggest the importance of examining this relationship further in larger samples of crack users.

No explanation for this unexpected relationship with crack use is apparent. Because our global bivariate results showed that crack users were also very likely to give sex for survival, we surmised that an increased likelihood of condom use may be the result of caution in a survival sex encounter rather than crack use, per se. However, our survival sex measure was not a significant predictor of condom use in any of the multivariate models. These results are further complicated by the fact that, as in another study of young crack users (5), the global associations between general crack use and risky behaviors were in the expected directions. None of the potential explanatory measures available in our data was able to explain why crack users were more likely than abstainers to protect themselves, but more research including other measures and greater numbers of crack users is needed before this surprising relationship can be accepted.

Perhaps most important, results of both the crack and marijuana models suggest that substance use during a given sexual encounter does not interfere with the ability to use a condom. In addition, alcohol and general drug use during the last encounter did not even have a significant bivariate relationship with nonuse of condoms. This is not to say that substance use did not put our respondents at risk for HIV contact, but such risk did not appear to be direct in terms of impairing judgment regarding condom use. In addition, the generally high prevalences of



condom use even within the context of substance use and casual sex suggest that general prevention efforts have had a positive impact on these youth.

We now turn our attention to potential third-factor explanations. The measure of motivation for condom use in response to knowledge about HIV was a significant predictor of most recent nonuse of condoms in both the marijuana and crack models (although marginally significant in the latter). The significance of this measure suggests that among the homeless youth in our sample, the motivation to use a condom is resistant to any potential impairment in judgment owing to substance use, in this case, marijuana use.

Having sex with a casual or onetime partner and not talking about HIV risks with the partner were significant (although marginally for the former) predictors of condom use in the marijuana model. As other research has shown (12,18,19), the less well known the partner, the more likely our respondents were to use a condom during their last encounter. Such a result suggests that these youth are sensitive to the need to take precautions with partners who are not well known to them, which is another indication that prevention messages may have influenced their behavior. A potential cause for concern, however, is the tendency to not use a condom with regular partners. Prevention efforts should encourage the universal use of condoms in this population regardless of the partner.

The increased likelihood of not using a condom if the risks of HIV were not discussed with the partner can be interpreted in at least two ways. First, this relationship may suggest a general tendency toward risk (i.e., not talking about risks and not taking precautions). Second, this relationship may be due to the fact that the particular risk for HIV was thought to be low or nonexistent for both the partner and the respondent, so there was no perceived need to discuss it or to use a condom. Further analysis is needed to determine which one of these interpretations is more appropriate.

Gender was another significant measure in both models, although marginally, and has important prevention implications. In both models, males were nearly two times more likely than females to have used a condom during their last sexual encounter. It has been previously suggested (19,31) that condom use is better predicted by the attitudes and characteristics of the male rather than those of the female partner, given that condoms are a male-controlled method of contraception and STD prevention. Women, especially young ones (32,33) and women who exchange sex directly for crack (34), may have little control over sexual decision-making, including negotiating condom use with their male partners.

A final measure that was significant in the crack model is symptoms of drug dependency. With each additional symptom, respondents were 1.3 times less likely to use a condom. Because substance use itself did not lead to condom nonuse, one explanation for this result is the underlying deviance hypothesis or Problem Behavior Syndrome (35). In other words, respondents who were involved enough with some types of substances to show symptoms of drug dependency were also less likely to use a condom in their last encounter and in general (as shown in the global association). It is likely true that they are also prone to other deviant behaviors. Hence, symptoms of substance dependency can be seen as a modest risk factor for risky sex, and homeless youth in drug treatment or otherwise identified as having symptoms are an appropriate target for the prevention of risky sexual behavior.

The results reported in this study are limited by four aspects of the data. First, a convenience rather than a random sampling strategy was used to collect our sample. Thus, we cannot say our results are representative of the general population of homeless youth in this country or even in Washington, DC. Second, our data are cross-sectional in that we surveyed respondents just once owing to the tremendous challenges in locating them for follow-up interviews. Hence, we cannot determine the temporal ordering of any relationships between substance use and

risky sex. Given that we found few relationships between the use of substances and nonuse of condoms, this limitation is likely minor. Third, the study is limited to retrospective self-reports of substance use and sexual behavior. Memory errors may be a problem for the global or lifetime measures of these behaviors, but for nearly 75% of the sample, the event-specific measures were limited to sexual encounters that occurred within the week prior to the survey. Other problems may occur if respondents were too drunk during their last encounter to accurately remember what they did (36), or if respondents believe that substance use does interfere with judgment (i.e., that substance use is an excuse for risky or unacceptable behavior) and they report substance use during a risky encounter even if such use was not true (37). We did ask about substance use before we asked about sexual behaviors in an attempt to minimize the chance of attributional biases, but again, because we found few relationships between substance use and risky sex, these limitations are likely not serious.

Finally, probably the most serious limitation of our study is that some of our results are based on only 19 respondents who had used crack during their last sexual encounter. This relatively small number of respondents limits the confidence we can place in our results that crack users were more likely than total abstainers to have used a condom during their last sexual encounter. On the other hand, the fact that we found a statistically significant effect from the crack measure, with such an uneven distribution, suggests that this effect might be quite robust. Nevertheless, additional research on larger numbers of crack users is warranted.

These limitations aside, the results reported in this study have important implications for HIV prevention among homeless and runaway youth. First, young women who are homeless should be targeted for HIV prevention, regardless of their substance use behaviors. Additional research should be done to explore the reasons why women are less likely to use condoms during their sexual encounters, but an obvious explanation is that men have control over this behavior simply because they are the ones who wear the condom.

Second, it may be true that factors related to certain types of substance use, crack use in this case, may actually result in more successful employments of prevention strategies. Our results are tenuous for reasons already discussed, and our regression models did not include every possible explanatory variable. Consequently, we do not suggest that crack use causes condom use. Perhaps crack users as a population are particularly aware of the real risk of contact with HIV and are consequently more consistently diligent in their efforts toward self-protection. Results from a recent multisite ethnographic study of crack users and crack houses indicated that there are defined subcultures of crack users and suppliers who share common values, attitudes, behaviors, and linguistic conventions (34). Additional research on crack users is needed to determine if some of the sanctions and peer pressures in these subcultures encourage protection of self and others in the group.

Finally, the majority of homeless youth use substances, but such use does not appear to lead to nonuse of condoms during a select sexual encounter when other potentially influential factors are controlled. Additional research on other samples of homeless youth, on other types of risky behaviors, and on more than one sexual encounter (i.e., first encounter, first encounter with a new partner) would strengthen these results, but studies of other populations do support these findings. Prevention efforts should target substance users, because such youth are more likely to engage in a series of risky behaviors. Additional research is needed to identify reasons why youth engage in risky sex, independent of their substance use.

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**Table 1**

## Global and Event-Specific Measures of Substance Use and Risky Sexual Behavior

<b>Behavior</b>	<b>%</b>
Global measures	
Lifetime use	
Alcohol	77.5
Marijuana	74.0
Crack cocaine	15.9
Hallucinogens	30.9
Heroin	7.0
Needles	4.0
≥3 symptoms of alcohol or drug dependence <sup>a</sup>	27.5
Ever had sexual intercourse <sup>b</sup>	88.7
≥20 or more sexual partners	29.7
Ever had anal intercourse	33.0
Survival sex <sup>c</sup>	44.6
Gave	28.3
Received	25.3
Ever had sex with:	
Onetime encounter	53.1
Partner with STD	30.1
Partner with IVDU	4.3
Partner with HIV	1.5
Male–male <sup>d</sup>	16.7
Not motivated to use a condom <sup>e</sup>	45.1
Sometimes/never use condom	45.5
Event-specific measures	
During most recent sexual encounter <sup>f</sup>	
Drank alcohol	29.1
Used any drug	34.3
Used marijuana <sup>g</sup>	87.5
Used crack <sup>g</sup>	18.8
Partner was new/onetime	23.7
Did not plan sex	39.9
Did not talk about HIV risk	76.1
Did not use a condom	35.8

<sup>a</sup>Symptoms of dependency are (a) spent a lot of time thinking about using or getting drugs or alcohol, (b) tried to cut down or stop using, (c) found that use interfered with activities, (d) had to use greater amounts to get same effect, and (e) used to keep from shaking or feeling sick.

<sup>b</sup>Sexual intercourse includes vaginal, oral, and anal sex.

<sup>c</sup>Gave and/or received sex in exchange for money/drugs/food or a place to stay.

<sup>d</sup>Percentage is calculated for males only ( $n = 156$ ).

<sup>e</sup>Said they had not changed their sexual behavior in response to knowledge about HIV, or did not choose using condoms in an open-ended question about ways sexual behavior has been changed (for those who said they did change).

<sup>f</sup>A total of 289 respondents or 88.4% of the sample had had a sexual encounter and had nonmissing data on the event-specific items. Percentages are calculated for these respondents.

<sup>g</sup>Among those who reported drug use during their most recent encounter.

**Table 2**  
Tetrachoric and Polychoric Correlations of Global Measures of Substance Use and Risky Sexual Behavior

<b>Risky Sexual Behavior</b>	<b>Alcohol Use</b>	<b>Marijuana Use</b>	<b>Crack Use</b>	<b>Hallucinogen Use</b>	<b>Heroin Use</b>	<b>Symptoms of Dependency<sup>h</sup></b>
No. of partners for vaginal sex <sup>d</sup>	0.64	0.66	0.49	0.51	0.44	0.59
No. of partners for oral sex <sup>b</sup>	0.56	0.68	0.66	0.59	0.55	0.46
No. of partners for anal sex <sup>c</sup>	0.51	0.49	0.41	0.37	0.44	0.42
How little knew partners <sup>d</sup>	0.67	0.74	0.58	0.60	0.68	0.58
Gave sex for survival	0.52	0.68	0.72	0.37	0.54	0.54
Got sex for survival	0.35	0.55	0.26	0.50	0.48	NS
Had sex with partner with HIV <sup>e</sup>	0.40	0.66	0.37	0.43	0.47	0.52
Had sex with partner with STD <sup>e</sup>	0.53	0.53	0.43	0.48	0.44	0.52
Had sex with partner with IVDU <sup>e</sup>	0.44	0.65	0.51	0.37	0.55	0.54
Had gay or bisexual sex <sup>f</sup>	0.46	NS	0.48	NS	NS	0.40
Frequency of condom use <sup>g</sup>	0.21	0.23	NS	0.17	NS	0.24

All correlations reported are significant at the 0.05 level or better.

<sup>a</sup> Recoded five categories where 0 = 0; 1 = 1–5; 2 = 6–10; 3 = 11–20; 4 = 21+partners.

<sup>b</sup> Recoded three categories where 0 = 0; 1 = 1–5; 2 = 6+ partners.

<sup>c</sup> Recoded three categories where 0 = 0; 1 = 1–2; 2 = 3+ partners.

<sup>d</sup> Response codes are: 0 = no partners; 1 = regular partner(s) only; 2 = casual partner(s) but no onetime partner(s); 3 = onetime partner(s).

<sup>e</sup> Response codes are: 0 = no; 1 = don't know; 2 = yes.

<sup>f</sup> Includes men only.

<sup>g</sup> Response codes are: 0 = always; 1 = most of the time; 2 = sometimes; 3 = never.

<sup>h</sup> Recoded three categories where 0 = 0; 1 = 1–2; 2 = 3–5 symptoms.

**Table 3**

Tetrachoric and Polychoric Correlations of Event-Specific Measures of Substance Use and Risky Sexual Behavior

<b>Risky Behavior During Last Encounter</b>	<b>Substance Use During Last Sexual Encounter</b>			
	<b>Alcohol</b>	<b>Any Drug<sup>b</sup></b>	<b>Marijuana<sup>b</sup></b>	<b>Crack<sup>b</sup></b>
How little knew partner <sup>a</sup>	0.44	0.38	0.36	0.63
Did not plan sex	NS	NS	NS	-0.58
Did not talk about HIV	NS	NS	NS	-0.38
Did not use condom	NS	NS	0.22	-0.49

All correlations reported are significant at the 0.05 level or better.

<sup>a</sup>Response codes are: 1 = regular partner; 2 = casual partner; 3 = new or onetime partner.

<sup>b</sup>Comparison groups are respondents who used no drugs during their last sexual encounter.

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**Table 4**

Logistic Regression Analysis Results for Predicting Nonuse of Condoms During Last Sexual Encounter, for Those Who Also Used Marijuana or Crack<sup>a</sup>

Predictor Variables	Marijuana Model ( <i>n</i> = 189)		Crack Model ( <i>n</i> = 159)	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Use during last encounter				
Marijuana (1)	1.4	0.62–3.05		
Crack (1)			0.05	0.00–0.52
Male (1)	0.52	0.24–1.11	0.51	0.23–1.13
Black (1)	1.13	0.44–2.92		
In school (1)	0.57	0.26–1.26		
Age first away (1–21)	0.94	0.80–1.10	0.88	0.75–1.02
Age first sex (3–18)	0.85	0.72–0.99		
Dependence symptoms (0–5)	1.13	0.89–1.42	1.34	1.02–1.76
How little knew partner (1–3)	0.65	0.40–1.04		
Did not talk about HIV (1)	3.18	1.20–8.41		
Not motivated to use a condom (1)	3.61	1.73–7.54	2.13	0.99–4.57
Model $\chi^2$	44.3		23.4	
	<i>(df</i> = 10; <i>p</i> < 0.001)		<i>(df</i> = 5; <i>p</i> < 0.001)	

<sup>a</sup>Those who used marijuana or crack (coded 1) are compared to those who used no drugs (coded 0). Those who used more than one substance were not included in the models.