



## Prevalence and correlates of exchanging sex for drugs or money among adolescents in the United States

Jessica M Edwards, Bonita J Iritani and Denise Dion Hallfors

*Sex. Transm. Inf.* published online 10 Aug 2006;  
doi:10.1136/sti.2006.020693

---

Updated information and services can be found at:

<http://sti.bmjournals.com/cgi/content/abstract/sti.2006.020693v1>

---

*These include:*

### Rapid responses

You can respond to this article at:

<http://sti.bmjournals.com/cgi/eletter-submit/sti.2006.020693v1>

### Email alerting service

Receive free email alerts when new articles cite this article - sign up in the box at the top right corner of the article

---

### Notes

---

**Online First** contains unedited articles in manuscript form that have been peer reviewed and accepted for publication but have not yet appeared in the paper journal (edited, typeset versions may be posted when available prior to final publication). Online First articles are citable and establish publication priority; they are indexed by PubMed from initial publication. Citations to Online First articles must include the digital object identifier (DOIs) and date of initial publication.

---

To order reprints of this article go to:

<http://www.bmjournals.com/cgi/reprintform>

To subscribe to *Sexually Transmitted Infections* go to:

<http://www.bmjournals.com/subscriptions/>

## ORIGINAL ARTICLE

## Prevalence and correlates of exchanging sex for drugs or money among adolescents in the United States

J M Edwards, B J Iritani, D D Hallfors

*Sex Transm Infect* 2006;**000**:1–5. doi: 10.1136/sti.2006.020693

See end of article for authors' affiliations

Correspondence to:  
Jessica M Edwards, Pacific  
Institute for Research and  
Evaluation, 1516 E  
Franklin Street, Suite 200,  
Chapel Hill, NC 27514-  
2812, USA; jedwards@  
pire.orgAccepted for publication  
14 June 2006**Objective:** This study examined the prevalence and correlates of exchanging sex for drugs or money among a nationally representative sample of 13 294 adolescents in the United States.**Methods:** Data are from the National Longitudinal Study of Adolescent Health, waves I and II. The lifetime prevalence of exchanging sex was estimated and a cross sectional analysis of sociodemographic and behavioural correlates was conducted. Unadjusted odds ratios were obtained.**Results:** 3.5% of adolescents had ever exchanged sex for drugs or money. Two thirds of these youths were boys. The odds of having exchanged sex were higher for youths who had used drugs, had run away from home, were depressed, and had engaged in various sexual risk behaviours. 15% of boys and 20% of girls who had exchanged sex reported they had ever been told they have HIV or another sexually transmitted infection (STI).**Conclusions:** Adolescents with a history of exchanging sex have engaged in other high risk behaviours and may experience poor health outcomes, including depression and HIV/STIs. These findings should help inform strategies to prevent this high risk sexual behaviour and its potential consequences.

Exchanging sex for drugs or money is a high risk sexual behaviour that is associated with HIV and other sexually transmitted infections (STIs).<sup>1–3</sup> The elevated risk for HIV/STIs correlated with exchanging sex may result from having more sexual partners, risky sexual partners, and more unprotected sex.<sup>4–5</sup> In addition, studies based on populations of youths who are homeless and adults involved in drug use suggest that exchanging sex is associated with factors, such as injection drug use, that also are known to increase HIV risk.<sup>4–8</sup>

The exchange of sex for drugs, money, or other things has been reported in studies of adults who use drugs, particularly crack cocaine.<sup>6–8</sup> Among women who use crack, the prevalence of having ever exchanged sex has been estimated at 70%.<sup>3–9</sup> Correlates of exchanging sex among adult users of crack cocaine include heavier drug use, unemployment, homelessness, psychological distress, and having experienced childhood abuse.<sup>8–10</sup>

Several studies have examined the exchange of sex for money or other things (for example, a place to stay) among runaway, homeless, and street based adolescent populations.<sup>4–5 11–13</sup> In a US study of a nationally representative sample of youths on the streets and a multi-city sample of youths living in shelters, 28% and 10% of adolescents, respectively, reported having ever exchanged sex.<sup>11</sup> Correlates of exchanging sex in these populations include lifetime and recent drug use, having been victimised, suicide attempts, previous psychiatric hospitalisation, and STIs.<sup>11–13</sup> However, to our knowledge, there is no published information on exchanging sex in the general adolescent population, including the prevalence of the behaviour and the characteristics of those who engage in it.

Understanding the factors that elevate the risk for HIV and other STIs among youths is critical, as they bear a large and disproportionate burden of these infections. Adolescents and young adults aged 15–24 account for 48% of new cases of STIs in the United States.<sup>14</sup> Surveillance data for 2004, for example, indicate that rates of both chlamydia and gonorrhoea were highest among females ages 15–19 and 20–24 and among males ages 20–24.<sup>15</sup> In addition, each year in the

United States, there are 20 000 new HIV infections among young people aged 13–24, representing half of new infections in the country.<sup>16</sup> We examined the prevalence and correlates of exchanging sex for drugs or money among male and female adolescents using data from the National Longitudinal Study of Adolescent Health (Add Health). Add Health provides a unique opportunity to examine sex exchange in a nationally representative sample of adolescents, which can help inform HIV and other STI prevention efforts for youths.

## METHODS

## Participants

Data are from waves I (collected in 1995) and II (1996) of the contractual data set of Add Health, a nationally representative probability sample of adolescents in the United States. All students who had completed Add Health's in-school questionnaire or who were listed on a school roster were eligible for the in-depth interviews conducted in the home. A total of 18 924 adolescents (7–12th grade) were in the wave I probability sample. By design, the 12th graders were not re-interviewed at wave II. Wave II consisted of 13 570 youths and the wave II response rate was 88%.<sup>17</sup> Interviews were conducted using laptop computers; audio computer assisted self interview (ACASI) was used to collect information on sensitive topics such as sexual behaviour and substance use. Add Health obtained informed adolescent assent and parental consent. Additional details about Add Health are available elsewhere.<sup>17</sup> We restricted the present sample to those who had valid responses for the questions in the wave I and wave II surveys that ascertained whether they had ever exchanged sex (n = 13 294).

## Measures

We coded sex exchange dichotomously based on whether the respondent reported having ever exchanged sex for drugs or

**Abbreviations:** ACASI, audio computer assisted self interview; CES-D, Center for Epidemiological Studies-Depression Scale; STIs, sexually transmitted infections

**Table 1** Sociodemographic characteristics of youths who have exchanged sex and youths who have never exchanged sex

	Exchanged (n=471) %	Never exchanged (n=12 823) %	Unadjusted odds ratio* (95% CI)
Gender			
Female	32.1	50.6	Referent
Male	67.9	49.4	<b>2.17 (1.67 to 2.82)</b>
Age (mean) (SE)	16.2 (.16)	16.0 (.12)	1.08 (0.99 to 1.17)
Race/ethnicity			
White	61.9	68.2	Referent
Black or African American	23.7	14.9	<b>1.75 (1.28 to 2.39)</b>
Hispanic	11.3	12.2	1.02 (0.65 to 1.58)
Asian	2.1	3.8	0.60 (0.28 to 1.29)
Native American	1.0	0.8	1.38 (0.50 to 3.84)
Family structure			
Two parents	66.8	71.9	Referent
Single mother	22.0	20.6	1.15 (0.86 to 1.53)
Other	11.2	7.4	<b>1.63 (1.06 to 2.51)</b>
Parental education			
More than high school	42.6	56.1	Referent
High school or less	57.4	43.9	<b>1.72 (1.32 to 2.26)</b>

CI, confidence interval; SE, standard error.

\*Odds ratios in which  $p < 0.05$  are shown in bold.

money in his or her lifetime. We obtained the lifetime measure of sex exchange by combining reports from wave I and wave II. Number of times respondents reported exchanging sex also was measured. Other sexual behaviour measures included having ever engaged in sexual (vaginal) intercourse, age at first sexual (vaginal) intercourse, lifetime number of sex partners, having ever had anal intercourse, having ever had a romantic attraction to someone of one's own sex, having ever engaged in any sexual activity with someone of one's own sex, having ever been physically forced to have sex (asked only of girls in the survey), and having ever physically forced someone to have sex (asked only of boys). Respondents also reported whether they had ever been told by a nurse or doctor that they have HIV or other STI.

Sociodemographic measures included gender, age (in years), race/ethnicity (Hispanic, and non-Hispanic categories of white, black or African American, Asian, and Native American), and parental education (high school or less; more than high school). Family structure was coded as two parents, single mother, and other (for example, single father).

Drug use measures were all dichotomous and included lifetime use of alcohol, marijuana, cocaine, injection drugs, other illegal drugs, inhalants, and cigarettes; past 30 day use of alcohol, marijuana, cocaine, injection drugs, other illegal drugs, inhalants, cigarettes, and chewing tobacco or snuff; and past year and past 30 day binge drinking (five or more drinks in a row).

Depression was measured based on the 20 item Center for Epidemiological Studies-Depression Scale (CES-D), with two items differing slightly from the original CES-D by measuring symptoms over the past year rather than the past week.<sup>18 19</sup> We coded depression as a dichotomous variable based on validated cut offs for boys ( $\geq 22$ ) and girls ( $\geq 24$ ).<sup>20 21</sup> Respondents also reported whether or not they had run away from home in the past 12 months.

### Data analysis

We conducted bivariate analyses to examine associations between each of the sociodemographic, drug use, depression, runaway, and sexual behaviour variables, and lifetime sex exchange. For continuous variables, *t* tests were used to assess significant differences between those who had ever and never exchanged sex. An F test that accounted for survey design effects was used to assess significance for categorical variables. Logistic regression analysis was used to obtain

unadjusted odds ratios and 95% confidence intervals. Separate analyses were conducted for boys and girls in order to examine potential gender differences in the prevalence and correlates of exchanging sex. Since results indicated that the factors associated with exchanging sex were similar for boys and girls, we report results for the combined sample. However, because some questions were asked differently by gender (for example, forced sex) and in order to present gender specific sexual behaviour patterns, the results for the sexual related behaviour measures are provided in separate tables for boys and girls. We used post-stratification sampling weights developed by the Add Health research team to yield estimates representative of the national population. Procedures for survey data in Stata, version 8.0 (Stata Corp, College Station, TX, USA), were used to account for the complex sampling design of the Add Health study. All percentages reported in the results are weighted percentages; all sample sizes provided are the unweighted numbers. Analyses for this study were approved by the institutional review board of the Pacific Institute for Research and Evaluation.

### RESULTS

The prevalence of having ever exchanged sex for drugs or money was 3.5% ( $n = 471$ ; 95% CI 3.0 to 4.0). Only 0.2% ( $n = 19$ ; 95% CI 0.1 to 0.2) of the total sample reported exchanging sex at both waves. Table 1 compares the sociodemographic characteristics of youths who have exchanged sex and youths who have never exchanged sex. Among those who have exchanged sex, 67.9% are boys ( $p < 0.05$ ). The odds of having ever exchanged sex were also higher for African American youths, youths who lived in a household with a family structure categorised as "other," and youths whose parents have a high school education or less ( $p < 0.05$ ).

Compared to youths who have never exchanged sex, larger proportions of youths who have exchanged sex had used drugs in their lifetime and in the past 30 days (table 2). For example, 10.6% of those who have exchanged sex reported using cocaine in the past 30 days, compared to 1.0% of those who have never exchanged sex ( $p < 0.05$ ). Past 30 day use of chewing tobacco or snuff was much higher among youths who have exchanged sex than among those without a history of exchanging sex (33.2% *v* 6.8%,  $p < 0.05$ ), as was past 30 day inhalant use (6.0% *v* 0.9%,  $p < 0.05$ ). The most drastic differences between the exchange groups were observed for

**Table 2** Lifetime and past 30 day drug use, depression, and runaway experience among youths who have exchanged sex and youths who have never exchanged sex

Drug use	Exchanged (n=471) %	Never exchanged (n=12 823) %	Unadjusted odds ratio*† (95% CI)
Alcohol			
Ever	67.3	65.2	1.10 (0.81 to 1.50)
Past 30 days	37.2	32.0	1.26 (0.95 to 1.67)
Binge drinking in past year	35.0	29.3	1.30 (0.99 to 1.72)
Binge drinking in past 30 days	30.9	19.8	<b>1.81 (1.34 to 2.44)</b>
Marijuana			
Ever	53.6	35.2	<b>2.13 (1.60 to 2.83)</b>
Past 30 days	28.1	16.2	<b>2.02 (1.49 to 2.73)</b>
Cocaine			
Ever	23.8	4.0	<b>7.57 (5.57 to 10.29)</b>
Past 30 days	10.6	1.0	<b>11.58 (7.08 to 18.94)</b>
Injection drugs			
Ever	10.6	0.7	<b>16.77 (10.00 to 28.12)</b>
Past 30 days	3.8	0.1	<b>33.84 (12.60 to 90.91)</b>
Other illegal drugs			
Ever	30.2	10.4	<b>3.73 (2.84 to 4.92)</b>
Past 30 days	12.3	3.4	<b>4.02 (2.68 to 6.02)</b>
Inhalants			
Ever	22.6	7.3	<b>3.70 (2.57 to 5.33)</b>
Past 30 days	6.0	0.9	<b>6.93 (2.84 to 16.88)</b>
Cigarettes			
Ever	73.5	65.0	<b>1.49 (1.07 to 2.07)</b>
Past 30 days	43.8	34.6	<b>1.47 (1.14 to 1.91)</b>
Chewing tobacco or snuff			
Past 30 days	33.2	6.8	<b>6.84 (4.88 to 9.58)</b>
Depressed	21.6	10.7	<b>2.31 (1.67 to 3.17)</b>
Ran away in past year	15.5	5.8	<b>2.99 (2.10 to 4.25)</b>

CI, confidence interval.

\*All correlates are dichotomous variables; the reference groups for odds ratios are the "0" or "no" categories.

†Odds ratios in which  $p < 0.05$  are shown in bold.

lifetime and past 30 day injection drug use. In addition, the odds of exchanging sex were higher for those who were depressed (OR = 2.31; 95% CI 1.67 to 3.17) and those who had run away in the past year (OR = 2.99; 95% CI 2.10 to 4.25).

Tables 3 and 4 present the sexual related behaviours among boys and girls, respectively. Among those who have ever exchanged sex, both boys and girls reported exchanging sex a median of one time. Significant differences between the exchange groups were found on most behaviour measures for both boys and girls. Compared to those who have never exchanged sex, youths in the exchange group had a greater number of sex partners and relatively more of them had ever been told by a doctor or nurse that they have HIV or other STI. Relatively more youths with a history of exchanging sex had ever had a romantic attraction to someone of the same sex and had engaged in sexual activity with someone of the

same sex. Among boys but not girls, a larger proportion of those who have exchanged sex had ever had anal intercourse compared to those who have never exchanged sex. Ten per cent of boys who have exchanged sex had ever physically forced someone to have sex and 16.8% of girls who have exchanged sex had ever been physically forced to have sex.

## DISCUSSION

Almost 4% of this nationally representative sample of youths reported having ever exchanged sex for drugs or money. Two thirds of those with a history of exchanging sex were boys. Because not all adolescents who had exchanged sex reported having ever had vaginal, or anal, intercourse, many may have engaged in exchanges involving oral sex. The wave I and wave II surveys did not include questions about oral sex specifically. Although the surveys also did not include questions about the partners with whom youths exchanged

**Table 3** Sexual related behaviours among boys who have exchanged sex and boys who have never exchanged sex

	Exchanged (n=311) %	Never exchanged (n=6,137) %	Unadjusted odds ratio*† (95% CI)
Number of times exchanged sex			
Median	1	—	
Mode	1	—	
Range	1–834	—	
Ever had sexual (vaginal) intercourse	58.6	41.7	<b>1.98 (1.38 to 2.84)</b>
Mean age at first sexual (vaginal) intercourse‡ (SE)	15.4 (0.20)	15.3 (0.09)	1.03 (0.92 to 1.15)
Mean lifetime number of sex partners (SE)	11.7 (2.68)	2.6 (0.19)	<b>1.02 (1.01 to 1.05)</b>
Ever had anal intercourse	12.0	6.0	<b>2.13 (1.35 to 3.38)</b>
Any sexual activity with another boy	14.6	6.7	<b>2.40 (1.52 to 3.79)</b>
Ever had romantic attraction to another boy	26.2	9.7	<b>3.30 (2.25 to 4.83)</b>
Ever physically forced someone to have sex	10.1	1.6	<b>6.96 (3.87 to 12.50)</b>
Ever been told by doctor or nurse that you have HIV or other STI	15.0	2.3	<b>7.51 (4.63 to 12.20)</b>

CI, confidence interval.; SE, standard error.

\*Except for the continuous variables, all correlates are dichotomous and the reference groups for odds ratios are the "0" or "no" categories.

†Odds ratios in which  $p < 0.05$  are shown in bold.

‡Among boys who reported having ever had vaginal intercourse.

**Table 4** Sexual related behaviours among girls who have exchanged sex and girls who have never exchanged sex

	Exchanged (n = 160) %	Never exchanged (n = 6686) %	Univariate odds ratio*† (95% CI)
Number of times exchanged sex			
Median	1	–	
Mode	1	–	
Range	1–600	–	
Ever had sexual (vaginal) intercourse	59.6	41.5	<b>2.08 (1.37 to 3.17)</b>
Mean age at first sexual (vaginal) intercourse‡ (SE)	14.9 (0.28)	15.4 (0.07)	0.83 (0.66 to 1.04)
Mean lifetime number of sex partners (SE)	4.2 (0.77)	1.6 (0.10)	<b>1.10 (1.06 to 1.13)</b>
Ever had anal intercourse	9.3	6.8	1.41 (0.80 to 2.48)
Any sexual activity with another girl	7.9	2.2	<b>3.83 (1.30 to 11.28)</b>
Ever had romantic attraction to another girl	17.2	8.0	<b>2.40 (1.45 to 3.95)</b>
Ever been physically forced to have sex	16.8	8.1	<b>2.28 (1.35 to 3.83)</b>
Ever been told by doctor or nurse that you have HIV or other STI	19.8	4.1	<b>5.80 (3.06 to 10.99)</b>

CI, confidence interval. SE, standard error.

\*Except for the continuous variables, all correlates are dichotomous and the reference groups for odds ratios are the "0" or "no" categories.

†Odds ratios in which  $p < 0.05$  are shown in bold.

‡Among girls who reported having ever had vaginal intercourse.

sex, 14.6% of boys and 7.9% of girls who have exchanged sex reported any sexual activity with someone of the same sex. Therefore, it appears that most had sex exchange partners of the opposite sex.

The correlates of exchanging sex were similar for boys and girls and are consistent with findings on the correlates of exchanging sex in specific populations of adults and youths.<sup>8 10 11 13</sup> Almost all types of substance use were associated with a greater likelihood of exchanging sex. In addition, youths who ran away from home in the past year and youths who were depressed were more likely to have exchanged sex. Positive associations were also found between exchanging sex and other measures of sexual related behaviour, such as mean lifetime number of sex partners. Among those with a history of exchanging sex, considerable proportions of boys and girls, respectively, reported having ever physically forced someone to have sex or having ever been physically forced to have sex.

There was a marked difference in the percentages of youths with and without a history of exchanging sex who reported they had ever received an HIV or STI diagnosis. Approximately 20% of girls who have exchanged sex, compared to 4.1% of girls who have never exchanged sex, reported that a nurse or doctor had ever told them they have HIV or other STI. A large difference between the exchange groups was also observed for boys. These results show that the disproportionate burden of HIV and other STIs that youths experience relative to other age groups is exacerbated for adolescents who exchange sex.

The present findings indicate that considerable numbers of youths in the general population have exchanged sex. The prevalence of exchanging sex reported here may be a conservative estimate. Some adolescents who were in wave I were not included in the sample at wave II owing to loss to follow up and the study design's exclusion from wave II of individuals who were in 12th grade at wave I. If some of these individuals had exchanged sex, their missing data would contribute to a lower estimate of the prevalence of exchanging sex. It is also possible that some individuals included in the sample who have exchanged sex did not disclose that information. However, Add Health's use of ACASI may have minimised this potential problem.<sup>22</sup>

This analysis did not control for potential confounding factors. Future research is needed to understand, for example, the greater likelihood of exchanging sex associated with lower parental education and the disproportionate representation of African American adolescents among those who have ever exchanged sex. Owing to the absence of

information on this topic, this study sought to present a comparison of the characteristics of youths who have exchanged sex and youths who have never exchanged sex. One of this study's main strengths is examining the exchange of sex for drugs or money among a nationally representative sample of youths. In addition to providing an estimate of the prevalence of exchanging sex in a general population of youths and a profile of youths who have and have never exchanged sex, the findings illuminate important issues for future research.

It is important for future studies to examine the contexts in which sex exchanges occur and the reasons underlying the exchanges, as well as respondents' definitions or perceptions of "sex exchange." The median number of sex exchanges was one and very few youths reported exchanging sex at both of the waves. This suggests that many youths who have exchanged sex may have done so for reasons other than survival. Based on the large number of times some youths have exchanged sex, it appears that at least some adolescents in this sample may have engaged in survival sex. It also is plausible that some youths who have exchanged sex only once did so for survival reasons during an acute period of need.

Sex exchange has most often been examined among populations of homeless, runaway, and street youths and adults involved in drug use.<sup>4-8 10-13</sup> In these populations, sex is exchanged for drugs by individuals who are addicted or for survival needs. Examining sex exchange in these specific populations has been highly valuable, especially given the considerably high rates of the behaviour found in these groups. However, information has been lacking on the extent to which youths in the general population are involved in sex exchange, for survival reasons or otherwise. Given that some youths in this nationally representative sample may have exchanged sex for reasons unrelated to survival or substance addiction, it is important for future research to examine those reasons and their contexts. For example, where do these sex exchanges occur (for example, parties)? Who are the exchange partners (for example, peers, adults)? What precipitates the exchanges (for example, peer pressure, lack of parental supervision)?

In addition, the results revealed that the majority of youths who have exchanged sex are boys and that most of their sex exchange partners appear to be girls or women. Examining the meanings adolescents ascribe to sex exchanges (for example, survival, sensation seeking) and the characteristics of the exchange partners (for example, age, friend, stranger) would also be informative for better understanding these

findings. Understanding the diverse contexts of sex exchange and the behavioural and health issues that may be uniquely associated with them will enhance the potential for appropriate health promotion efforts.

The findings indicate that adolescents with a history of exchanging sex have engaged in other high risk behaviours, including other sexual behaviours and drug use, and may experience poor health outcomes, such as depression and STIs. This study provides information on factors associated with exchanging sex that should be examined further in other studies in order to learn about the sequencing of the correlates and possible causal relations. Future research may also need to consider contextual factors not examined here, including parental substance use and other indicators of family wellbeing. Better understanding of the factors that may precede and contribute to, as well as result from, youths becoming involved in sex exchange can help formulate appropriate prevention and intervention strategies.

## ACKNOWLEDGEMENTS

This study used data from Add Health, a program project designed by J Richard Udry, Peter S Bearman, and Kathleen Mullan Harris, and funded by the National Institute of Child Health and Human Development (grant P01-HD31921), with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R Rindfuss and Barbara Entwistle for assistance in the original design. Those interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W Franklin Street, Chapel Hill, NC 27516-2524, USA, [www.cpc.unc.edu/addhealth/contract.html](http://www.cpc.unc.edu/addhealth/contract.html).

## CONTRIBUTORS

JE led the data analysis and writing; BI helped to analyse the data and contributed to writing the paper; DH helped to conceptualise the paper, contributed to the literature review, and critically reviewed each draft. All of the authors helped to conceptualise ideas, interpret findings, and critically revise the paper.

## Authors' affiliations

J M Edwards, B J Iritani, D Dion Hallfors, Pacific Institute for Research and Evaluation, 1516 E Franklin Street, Suite 200, Chapel Hill, NC, USA

Funding: This research was supported by the National Institute on Drug Abuse (NIDA) (grant R01-DA14496; D Hallfors, principal investigator). NIDA had no involvement in this study design; in the collection, analysis, or interpretation of data; or in the writing of this paper or the decision to submit the paper for publication.

## Key messages

- Our findings indicate that 3.5% of adolescents have ever exchanged sex for drugs or money and that a majority of these youths are boys.
- To our knowledge, this is the first report of the prevalence of sex exchange among adolescents using a nationally representative sample.
- Among youths who have exchanged sex, the median number of exchanges was one, suggesting that many youths may have exchanged sex for reasons other than survival.
- The likelihood of engaging in sex exchange is elevated for youths who are involved in drug use, have run away from home, are depressed, and have engaged in various sexual risk behaviours.
- 15% of boys and 20% of girls with a history of exchanging sex reported that they have ever been told they have HIV or another STI.

Competing interest: none.

## REFERENCES

- 1 Roy E, Haley N, Leclerc P, *et al.* Prevalence of HIV infection and risk behaviours among Montreal street youth. *Int J STD AIDS* 2000;**11**:241–7.
- 2 Kral AH, Bluthenthal RN, Booth RE, *et al.* HIV seroprevalence among street-recruited injection drug and crack cocaine users in 16 US municipalities. *Am J Public Health* 1998;**88**:108–13.
- 3 Tortu S, Goldstein M, Deren S, *et al.* Urban crack users: gender differences in drug use, HIV risk and health status. *Women Health* 1998;**27**:177–89.
- 4 Haley N, Roy E, Leclerc P, *et al.* HIV risk profile of male street youth involved in survival sex. *Sex Transm Infect* 2004;**80**:526–30.
- 5 Weber AE, Boivin JF, Blais L, *et al.* HIV risk profile and prostitution among female street youths. *J Urban Health* 2002;**79**:525–35.
- 6 Logan TK, Leukefeld C, Farabee D. Sexual and drug use behaviors among women crack users: implications for prevention. *AIDS Educ Prev* 1998;**10**:327–40.
- 7 Logan TK, Leukefeld, C. Sexual and drug use behaviors among female crack users: a multi-site sample. *Drug Alcohol Depend* 2000;**58**:237–45.
- 8 Logan TK, Cole J, Leukefeld C. Gender differences in the context of sex exchange among individuals with a history of crack use. *AIDS Educ Prev* 2003;**15**:448–64.
- 9 Tortu S, McCoy HV, Beardley M, *et al.* Predictors of HIV infection among women drug users in New York and Miami. *Women Health* 1998;**27**:191–204.
- 10 Edwards JM, Halpern CT, Wechsberg WM. Accepted for publication. Correlates of exchanging sex for drugs or money among women who use crack cocaine. *AIDS Educ Prev*.
- 11 Greene JM, Ennett ST, Ringwalt CL. Prevalence and correlates of survival sex among runaway and homeless youth. *Am J Public Health* 1999;**89**:1406–9.
- 12 Weber AE, Boivin JF, Blais L, *et al.* Predictors of initiation into prostitution among female street youths. *J Urban Health* 2004;**81**:584–95.
- 13 Yates GL, Mackenzie RG, Pennbridge J, *et al.* A risk profile comparison of homeless youth involved in prostitution and homeless youth not involved. *J Adolesc Health* 1991;**12**:545–8.
- 14 Weinstock H, Berman S, Cates W. Sexually transmitted diseases among American youth: incidence and prevalence estimates, 2000. *Perspect Sex Reprod Health* 2004;**36**:6–10.
- 15 Centers for Disease Control and Prevention. *Sexually transmitted disease surveillance, 2004*. Atlanta, GA: US Department of Health and Human Services, September, 2005.
- 16 Futterman DC. HIV in adolescents and young adults: half of all new infections in the United States. *Top HIV Med* 2005;**13**:101–5.
- 17 Harris KM, Florey F, Tabor J, *et al.* Add Health. The National Longitudinal Study of Adolescent Health: Research Design, 2003. Available at: <http://www.cpc.unc.edu/projects/addhealth/design> Accessed 12 October, 2005.
- 18 Radloff LS. The CES-D Scale: a self-report depression scale for research in the general population. *Appl Psychol Meas* 1977;**1**:385–401.
- 19 Rushton JL, Forcier M, Schectman RM. Epidemiology of depressive symptoms in the National Longitudinal Study of Adolescent Health. *J Am Acad Child Adolesc Psychiatry* 2002;**41**:199–205.
- 20 Goodman E, Capitman J. Depressive symptoms and cigarette smoking among teens. *Pediatrics* 2000;**106**:748–55.
- 21 Roberts RE, Lewinsohn PM, Seeley JR. Screening for adolescent depression: a comparison of depression scales. *J Am Acad Child Adolesc Psychiatry* 1991;**30**:58–66.
- 22 Turner CF, Ku L, Rogers SM, *et al.* Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. *Science* 1998;**280**:867–73.