

Original article

Trends in adolescent contraceptive use, unprotected and poorly protected sex, 1991–2003

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Abstract

Purpose: To estimate trends in use and nonuse of effective protection among adolescents 1991–2003, and to assess factors associated with poorly protected sex in 2003.

Methods: We analyzed seven Youth Risk Behavior Surveys (YRBSs) of 9th–12th graders conducted from 1991 through 2003. We estimated trends in use of condoms, effective contraception, withdrawal, and no method, using linear logistic regression models, and evaluated correlates of the use of no method or withdrawal in 2003.

Results: Throughout 1991–2003, about one third of students reported that they had been sexually active in the previous 3 months. Condom use increased significantly throughout 1991–2003, from 46.2% (\pm 3.3%) in 1991 to 63.0% (\pm 2.5%) in 2003, and the percentage reporting use of either withdrawal or no method steadily declined, from 32.6% (\pm 2.7%) to 18.8% (\pm 2.1%). In 2003, use of withdrawal or no method was greater among females, Hispanics, those who had been pregnant or had caused a pregnancy, and those who reported feeling sad or hopeless or had considered suicide.

Conclusions: Reported unprotected sex decreased, while use of condoms increased. A high-risk group engaging in poorly protected sex was identified, accounting for 6.4% of students. © 2006 Society for Adolescent Medicine. All rights reserved.

Keywords:

Trends; Contraceptive use; Unprotected sex; Risk behavior

Adolescent sexual activity has many adverse consequences, among them the risk of unplanned pregnancy and sexually-transmitted infections including HIV [1]. Almost half of high-school students report being sexually experienced, and one third report having had recent sexual intercourse [2]. The federal government has set specific objectives for delaying the initiation of sexual activity, for promoting abstinence and, among those who are sexually active, for increasing the use of condoms and the use of effective birth control [3]. The past 40 years have witnessed enormous change in adolescent sexual activity, use of condoms and contraceptive methods, rates of sexually-transmit-

ted diseases, and pregnancy. Since the late 1980s, sexual risk behaviors among adolescents have changed, and outcomes for these behaviors have generally improved. For example, during this time period, the percentage of teenagers who reported being sexually experienced declined [4–6] and, among those who were sexually active, the use of contraception increased [4–6]. Between 1991 and 2002, the rate of gonorrhea among 15–19-year-olds declined from 1031.4 to 476.4 per 100,000 [7,8], and the overall pregnancy rate (including live births, induced abortions, and fetal losses) for 15–19-year-olds declined from 116.3 pregnancies per 1000 women to 84.5 per 1000 women between 1990 and 2000 [9]. Analysis of vital statistics and survey data suggests that both changes in sexual activity and in contraceptive use were important determinants of decline in pregnancy rates observed for teenagers [10].

We used a series of seven nationally representative

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Table 1
Use of condoms and contraceptive methods during last sexual intercourse for 9th–12th-grade students, sexually active in the past 3 months, 1991–2003 YRBS^a

Total	Condom		Pill		Depo Provera		Hormonal: pill or Depo		Dual use: condom and hormonal		Withdrawal		No method		Unprotected: withdrawal or no method		N
	%	CI	%	CI	%	CI	%	CI	%	CI	%	CI	%	CI	%	CI	
Year																	
1991	46.2*	3.3	20.8	2.3			20.8*	2.3	3.2*	.7	17.0*	2.5	15.6*	1.8	32.6*	2.7	4698
1993	52.8	2.7	18.4	2.1			18.4	2.1	3.7	.7	13.7	1.3	14.7	1.6	28.4	1.9	6441
1995	54.4	3.5	17.4	2.2			17.4	2.2	4.3	.9	13.6	2.0	14.8	2.2	28.4	1.9	4482
1997	56.8	1.6	16.6	2.0			16.6	2.0	5.3	1.5	12.2	1.3	14.3	1.7	26.5	1.8	6077
1999	58.0	4.2	16.2	2.6	3.4	.9	19.5	3.1	4.8	1.1	9.9	1.3	13.8	1.7	23.7	2.2	5628
2001	57.9	2.2	18.2	1.7	4.4	.8	22.6	1.8	7.2	.8	11.0	1.6	12.3	1.5	23.3	2.2	4658
2003	63.0	2.5	17.0	2.3	3.8	1.0	20.7	2.6	6.8	1.3	8.9	1.5	9.9	1.4	18.8	2.1	5218
Male																	
1991	54.5*	3.8	16.5	2.6			16.5	2.6	3.3*	1.2	15.2*	2.4	13.6*	2.5	28.7*	2.6	2367
1993	59.2	3.8	14.7	2.7			14.7	2.7	3.2	1.0	11.4	1.2	13.4	1.9	24.7	2.1	3259
1995	60.5	4.3	14.3	3.5			14.3	3.5	5.1	2.1	12.2	2.9	12.8	2.9	25.0	3.5	2172
1997	62.5	2.8	13.0	2.7			13.0	2.7	4.6	1.7	9.5	1.8	14.0	2.3	23.5	2.0	3023
1999	65.5	4.3	11.8	4.4	1.6	.9	13.4	4.4	3.4	.9	8.1	1.7	11.6	2.5	19.7	2.0	2813
2001	65.1	2.7	14.9	1.9	3.0	1.0	17.9	2.0	7.0	1.4	9.3	1.5	10.5	1.7	19.8	2.1	2278
2003	68.8	2.6	13.1	2.1	2.4	1.0	15.6	2.4	5.5	1.5	7.1	1.6	8.4	1.4	15.5	1.7	2608
Female																	
1991	38.0*	4.3	25.0	3.8			25.0*	3.8	3.1*	1.0	18.9*	3.7	17.5*	2.3	36.5*	4.5	2329
1993	46.1	2.8	22.4	2.6			22.4	2.6	4.2	1.0	16.2	1.6	15.9	2.1	32.1	2.3	3168
1995	48.6	5.2	20.4	3.0			20.4	3.0	3.6	.8	14.9	2.7	16.8	2.7	31.8	2.5	2299
1997	50.8	3.0	20.5	2.9			20.5	2.9	6.1	1.9	15.2	2.1	14.5	1.9	29.7	3.1	3049
1999	50.7	5.8	20.4	2.7	5.0	1.3	25.4	3.2	6.0	1.5	11.7	1.7	15.9	2.9	27.6	4.0	2785
2001	51.3	3.4	21.1	2.7	5.7	1.3	26.8	2.5	7.5	1.3	12.6	2.6	13.9	2.1	26.5	3.3	2360
2003	57.4	3.1	20.6	3.1	5.1	1.5	25.7	3.6	8.0	1.9	10.7	2.1	11.4	2.0	22.2	3.1	2584

^a Based on following questions asked of both male and female students:

* $p < .05$, linear increase or decrease based on logistic regression with year of survey, controlling for grade sex, and race/ethnic group.

CI: 95% confidence interval, percentage +/- value shown “The last time you had sexual intercourse, did you or your partner use a condom?” “The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy?”

school-based surveys, the Youth Risk Behavior Survey (YRBS), which were conducted in alternating years from 1991 through 2003, to observe trends in contraceptive use by method. Data from these seven YRBS surveys indicate that there has been a steady and statistically significant drop in the percentage of students who reported that they have ever had sexual intercourse, and have had four or more lifetime partners [2], while the percentage who reported sexual intercourse in the 3 months before the survey stayed about the same [5]. In the analysis presented, we traced 1991–2003 trends in contraceptive use among the sexually-active students and identified a group at particularly high risk, those high-school students who were sexually active, but during their most recent sexual intercourse either did not use any method or used withdrawal as a method, and examined the correlates of this risk behavior.

Methods

The YRBS was conducted in 1991, 1993, 1995, 1997, 1999, 2001, and 2003. Each YRBS survey was designed as

an independent sample of 9th- through 12th-grade students representative of all students in the United States; samples of 10,904–16,262 were collected for the seven surveys, with overall response rates of 60–70% [2,11]. Students completed self-administered paper questionnaires, and entered answers on machine-readable booklets. The questionnaire asked whether students had ever had sexual intercourse, and if yes, how many lifetime partners they had, and the number partners they had in the past 3 months. Separate questions were asked about condom use and contraceptive method at last sexual intercourse. (Table 1). For condom and contraceptive use we limited attention to those students who reported having had at least one sex partner in the past 3 months, and defined the percentage using condoms, pill, injectable contraceptives (first asked in 1999), hormonal contraceptives (either pill or injectable), dual use of hormonal contraceptives and condoms, withdrawal, and no method. Dual use was defined as those who reported condom use and reported either pill or injectable on the question on pregnancy prevention method. For those who were sexually active, we assessed the statistical significance of

trends in measures of condom and contraceptive use, using linear logistic regression models for each item by the year of survey, controlling statistically for grade, sex, and race/ethnic group. We used the linear regression slope as a measure of the average increase or decrease over the 12-year period, and tested whether the slope was significantly different from zero as a measure of whether the trend in each item was, on the average, upward or downward.

For students interviewed in 2003, we defined a group at high risk, those sexually-active 9th–12th graders who reported using no method, or use of withdrawal the most recent time they had sexual intercourse. We assessed the statistical significance of bivariate associations of this variable with a series of covariates using χ^2 . The covariates included sociodemographic measures (gender, age, school grade, race/ethnicity, region of residence), and other risk factors measured on the YRBS that might be related to poorly protected sexual activity: number of recent sex partners, pregnancy history, cigarette and alcohol consumption, illegal drug use, history of forced sex, and drug or alcohol used during last sexual intercourse. Because risky adolescent sex has been found to be associated with depression, poor self-image, and related factors [12–15], we included risk factors measuring items of this type that were available on the YRBS: considering suicide in the past year, feeling sad or hopeless for 2 weeks or more in the past year, slightly or very overweight body image, and watching television for three or more hours per school day. To assess which of these factors were independently associated with use of no method or withdrawal, we developed a multiple logistic regression model, and reduced the model using stepwise methods to include only the statistically significant predictors. All confidence intervals and statistical tests were adjusted for the complex sample design using statistical software for analyzing data from complex samples (SUDAAN). We used a .05 level of significance throughout. Although we have done a relatively limited number of statistical tests, the results may be affected by multiple comparisons. About 1 in 20 significant findings could be expected to have occurred at random. The size of the difference should also be taken into account when assigning importance to a given finding.

Results

In the 2003 YRBS, 34.3% percent of respondents (95% confidence interval [CI], $\pm 2.1\%$) reported having sexual intercourse with at least one person in the 3 months before the survey. Among sexually-active students, the data from the seven surveys indicate steadily increasing condom use throughout the 1991–2003 period for both male and female students, a statistically significant linear trend (Table 1). For both sexes, the percent reporting condom use during last sexual intercourse increased from 46.2% to 63.0%. Oral contraceptive use did not have a statistically significant trend during this

period. In the 1999, 2001, and 2003 surveys, 3–4% of sexually active students reported Depo-Provera use. The addition of Depo-Provera at the end of the period compensates for the lower percentage reporting oral contraceptives, resulting in a trend in hormonal use in which the percentage at the beginning and end of the period are almost the same, i.e., 20.7% and 20.8% for both sexes combined in 1991 and 2003. For both sexes combined, and for females, the linear regression analysis has a statistically significant upward trend in use of hormonal contraceptives, mainly reflecting gains in these methods between 1993–1995 and 2001–2003, indicating that, on average, hormonal use was increasing over this period. Table 2 also indicates a statistically significant trend toward greater dual use (simultaneous use of condom and hormonal contraceptives) that was reported by 6.8% of sexually-active male and female students in 2003. In general, gender-specific methods are reported at a higher rate by the gender most directly involved. That is, condom use is reported to a higher degree by males (68.8% in 2003 vs. 57.4% for females), and hormonal methods by females (25.7% in 2003, compared to 15.6% for males).

The 12-year time series indicates the decline in the percentage of sexually-active high-school students reporting the use of withdrawal or no method at last sex. Withdrawal declined from 17.0% to 8.9%, no method from 15.6% to 9.9%. The combination of these two categories measuring unprotected or poorly protected sex declined from 32.6% to 18.8%. All three of these indicators (withdrawal, no method, and the combination of the two) had statistically significant downward trends for the combined sexes and for males and females separately. Males reported a lower percentage of withdrawal or no method in 2003 (15.5% compared to 22.2% for females).

According to the bivariate χ^2 analysis, significant differences in poorly protected sex were found for gender, race/ethnicity, and having been pregnant or caused a pregnancy (Table 2). A higher percentage engaging in poorly protected sex was found for persons reporting a number of risk factors: use of cocaine, four or more sex partners in the past 3 months, use of alcohol or drugs during last sex, or ever having been forced to have sex. Finally, a higher percentage reporting no method or withdrawal was found for persons reporting feeling sad or hopeless, those who had seriously considered suicide, and those who considered themselves slightly or very overweight.

Results of the multivariate analysis of factors independently associated with use of withdrawal or no method during last sexual intercourse (Table 3) indicate the following categories reporting more poorly protected sex: females, Hispanic students, those who had ever been pregnant or caused a pregnancy, and those who had seriously considered suicide in the past year or felt sad or hopeless. In this multivariate analysis, the use of withdrawal or no method was not associated with any of the other variables considered for the model including age, alcohol consumption, four or more recent sex partners, or drug or sex risk behavior.

Table 2
 Factors associated with unprotected or poorly protected last sex (withdrawal or no method) for 9th–12th-grade students, sexually active in the past 3 months, 2003 YRBS

	%	95% CI		N
Total	18.8	16.8	20.9	5218
Male	15.5*	13.8	17.2	2608
Female	22.2	19.1	25.3	2584
Age < 15 years	18.7	10.2	27.2	225
15	14.7	10.8	18.6	813
16	19.4	16.1	22.6	1317
17	20.5	17.8	23.3	1688
18+	19.6	15.0	24.2	1162
9th grade	16.0	11.3	20.6	781
10th grade	17.6	13.7	21.5	1107
11th grade	19.8	17.4	22.3	1486
12th grade	20.1	17.4	22.8	1813
Caucasian	16.8*	13.9	19.7	1861
African American	14.7	12.3	17.2	1547
Hispanic	27.5	23.6	31.3	1497
Others	22.3	14.9	29.6	285
Ever pregnant or caused pregnancy	31.9*	27.5	36.3	737
Others	17.3	15.2	19.4	4460
Northeast region	16.7	11.9	21.5	680
Midwest	16.6	12.1	21.2	847
South	21.3	19.2	23.4	2977
West	19.1	15.5	22.7	714
Metro area central city	19.5	16.4	22.5	2202
Metro area outside central city	17.3	14.6	20.0	2261
Non-metro area	21.9	17.5	26.3	755
Smoked cigarettes in past month	20.8	17.6	24.0	1831
Others	18.7	16.0	21.5	3059
Drank alcohol in past month	19.5	17.2	21.8	3244
Others	18.9	15.3	22.5	1666
Ever used marijuana	19.4	17.1	21.7	3460
Others	18.2	14.9	21.6	1660
Ever used heroin	23.7	15.3	32.1	246
Others	18.6	16.5	20.7	4943
Ever used cocaine	26.2*	21.2	31.1	875
Others	17.5	15.3	19.7	4288
4 or more sex partners past 3 months	25.0*	19.5	30.6	452
Others	18.3	16.1	20.5	4766
Alcohol/drugs used during last sex	22.8*	18.4	27.1	1287
Others	17.5	15.5	19.6	3907
Drug or sex risk**	22.8	18.4	27.1	566
Others	18.4	16.2	20.6	4652
Ever forced to have sex against will	26.3*	22.9	29.8	752
Others	17.3	15.1	19.5	4431
Seriously considered suicide past year	27.1*	23.8	30.3	1081
Others	16.3	14.1	18.5	4127
Felt sad/hopeless for 2 weeks past year	24.4*	21.3	27.4	1883
Others	15.6	13.6	17.7	3312

Table 2
Continued

Described weight as slightly/very overweight	23.2*	20.5	25.9	1394
Others	17.2	14.9	19.6	3779
3+ hours TV on average school day	21.4	18.7	24.1	2330
Others	17.3	14.4	20.2	2782
Ever had HIV/AIDS education	18.6	16.3	21.0	4447
Others	20.6	14.8	26.3	658

* $p < .05$, bivariate χ^2 .

** Four sex partners in past 3 months or lifetime drug injection.

The final multivariate regression model was tested for goodness of fit using the Hosmer-Lemeshow χ^2 statistic, which was not statistically significant, indicating adequate fit for the model.

Discussion

The seven national surveys conducted as part of the YRBS over the 1991–2003 period indicate that during this period when reported sexual experience was declining, among those who were sexually active, there was steadily increasing reported condom and contraceptive use, and a steadily decreasing percentage who reported using no method or withdrawal during last sexual intercourse. Overall hormonal contraceptive use (use of either the pill or Depo-Provera) changed little over time, although a shift from the pill to Depo-Provera occurred. It will be interesting

Table 3
Logistic regression model: multivariate adjusted odds ratios (AORs)
Factors associated with unprotected or poorly protected last sex
(withdrawal or no method) 9th–12th grade students, sexually active in
the past 3 months, 2003 YRBS

	Logistic regression model		
	AOR	95% CI	
Total			
Male	0.7	.6	.9
Female	1.0		
Caucasian	1.0		
African American	0.8	.6	1.1
Hispanic	1.8	1.4	2.3
Others	1.3	.8	2.1
Ever pregnant or caused pregnancy	1.9	1.5	2.5
Others	1.0		
Seriously considered suicide past year	1.5	1.2	1.9
Others	1.0		
Felt sad/hopeless for 2 weeks past year	1.3	1.03	1.6
Others	1.0		
Unweighted n	5218		

AORs (adjusted odds ratios) are based on reduced logistic regression models including only significant predictors, $p < .05$ (variables shown).

to see if any effect on reported Depo-Provera use is apparent in the 2005 YRBS, which followed the November 2004 “black-box” warning issued by the Food and Drug Administration concerning the effect of long-term use on loss of bone density [16].

Dual use of condoms together with a hormonal method approximately doubled from 1991 to 2003, but was still used by only 6.8% of sexually-active high-school students. These changes in contraceptive behaviors are consistent with other observed trends over this period for teenagers, including declining gonorrhea rates [7,8] and pregnancy rates [9,10]. The period covered by these surveys is one in which there was increasing awareness of serious sexually-transmitted infections, including HIV, and the importance of prevention, and survey data show upward trends in reported condom use among both adolescents and adults [5,6,17,18].

While efforts to prevent sexually-transmitted diseases (STDs), HIV, and unplanned pregnancy emphasize abstinence and delay of sexual debut, it is important for prevention programs to identify the residual group of sexually-active teens that remains at high risk through unprotected or poorly protected sexual activity. Based on the estimates presented here, this residual group would be relatively small, accounting for 18.8% of the 34.3% who were sexually active, or about 6.4% of high-school students. The analysis presented here found that certain categories of sexually-active high-school students were more likely to use no method or withdrawal, female and Hispanic students, for example. Thinking about suicide and feeling sad or hopeless were found to be strongly associated with unprotected or poorly protected risk sex, similar to previous studies [12–15].

The 1991–2003 YRBS data are designed to produce nationally representative estimates of students attending high school, and do not necessarily reflect behaviors of high-school-age youth who do not attend school, nationally about 5% of 16–17-year-olds [19]; out-of-school youth have been found to engage in risk behaviors to a greater extent than school attending youth [20]. The YRBS as a survey relies on self-reported data, which contain some unknown level of reporting error. The YRBS questionnaire has been evaluated and found to have good test-retest reli-

ability [21] and estimates of sexual behavior and condom use variables from the YRBS are comparable to other surveys of adolescents [22]. The contraceptive-use variables used here are based on the last sexual intercourse, and do not necessarily reflect behavior during previous sexual activity, or with other partners. In assessing 1991–2003 trends, we used the linear regression slope. This provides a useful measure the average increase or decrease over 12-year period, but some items may have had non-linear patterns of change.

The YRBS collects information on a wide variety of risk factors, but relatively few explanatory variables that would be needed for in-depth analysis. The YRBS provides the ability to assess trends through repeated measurements at several frequently-spaced points in time, thereby providing the ability to closely monitor trends and assess the overall impact of interventions. The results need to be interpreted in the context of ongoing research on adolescent risk behavior, including those studies that provide more detailed measurement of the determinants of adolescent risky sexual behavior.

Among sexually-active teenagers, the data from the 1991–2003 YRBS clearly show a 12-year trend toward high-school students reporting a greater degree of protection during recent sexual intercourse. An increase in condom use and steady use of hormonal contraceptives has resulted in a declining percentage reporting use of withdrawal or no method. Despite overall improvement in contraceptive use, students with certain characteristics are more likely to report this risky behavior: females, Hispanics, and those who think about suicide or feel sad or hopeless. Reaching these students should be part of a comprehensive program to reduce the incidence of STDs, HIV, and unplanned pregnancy among adolescents.

References

- [1] Alan Guttmacher Institute. Sex and America's Teenagers. New York, NY and Washington, DC: The Alan Guttmacher Institute, 1994.
- [2] Grunbaum JA, Kann L, Kinchen SA, et al. Youth Risk Behavior Surveillance—United States, 2003. Centers for Disease Control and Prevention. Surveillance Summaries. MMWR 2004;53:1–96.
- [3] [http://www.healthypeople.gov/Document/tableofcontents.htm#Volume2;objectives 9–10, 13–6, and 25–11](http://www.healthypeople.gov/Document/tableofcontents.htm#Volume2;objectives%209-10,%2013-6,%20and%2025-11). Accessed May 24, 2004.
- [4] Abma JC, Sonenstein FL. Sexual activity and contraceptive practices among teenagers in the United States, 1988 and 1995. National Center for Health Statistics. Vital Health Stat 2001;23(21):1–81.
- [5] Brener N, Lowry R, Kann L, et al. Trends in sexual risk behaviors among high school students—United States, 1991–2001. MMWR 2002;51:856–9.
- [6] Abma JC, Martinez GM, Mosher WD, Dawson BS. Teenagers in the United States: Sexual activity, contraceptive use, and childbearing, 2002. Vital Health Stat 2004;23:24.
- [7] Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 1993. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, December 1994.
- [8] Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 2002. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, September 2003.
- [9] Ventura SJ, Abma JC, Mosher WD, Henshaw S. Estimated pregnancy rates for the United States, 1990–2000: An update. Natl Vital Stat Rep 2004;52:1–9.
- [10] Santelli JS, Abma J, Ventura S, et al. Can changes in sexual behaviors among high school students explain the decline in teen pregnancy rates in the 1990s? J Adolesc Health 2004;35:80–90.
- [11] Brener ND, Kann L, Kinchen SA, et al. Centers for Disease Control and Prevention. Methodology of the Youth Risk Behavior Surveillance System. MMWR 2004;53:1–13.
- [12] Bean MR, Gils-Rivas V, Greenberger E, Chen C. Adolescent problem behavior and depressed mood: Risk and protection across social contexts. J Youth Adolesc 2002;31:343–57.
- [13] Lucenko BA, Malow RM, Sanchez-Martinez M, et al. Negative affect and HIV risk in alcohol and other drug abusing adolescent offenders. J Child Adolesc Substance Abuse 2003;13:1–17.
- [14] Bachanas PJ, Morris MK, Lewis-Gess JK, et al. Predictors of risky sexual behavior in African-American adolescent girls: Implications for prevention interventions. J Pediatr Psychol 2002;27:519–30.
- [15] Brooks TL, Harris SK, Thrall JS, Woods ER. Association of adolescent risk behaviors with mental health symptoms in high school students. J Adolesc Health 2002;2002:240–6.
- [16] US Food and Drug Administration. Black box warning added concerning long-term use of Depo-Provera contraceptive injection. <http://www.fda.gov/bbs/topics/ANSWERS/2004/ANS01325.html>. Accessed June 27, 2005.
- [17] Catania J, Canchola J, Binson D, et al. National trends in condom use among at risk heterosexuals in the United States. J Acquir Immune Defic Syndr 2001;27:176–82.
- [18] Anderson JE. Condom use and HIV risk among US adults. Am J Public Health 2003;93:912–4.
- [19] US Department of Education. Dropout rates in the United States: 2000. Washington, DC: US Department of Education, National Center for Educational Statistics, Office of Educational Research and Improvement, 2001. Publication no. (NCES) 2002-114.
- [20] Centers for Disease Control and Prevention. Health risk behaviors among adolescents who do and do not attend school—United States, 1992. MMWR 1994;43:129–32.
- [21] Brener ND, Kann L, McManus T, et al. Reliability of the 1999 Youth Risk Behavior Survey Questionnaire. J Adolesc Health 2002;31:336–42.
- [22] Santelli J, Lindberg L, Abma J, et al. Adolescent sexual behavior: Estimates and trends from four nationally representative surveys. Fam Plann Perspect 2000;32:156, 165, 194.