

# Multiple Sexual Partners Among U.S. Adolescents And Young Adults

By John S. Santelli, Nancy D. Brener, Richard Lowry, Amita Bhatt and Laurie S. Zabin

**Context:** Because many teenagers and young adults fail to use condoms correctly and consistently, the number of sexual partners they have is an important risk factor for sexually transmitted diseases, including HIV. Identifying factors that are associated with having multiple partners can help in the design of disease interventions.

**Methods:** Data on 8,450 males and females aged 14–22 who participated in the 1992 Youth Risk Behavior Survey were used to examine the prevalence of and factors associated with young people's having multiple partners.

**Results:** In all, 63% of female respondents and 64% of males were sexually experienced. Among those who had had sex during the three months before the survey, 15% and 35%, respectively, had had two or more partners during that period. At each age, the majority of sexually experienced respondents had had more than one lifetime partner; between ages 14 and 21, the proportion who had had six or more rose from 8% to 31% among females and from 14% to 45% among males. In logistic regression analyses, alcohol use, illicit drug use and young age at first coitus were associated with increased odds that females had had two or more partners in the previous three months, and being married lowered the odds; black or Hispanic race or ethnicity, alcohol use and young age at first coitus increased the odds for males, and being married reduced the odds. As the number of reported alcohol-related behaviors increased, the adjusted proportion of respondents who had recently had multiple partners rose from 8% to 48% among females and from 23% to 61% among men.

**Conclusions:** The strong association between alcohol use and having multiple sexual partners underscores the need to educate young people about the effects of alcohol on partner choice and the risk of infection with sexually transmitted diseases.

Family Planning Perspectives, 1998, 30(6):271–275

Sexually transmitted diseases (STDs) are enormously costly to society in terms both of human pain and suffering and of health care expenditures. Among their consequences, STDs are potent cofactors in the sexual transmission of HIV.<sup>1</sup>

Of an estimated 12 million new STD infections that occur each year in the United States, three million occur among people younger than 20, and another four million occur among those aged 20–25.<sup>2</sup> The probability of acquiring an STD is the product of several risk factors, including age at first coitus, number of concurrent or sequential sexual partners, use of barrier methods of contraception, partner choice, prevalence of the disease in a community, access to health services for treatable STDs and biological factors, such as cervical ectopy (extension of the cervical mucosa around the opening of the cervix into the uterus).<sup>3</sup> An adolescent whose only lifetime sexual partner has ever had other partners is also at risk for STDs, particularly if the partner comes from a community with a high prevalence of infection.

Having multiple sexual partners represents an important behavioral risk fac-

tor for STDs among adolescents and young adults, especially if they fail to use condoms correctly and consistently. Most teenagers do not have multiple concurrent sexual partners; however, because many adolescent relationships are of short duration, teenagers often have multiple sequential partners.

Previous research has demonstrated that adolescents are more likely than adults to report having had multiple sexual partners in the recent past.<sup>4</sup> Adolescent males are more likely than adolescent females to report multiple sexual partners and multiple concurrent partners.<sup>5</sup> The number of lifetime sexual partners among adolescents is strongly related to the length of time since first coitus.<sup>6</sup>

Studies of primarily adult populations have identified several demographic markers for multiple sexual partners; younger age has consistently emerged as a risk marker. In the 1988 National Survey of Family Growth, among women 15–44 years old, risk factors for having more than one partner in the previous three months included having been young at first coitus, being younger than 30, being unmarried,

living in an urban area, having an income below 200% of the poverty line, working outside the home and having no religious affiliation. Unmarried teenagers were about as likely as unmarried women in their 20s to have had multiple partners.<sup>7</sup>

Similarly, in the National AIDS Behavioral Surveys, risk factors for multiple partners in the past year among 18–75-year-old men and women included male gender, younger age, unmarried status, urban residence and higher educational status (for whites).<sup>8</sup> Because of difficulties in obtaining accurate reports about a sexual partner's other relationships, few studies have been able to measure the STD risk associated with having a sexual partner who is not monogamous, although attempts have been made to estimate this risk.<sup>9</sup>

For a variety of social, physiological and individual reasons, alcohol and drug use among adolescents may influence sexual behavior, including an individual's number of partners. Use of alcohol and other substances has been associated with sexual risk behavior in some studies,<sup>10</sup> but most of these have focused on condom use. Prior use of alcohol and drugs greatly increases the risk of early initiation of sexual intercourse,<sup>11</sup> and beginning intercourse at a young age, having multiple partners and failing to use condoms are interrelated.<sup>12</sup>

Given the relationship between multiple sexual partners and STDs, the purpose of our study was to examine potential risk factors associated with having multiple sexual partners among youth in the United States. Our analysis was guided by three questions: What is the prevalence of having multiple partners among U.S. adolescents and young adults? After controlling

John S. Santelli and Richard Lowry are medical epidemiologists, and Nancy D. Brener is research psychologist, Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta. Laurie S. Zabin is professor, and Amita Bhatt is a graduate student, Department of Population Dynamics, Johns Hopkins University School of Hygiene and Public Health, Baltimore. The authors thank Jennifer Hirsch, Janet Collins, Stephen Banspach, Lloyd Kolbe, Diane Rowley and the editorial staff of the National Center for Chronic Disease Prevention and Health Promotion for their helpful suggestions.

**Table 1. Percentage of 14–22-year-old respondents who were sexually experienced, and percentage distribution of sexually experienced respondents, by number of partners in the past three months, according to gender, Youth Risk Behavior Survey, 1992**

Measure	Females (N=4,223)	Males (N=3,949)
% sexually experienced	62.5 (±1.9)	63.5 (±1.8)
% distribution by no. of recent partners		
0	15.4 (±1.7)	24.3 (±2.0)
1	71.8 (±2.0)	49.5 (±2.2)
2	8.2 (±1.2)	12.2 (±1.4)
≥3	4.6 (±0.9)	14.0 (±1.5)
Total	100.0	100.0

Note: Figures in parentheses are 95% confidence limits.

for demographic factors, are young people’s risk behaviors, particularly alcohol or drug use and early onset of sexual intercourse, associated with having multiple partners? Finally, what is the relationship between a young person’s number of sexual partners and his or her condom use? (The last question is important because individuals with multiple partners have the greatest need to use condoms.)

## Methods

### Data

Data for our analyses are from the 1992 National Health Interview Survey (NHIS) and Youth Risk Behavior Survey (YRBS). The NHIS is an annual household interview survey of the civilian, noninstitutionalized population of the United States; the survey uses a multistage probability cluster design to obtain data representative of the U.S. population, and it oversamples minority families.<sup>13</sup> The 1992 YRBS was conducted as a supplement to the 1992 NHIS.

The 1992 NHIS enumerated all 12–21-year-olds from sampled households, including those who were married and those who were living away from their family of origin. YRBS respondents were randomly selected from this list. Out-of-school youth were oversampled; one in-school and up to two out-of-school youth were selected from each family. A weighting factor was applied to each YRBS record to adjust for oversampling and nonresponse. The final sample was weighted to be representative of the population of youth aged 12–21 residing in U.S. households.

Youth were surveyed approximately two months after the initial household survey. Data collection used audio interview technology; participants privately listened through headphones to a tape recording of the questionnaire, and they recorded their responses on a standardized answer

sheet. This technique was used to address young people’s potential concerns about confidentiality with in-home interviewing. Most data included in our analysis were reported by the respondent, but the youth’s race, ethnicity, residence and marital status were reported by the adult who completed the core NHIS interview.

Of the 13,789 youth aged 12–21 who were selected at the time of the core survey, 10,645 (77%) were located and agreed to be interviewed. Our analysis excluded the 2,195 respondents aged 12–13, because the survey for this age-group did not ask about their sexual activity; the resulting sample consisted of 8,450 youth, including 126 who were 21 years of age at the time of the core NHIS but had turned 22 by the time of the YRBS.

We limited our analysis of lifetime sexual partners to the 5,223 respondents who were sexually experienced (i.e., had ever had sexual intercourse). Analyses related to the number of recent sexual partners and condom use were restricted to the 4,075 young people who were currently sexually active (i.e., had had intercourse in the previous three months). Specific analyses are based only on respondents who answered the relevant questions.

### Analytic Techniques

We used factor analysis to create scales for various risk behaviors. We initially examined items related to drug and alcohol use, weapon carrying and fighting, and age at first sexual intercourse. Males and females showed similar factor structures. Initial factor analysis suggested that risk behaviors clustered into two factors: one for substance use and one including weapon carrying, fighting and age at first

intercourse. The second factor showed poor internal consistency and could not be used to create a homogeneous scale.

After orthogonal rotation, substance use could be divided into two factors with eigen values of one or greater. The first factor described alcohol use and included five items: ever-use of alcohol, binge drinking (i.e., five or more drinks in a row) in the past 30 days, alcohol or other drug use immediately before the most recent intercourse, riding with a drinking driver in the past 30 days and driving immediately after drinking in the past 30 days. The second factor described illicit drug use and included three items: ever-use of marijuana, cocaine and other illicit drugs.

These factors were incorporated into scales for alcohol use (Cronbach alpha=.70 for males and .63 for females) and illicit drug use (Cronbach alpha=.71 for males and .68 for females). Scores were determined by the number of behaviors in which the adolescent had participated. A score of zero, for example, meant that none of the behaviors applied.

Because the number of sexual partners is highly skewed, we dichotomized each dependent variable and used logistic regression to estimate the independent influence of the predictors. The number of recent sexual partners was dichotomized as one versus two or more. Lifetime partners was dichotomized as 1–5 versus six or more. In building logistic models, we first examined cross-tabulations to identify potential independent predictors of multiple sexual partners.

We conducted separate analyses for males and females. Regression analyses used SUDAAN software to account for the complex, weighted sampling design.

**Table 2. Percentage distribution of sexually experienced respondents, by lifetime number of sexual partners, according to current age and gender**

No. of partners	Age							
	14	15	16	17	18	19	20	21
<b>Females</b>								
	(N=101)	(N=185)	(N=260)	(N=301)	(N=320)	(N=384)	(N=508)	(N=503)
1	43.6	41.8	45.6	36.8	33.8	29.4	23.7	19.7
2	31.2	22.6	20.6	20.3	16.5	15.6	13.4	13.9
3	10.3	9.9	11.8	15.1	19.1	12.2	13.8	15.1
4	5.7	6.6	6.1	8.1	7.9	10.3	11.4	11.9
5	1.7	5.1	4.0	6.8	6.9	8.4	7.5	8.2
≥6	7.5	13.8	11.9	12.9	15.9	24.1	30.3	31.1
<b>Males</b>								
	(N=134)	(N=198)	(N=269)	(N=310)	(N=329)	(N=350)	(N=429)	(N=407)
1	44.3	38.1	32.5	27.0	28.5	19.3	15.3	13.2
2	16.7	14.8	12.0	16.4	10.5	14.3	14.6	13.8
3	13.5	17.1	15.4	14.3	10.6	15.2	9.8	12.1
4	2.5	8.0	7.2	9.2	9.2	5.6	10.9	8.1
5	9.3	2.5	4.3	8.6	9.8	7.1	4.8	7.8
≥6	13.8	19.5	28.7	24.5	31.5	38.5	44.7	45.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: The number of 22-year-olds was too small for analysis.

**Table 3. Odds ratios reflecting the likelihood that currently sexually active respondents aged 14–22 had two or more sexual partners in the past three months, by various characteristics, according to gender**

Characteristic	Females (N=2,049)	Males (N=1,688)
<b>Age</b>	0.98 (0.91–1.06)	0.98 (0.91–1.06)
<b>Race/ethnicity</b>		
Black	1.37 (0.94–1.98)	2.81* (1.86–4.24)
Hispanic	1.11 (0.72–1.72)	1.43* (1.02–2.00)
White	1.00	1.00
<b>Residence</b>		
Urban	†	1.22 (0.88–1.69)
Rural	†	1.01 (0.73–1.39)
Suburban	†	1.00
<b>Marital status</b>		
Married	0.35* (0.22–0.55)	0.11* (0.05–0.22)
Widowed/ divorced/ separated	0.80 (0.23–2.73)	0.68 (0.17–2.64)
Never-married	1.00	1.00
<b>Alcohol use score‡</b>	1.68* (1.49–1.91)	1.60* (1.44–1.77)
<b>Illicit drug use score§</b>	1.22* (1.02–1.45)	0.96 (0.83–1.12)
<b>Age at first intercourse</b>		
≤13	1.98* (1.26–3.11)	3.52* (2.46–5.04)
14–15	1.25 (0.85–1.83)	2.18* (1.56–3.03)
≥16	1.00	1.00

\*p<.05. †Residence was not statistically significant for females and was therefore excluded from the analysis. ‡Six-point use scale with a range of 0–5. §Four-point use scale with a range of 0–3. Notes: For categorical variables, the reference group consists of currently sexually active youth who had one partner in the past three months. For age, the odds ratio represents the change in likelihood associated with each additional year of age; for the scored variables, the odds ratio represents the change associated with each one-point increase in the score. Figures in parentheses are 95% confidence intervals.

Variables evaluated as potential predictors included demographic characteristics (age; race or ethnicity; marital status; and urban, rural or suburban residence), the scales for alcohol and illicit drug use, and a sexual behavior variable (age at first coitus). Generally, we entered demographic factors first into each logistic analysis. We also assessed interactions between significant demographic variables and each independent variable or scale.

We used direct standardization with sample weights in SUDAAN to demonstrate the independent effect of the alcohol scale on having multiple sexual partners in the previous three months. Probabilities were standardized for age, race or ethnicity, marital status and age at first intercourse. SUDAAN was used to calculate 95% confidence intervals for estimates. All estimates were based on weighted data.

## Results

In all, 63% of females and 64% of males in our sample were sexually experienced (Table 1). Most sexually experienced re-

spondents (72% of females and 50% of males) reported having had one partner in the past three months, although sizable proportions reported no recent partners (15% and 24%, respectively) or more than one (13% and 26%, respectively). Among those who were currently sexually active, 35% of males and 15% of females reported two or more sexual partners in the previous three months (not shown).

At every age, most sexually experienced young people reported two or more lifetime partners (Table 2). A progression to multiple lifetime partners was apparent even among 14- and 15-year-olds. The proportion of sexually experienced youth reporting six or more lifetime sexual partners rose from 8% at age 14 to 31% at age 21 among females and from 14% to 45% among males. Correspondingly, the proportion reporting one lifetime partner declined steadily with age. Among 21-year-olds, only 20% of sexually experienced females and 13% of sexually experienced males reported a single lifetime partner.

Next, we examined cross-tabulations between an individual's number of recent sexual partners and potential risk factors (not shown). For females and males, age at first intercourse, alcohol use and illicit drug use were related to the number of sexual partners in the past three months. The proportion who had had multiple partners in the past three months increased from 7% among currently sexually active females who reported no alcohol-related behaviors to 61% among those who reported all five behaviors; among males, these proportions were 28% and 65%, respectively.

Married males and females had had fewer recent partners than their single counterparts. Among females, age, race or ethnicity and urban residence showed little relationship to the number of recent partners. Black males and males living in urban areas were somewhat more likely to report two or more partners than were those in other racial or ethnic groups and residents of nonurban areas.

Results of the first set of logistic regression analyses (Table 3) revealed that among those who were currently sexually active, married females were significantly less likely than their never-married counterparts to have had multiple partners in the past three months (odds ratio, 0.4). Alcohol use substantially raised the probability that a female had recently had multiple partners; the odds ratio (1.7) indicates that for each alcohol-related behavior a young woman reported, the likelihood that she had had multiple partners increased by about 70%. Illicit drug use also had a significant, al-

though smaller, effect (1.2). Finally, young women who first had sex before age 14 were about twice as likely to have had multiple partners as were those whose first intercourse occurred at age 16 or later (2.0).

For currently sexually active males, many of the results were similar to those for females. Being married lowered the probability of having had multiple partners (0.1), and alcohol use substantially increased the odds (1.6). Early initiation of sexual intercourse raised the probability of multiple partners, and the effect was greater than for females. However, several notable differences also emerged. Black and Hispanic males were significantly more likely than whites to report multiple partners in the past three months (odds ratios, 2.8 and 1.4, respectively); illicit drug use did not affect the odds.

Urban residence was not significant in the final calculations for males. However, because of multicollinearity between race or ethnicity and urban status, we reran the analyses with race or ethnicity removed (not shown). In these calculations, urban residents were significantly more likely than suburban males to have had multiple partners (odds ratio, 1.5; p<.001).

The analyses estimating the effects of various factors on the odds of having had six or more lifetime sexual partners yielded generally similar results for each gender (Table 4). Alcohol use and illicit drug use showed substantial impact for both (odds ratios, 1.4–1.9). Older current age and earlier age at sexual initiation significantly increased the odds of having had six or more lifetime partners; this finding is not surprising, since both of these factors in-

**Table 4. Odds reflecting the likelihood that sexually experienced respondents aged 14–22 have had six or more lifetime sexual partners, by various characteristics, according to gender**

Characteristic	Females (N=2,459)	Males (N=2,263)
<b>Age</b>	1.39* (1.31–1.48)	1.43* (1.35–1.52)
<b>Race/ethnicity</b>		
Black	1.69* (1.13–2.54)	2.63* (1.91–3.62)
Hispanic	0.42* (0.24–0.73)	1.39* (1.01–1.93)
White	1.00	1.00
<b>Alcohol use score†</b>	1.40* (1.26–1.56)	1.36* (1.23–1.50)
<b>Illicit drug use score‡</b>	1.94* (1.69–2.22)	1.49* (1.29–1.72)
<b>Age at first intercourse</b>		
≤13	6.81* (4.57–10.15)	12.54* (8.86–17.74)
14–15	2.41* (1.81–3.20)	4.99* (3.66–6.79)
≥16	1.00	1.00

\*p<.05. †Six-point use scale with a range of 0–5. ‡Four-point use scale with a range of 0–3. Notes: See notes to Table 3.

**Table 5. Standardized percentage of currently sexually active respondents aged 14–22 who had two or more sexual partners in the past three months, by alcohol use score, according to gender**

Alcohol use score	Females	Males
0	8.0 (±4.9)	23.3 (±5.6)
1	8.4 (±2.0)	23.8 (±3.6)
2	12.4 (±3.2)	28.5 (±3.7)
3	20.1 (±3.7)	38.1 (±5.0)
4	27.3 (±5.3)	39.6 (±5.1)
5	47.8 (±6.0)	60.8 (±6.8)

Notes: Percentages are standardized by age, race or ethnicity, marital status and age at first sexual intercourse. Figures in parentheses are 95% confidence intervals.

crease the period of time that a person has been sexually active. Black and Hispanic respondents were significantly more likely than their white peers to report six or more lifetime partners (odds ratios, 1.4–2.6), with one exception: Hispanic females had a reduced probability of this outcome (0.4).

Next, using direct standardization, we adjusted for the influence of age, race or ethnicity, marital status and age at first intercourse to examine the independent influence of alcohol on having multiple sexual partners. As the alcohol-use scale increased, the probability of reporting multiple partners rose dramatically (Table 5). Only 8% of currently sexually active females reporting no alcohol-related behaviors had had two or more sexual partners in the previous three months, compared with 48% reporting all five behaviors; among males, these proportions were 23% and 61%, respectively.

Finally, we examined the association between having multiple partners and condom use. Overall, 35% of currently sexually active females and 53% of similar males said they had used condoms at last intercourse (Table 6). Condom use at last intercourse showed no relationship with the number of partners in the past three months. Respondents who had not had sex in the previous three months were more likely than those who were currently sexually active to have used a condom the last time they had intercourse (not shown).

## Discussion

Our analyses yield findings that will be of use to health care practitioners and health educators seeking to reduce adolescents' risk of infection with HIV and other STDs. We found that most sexually experienced youth at every age have had two or more lifetime sexual partners, and many have had six or more. Many young people have recently had multiple sexual partners, which should not be unexpected, given the

instability of many relationships among adolescents and young adults.

Consistent with earlier studies, involving primarily adult samples,<sup>14</sup> we find that demographic factors and early age at first intercourse are associated with young people's odds of having had multiple partners. Additionally, however, our analyses reveal that alcohol and drug use are significant determinants of their lifetime number of partners, and alcohol-related behavior is one of the most important risk factors for multiple sexual partners in the recent past.

The association between alcohol or other drug use and risky sexual behavior may be explained through social, physiological or individual mechanisms.<sup>15</sup> Alcohol may disinhibit judgment and behavior via physiological or socially learned mechanisms. Alternatively, a youth's personal characteristics (e.g., a risk-taking personality profile) or social environment (situational factors) may lead both to alcohol or drug use and to risky sexual activity.

The relationship between alcohol use and multiple sexual partners meets three criteria for suggesting causation on the basis of epidemiologic data: a strong association, evidence of a dose-response relationship and biological plausibility.<sup>16</sup> We believe that these data are consistent with several explanations for the effect of alcohol. Further research is needed into the mechanisms by which alcohol influences the initiation of new sexual partnerships.

Our finding of an association between a past event (early initiation of intercourse) and current behavior (having multiple partners in a three-month period) is consistent with findings from other studies that age at first intercourse is a risk marker for sexual risk behavior, such as failing to use condoms<sup>17</sup> and having multiple sexual partners,<sup>18</sup> long after sexual initiation. This association suggests the influence of a relatively stable personality characteristic—perhaps “unconventionality,” as described in problem behavior theory,<sup>19</sup> or a biological predisposition to “sensation-seeking.”<sup>20</sup>

The development of young adults' risk behaviors is influenced by a complex set of biological, social environmental, perceived environmental, personality and behavioral factors.<sup>21</sup> Early initiation of intercourse has been related to sexual abuse,<sup>22</sup> which may influence personality variables such as self-esteem and perceived value of health that, in turn, could influence decisions about sexual partners.

Our data show both similarities and differences in numbers of sexual partners by gender. Adolescent males were more like-

ly than females to report multiple partners, both in the past three months and over their lifetime. Sexually experienced males were also more likely to report having had no partners in the previous three months. These patterns suggest fundamental differences in the stability of relationships for males and females, and may reflect different approaches to experiencing and understanding sexual relationships. Despite these differences, similar sets of risk factors were associated with multiple partners among males and females.

In considering our results, it is important to be aware of certain limitations of the analysis. The YRBS was designed as a behavioral surveillance tool, not as a method of providing in-depth information about particular behaviors. It offers little information about peer norms, personality traits or factors such as self-efficacy that may influence decision-making about sexual partners, or same-sex sexual behaviors. In addition, although the YRBS had good test-retest reliability, self-reported sexual behaviors are difficult to validate.<sup>23</sup>

An important limitation of cross-sectional surveys that enumerate respondents' recent or lifetime sexual partners is that they do not distinguish between sequential and concurrent partners. Further, an enumeration of sexual partners provides no information about partner characteristics that may be related to behavioral risk factors associated with STDs. Nor does the number of sexual partners directly translate into the risk of STD infection, which also depends on such factors as STD prevalence and use of barrier protection. On the other hand, the number of partners as a summary measure has emerged in many studies as an important behavioral risk factor for STD transmission.<sup>24</sup> Another limitation of cross-sectional surveys is that whereas they can find associations among behaviors, they cannot prove causality.

Thus, although more research is needed, it is clear that health care practitioners and health educators need to stress the connections among alcohol use, multiple sexual partners and the risk of infection with

**Table 6. Percentage of currently sexually active respondents aged 14–22 who used a condom at last intercourse, by number of partners in the past three months, according to gender**

No. of partners	Females	Males
<b>Total</b>	<b>35.4 (±2.6)</b>	<b>52.5 (±2.7)</b>
1	36.0 (±2.7)	50.2 (±3.3)
2	30.6 (±7.7)	55.9 (±6.6)
≥3	34.5 (±9.5)	57.8 (±6.2)

Note: Figures in parentheses are 95% confidence intervals.

HIV and other STDs. Counseling and education should help adolescents and young adults understand the potentially negative effect of drinking on judgment about partner choice and the connection between the use of alcohol or other drugs and risky sexual behaviors in certain social contexts.

## References

1. Wasserheit JN, Epidemiological synergy: interrelationships between HIV infection and other STDs, *Sexually Transmitted Diseases*, 1992, 19(2):61-77.
2. Kassler WJ and Cates W Jr., The epidemiology and prevention of sexually transmitted diseases, *Urologic Clinics of North America*, 1992, 19(1):1-12.
3. Cates W Jr., The epidemiology and control of sexually transmitted diseases in adolescents, *Adolescent Medicine: State of the Art Reviews*, 1990, 1(3):409-428; Aral SO and Holmes KK, Epidemiology of sexual behavior and sexually transmitted diseases, in: Holmes KK et al., eds., *Sexually Transmitted Diseases*, second ed., New York: McGraw-Hill, 1990; and Santelli JS and Beilenson P, Risk factors for adolescent sexual behavior, fertility, and sexually transmitted diseases, *Journal of School Health*, 1992, 62(7):271-279.
4. Forrest JD and Singh S, The sexual and reproductive behavior of American women, 1982-1988, *Family Planning Perspectives*, 1990, 22(5):206-214.
5. Smith TW, Adult sexual behavior in 1989: number of partners, frequency of intercourse and risk of AIDS, *Family Planning Perspectives*, 1991, 23(3):102-107.
6. Durbin M et al., Factors associated with multiple sex partners among junior high school students, *Journal of Adolescent Health*, 1993, 14(3):202-207.
7. Seidman SN, Mosher WD and Aral SO, Women with multiple sexual partners: United States, 1988, *American Journal of Public Health*, 1992, 82(10):1388-1394; and Kost K and Forrest JD, American women's sexual behavior and exposure to risk of sexually transmitted diseases, *Family Planning Perspectives*, 1992, 24(6):244-254.
8. Binson D et al., Multiple sexual partners among young adults in high-risk cities, *Family Planning Perspectives*, 1993, 25(6):268-272; and Dolcini MM et al., Demographic characteristics of heterosexuals with multiple partners: the National AIDS Behavioral Surveys, *Family Planning Perspectives*, 1993, 25(5):208-214.
9. Kost K and Forrest JD, 1992, op. cit. (see reference 7).
10. Lowry R et al., Substance use and HIV-related sexual behaviors among U.S. high school students: are they related? *American Journal of Public Health*, 1994, 84(7):1116-1120; Leigh BC, Alcohol and unsafe sex: an overview of research and theory, in: Seminara D, Watson RR and Pawlowski A, eds., *Alcohol, Immunomodulation, and AIDS*, New York: Alan R. Liss, 1990, pp. 35-46; Halpern-Felsher BL, Millstein SG and Ellen JM, Relationship of alcohol use and risky sexual behavior: a review and analysis of findings, *Journal of Adolescent Health*, 1996, 19(5):331-336; Fortenberry JD, Adolescent substance use and sexually transmitted diseases risk: a review, *Journal of Adolescent Health*, 1995, 16(4):304-308; and Ferguson DM and Lynskey MT, Alcohol misuse and adolescent sexual behaviors and risk taking, *Pediatrics*, 1996, 98(1):91-96.
11. Rosenbaum E and Kandel DB, Early onset of adolescent sexual behavior and drug involvement, *Journal of Marriage and the Family*, 1990, 52(3):783-798.
12. Orr DP, Beiter M and Ingersoll G, Premature sexual activity as an indicator of psychosocial risk, *Pediatrics*, 1991, 87(2):141-147; Sonenstein FL, Pleck JH and Ku LC, Sexual activity, condom use and AIDS awareness among adolescent males, *Family Planning Perspectives*, 1989, 21(4):152-158; DiClemente RL et al., Determinants of condom use among junior high school students in a minority, inner-city school district, *Pediatrics*, 1992, 89(2):197-202; Upchurch DM et al., Prevalence and patterns of condom use among patients attending a sexually transmitted disease clinic, *Sexually Transmitted Diseases*, 1992, 19(3):175-180; and Orr DP and Langefeld CD, Factors associated with condom use by sexually active male adolescents at risk for sexually transmitted disease, *Pediatrics*, 1993, 91(5):873-879.
13. Adams PF et al., Health risk behaviors among our nation's youth: United States, 1992, *Vital and Health Statistics*, 1995, No. 192; and Benson V and Marano MA, Current estimates from the National Health Interview Survey 1992, *Vital and Health Statistics*, 1994, No. 189.
14. Seidman SN, Mosher WD and Aral SO, 1992, op. cit. (see reference 7); Kost K and Forrest JD, 1992, op. cit. (see reference 7); Binson D et al., 1993, op. cit. (see reference 8); and Dolcini MM et al., 1993, op. cit. (see reference 8).
15. Leigh BC, 1990, op. cit. (see reference 10); Halpern-Felsher BL, Millstein SG and Ellen JM, 1996, op. cit. (see reference 10); Fortenberry JD, 1995, op. cit. (see reference 10); and Ferguson DM and Lynskey MT, 1996, op. cit. (see reference 10).
16. Last JM, Epidemiology and health information, in: Last JM et al., eds., *Public Health and Preventive Medicine*, 12th ed., Norwalk, CT: Appleton-Century-Croft, 1986.
17. Greenberg J, Magder L and Aral S, Age at first coitus: a marker of risky sexual behavior in women, *Sexually Transmitted Diseases*, 1992, 19(6):331-334; and Orr DP, Beiter M and Ingersoll G, 1991, op. cit. (see reference 12).
18. Seidman SN, Mosher WD and Aral SO, 1992, op. cit. (see reference 7); Kost K and Forrest JD, 1992, op. cit. (see reference 7); Binson D et al., 1993, op. cit. (see reference 8); and Dolcini MM et al., 1993, op. cit. (see reference 8).
19. Donovan JE and Jessor R, Structure of problem behavior in adolescence and adulthood, *Journal of Consulting and Clinical Psychology*, 1985, 53(6):890-904.
20. Alexander CS et al., A measure of risk taking for young adolescents: reliability and validity assessments, *Journal of Youth and Adolescence*, 1990, 19(6):559-569; and Zuckerman M, Sensation seeking: a comparative approach to a human trait, *Behavior and Brain Science*, 1984, 7:413-471.
21. Jessor R, Risk behavior in adolescence: a psychosocial framework for understanding and action, *Journal of Adolescent Health*, 1991, 12(8):597-605.
22. Nagy S, DiClemente RJ and Adcock AG, Adverse factors associated with forced sex among southern adolescent girls, *Pediatrics*, 1995, 96(5):944-946.
23. Brener ND et al., Reliability of the Youth Risk Behavior Survey questionnaire, *American Journal of Epidemiology*, 1995, 141(6):575-580.
24. Aral SO and Holmes KK, 1990, op. cit. (see reference 3).