

Contraceptive Use and Pregnancy Risk Among U.S. High School Students, 1991–2003

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CONTEXT: Trends in teenagers' contraceptive use have received less attention than trends in adolescent sexual intercourse, despite the importance of contraceptive use to preventing teenage pregnancy.

METHODS: Sexually active high school students' use of contraceptives and risk of pregnancy from 1991 to 2003 were examined using data from the national Youth Risk Behavior Survey and published contraceptive failure rates. Changes in pregnancy risk were assessed using weighted least-squares regression.

RESULTS: Between 1991 and 2003, contraceptive use improved among sexually active U.S. high school students. Improvements among women included an increase in the proportion reporting condom use at last sex (from 38% to 58%) and declines in the proportions using withdrawal (from 19% to 11%) and no method (18% to 12%). Hormonal method use changed little, as a decline in pill use (from 25% to 20%) was offset by use of injectables (5% in 2003). Similar patterns were found among men. Women's risk of pregnancy declined 21% over the 12 years. The largest improvements in contraceptive use and pregnancy risk occurred among ninth graders, and whites and blacks. In 2003, 46% of pregnancy risk resulted from failure to use any method of contraception, and 54% resulted from contraceptive failure.

CONCLUSIONS: Improvement in the use of contraceptives by sexually active high school students during the 1990s is encouraging. To sustain this trend, programs need to encourage contraceptive use among teenagers who do not use it and to stress consistent and correct use among those who do.

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Teenage birthrates and pregnancy rates have declined remarkably since 1991. Between 1991 and 2003, birthrates among 15–19-year-olds dropped by 33% to 41.7 per 1,000, the lowest rate ever recorded since the National Center for Health Statistics began tracking birthrates for this age-group in 1940.¹ Declines have been greater among those aged 15–17 than among their 18–19-year-old counterparts, and greater among black teenagers than among other racial or ethnic groups. The birthrate for black 15–17-year-olds fell by more than half, from 86 to 39 per 1,000, between 1991 and 2003. These decreases cannot be ascribed to increased use of abortion; in fact, during the 1990s, abortion rates among teenagers fell even faster than birthrates.²

Between 1991 and 2001, both improved use of contraceptives and delay in initiation of sexual intercourse contributed to the decline in teenage pregnancy rates.³ Although both household- and school-based surveillance systems document declines in sexual experience among youth in the United States,⁴ use of contraceptives remains the critical factor mediating the risk of pregnancy among sexually active teenagers.⁵

Contraceptive use among U.S. teenagers has changed substantially over the past 30 years. In the 1970s, the birth control pill was the most commonly used method among young women, followed by condoms and then withdrawal.⁶ Condom use among adolescents increased dramatically in the

1980s, as use of birth control pills declined.⁷ Increased reliance on the condom has resulted in an increased use of contraceptives at first intercourse.⁸ Since 1988, condom use among U.S. teenagers has continued to increase, and long-acting hormonal methods have been introduced.⁹ Prior analyses have found that condom use among high school students increased between 1991 and 2003¹⁰ (trends in the use of other contraceptive methods have not been reported recently for this group).

Assessing the risk of pregnancy among a population of teenagers using many contraceptive methods is difficult, as the failure rates for specific methods vary widely. For example, the typical-use failure rate for injectables is three pregnancies per 100 woman-years of use, while for withdrawal the failure rate is 27 pregnancies per 100 woman-years of use.¹¹ To summarize the overall risk of pregnancy, in a previous study we created a pregnancy risk index based on the prevalence of use of specific methods (including use of no method) and the typical-use failure rate for each.¹² The current study uses this index to explore changes in pregnancy risk over time among sexually active high school students between 1991 and 2003, and to examine changes in pregnancy by grade in high school and race or ethnicity. Our study does not address changes in the proportion of high school students who are sexually experienced, as this has been described previously.¹³

METHODS

Data on Contraceptive Use

For these analyses we utilized public use data on contraceptive practice and sexual behavior collected through the national Youth Risk Behavior Survey (YRBS), which is conducted by the Centers for Disease Control and Prevention (CDC). The CDC has reviewed the collection and release of YRBS data to ensure the protection of human subjects.

The YRBS has been conducted every two years since 1991, using a national sample frame of public and private schools to draw a national probability sample of adolescents in grades 9–12. Separate samples are drawn for individual states and some large cities. The YRBS uses self-administered paper-and-pencil questionnaires in classroom settings and employs a combination of active and passive parental permission, depending on the usual practices of the sampled school. The use of these two forms of permission has varied over time without any specific trend. The survey uses a three-stage, stratified, clustered sample and oversamples minority youth to produce national estimates for high school students. The sample is limited to youth who are enrolled in school and present on the day the survey is initially administered or on one of several makeup days.¹⁴

For our study, data from every national YRBS through 2003 provided estimates for use of condoms and of other contraceptives at last intercourse. These estimates are based on two closed-ended questions: “The last time you had sexual intercourse, did you or your partner use a condom?” and “The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy?”

The CDC has generally reported condom and contraceptive use among “sexually active” individuals, defined as those who have had intercourse in the past three months; we have followed that practice here. The YRBS questions on condom and contraceptive use have been worded consistently since 1991, but injectable contraceptives were added as a response category only in 1999. By combining the data from the two questions, we calculated the rates of dual use—i.e., use of condom and hormonal method at last intercourse. Hormonal methods other than the pill and injectable are not included as response categories for the YRBS; data from the 1995 and 2002 cycles of the National Survey of Family Growth (NSFG) indicate that use of other hormonal contraceptive methods among 15–17-year-olds is relatively low.¹⁵

Contraceptive Failure Rates

To describe the efficacy of specific contraceptive methods as typically used, we used published first-year failure rates (pregnancies per 100 women) that were based on the 1988 and 1995 rounds of the NSFG,¹⁶ as failure rates based on the 2002 NSFG are not expected to be available until late 2006. Typical-use failure reflects both the inherent limitations of the method and the difficulties women (or couples) have in using it consistently and correctly. These failure rates were adjusted for underreporting of abortion, and did not differ statistically between the two years.

Contraceptive failure rates varied widely by method and,

TABLE 1. First-year contraceptive failure rate per 100 U.S. women using selected methods, by age and race or ethnicity

Method	<18	15–44			
		All	White	Black	Hispanic
Pill only	7.4	7.5	6.0	11.5	12.8
Condom only	14.5	13.7	11.6	24.1	18.8
Pill and condom	1.1	1.1	0.7	2.8	2.4
Withdrawal	24.8	24.5	24.5	33.8	19.5
Injectable	3.5	3.5	3.5	3.8	3.4
Injectable and condom	0.5	0.5	0.4	0.9	0.6
Other method	12.4	12.5	11.2	18.1	15.5
Other and condom	1.8	1.7	1.3	4.4	2.9
No method	85.0	85.0	85.0	85.0	85.0
Not sure†	85.0	85.0	85.0	85.0	85.0

†Assumed to be the same as the rate for no method. Notes: Except for no method, rates are based on data from the 1988 and 1995 National Surveys of Family Growth; data are corrected for abortion underreporting. Failure rates for dual methods are calculated by multiplying the rates for the two methods. White and black include non-Hispanics only. Sources: reference 16, Table 6; and, for no method, reference 11.

within methods, by race or ethnicity for women aged 15–44 overall (Table 1). Remarkably, however, method-specific rates for teenagers were similar to those for women overall.¹⁷ Method-specific contraceptive failure rates stratified by both age and race or ethnicity are not available, and thus we used rates by race or ethnicity for women aged 15–44. Recent data on the failure rate for nonuse of contraception were not available; we used a failure rate based on historical data.¹⁸ A small proportion (3–5%) of teenagers in the YRBS reported “some other method” or “not sure” as their method used at last intercourse. Those who responded “not sure” were assigned the failure rate for no method; those who reported “some other method” were assigned the overall contraceptive failure rate.¹⁹ The overall (or average) contraceptive failure rate refers to the risk of pregnancy in a year across all methods and among all women who are contraceptive users. Failure rates for combined methods (i.e., pill and condom or injectable and condom) at last intercourse were estimated by multiplying the method-specific failure rates for the two methods. Thus, our calculations reflect the overall effectiveness of contraceptive use and assumptions about the effectiveness of contraceptive use drawn from previous research. We did not summarize male contraceptive use, as method-specific contraceptive failure rates are not available for men; we simply examined trends in use of methods by male adolescents or their partners.

Analysis

We used the pregnancy risk index to estimate the overall risk of pregnancy among sexually active students. The index was calculated for each survey year by summing the product of each method-specific failure rate and the proportion of women using that method. In our analyses, nonuse of contraception is considered a “method” with a specific risk of pregnancy. This index allows one to estimate pregnancy risk resulting from contraceptive use and from nonuse.

We used weighted least-squares regression to calculate the change over time in pregnancy risk. SUDAAN software,

TABLE 2. Percentage distribution of sexually active U.S. high school students, by contraceptive method used at last sexual intercourse, and females' pregnancy risk score, Youth Risk Behavior Survey, 1991–2003

Method	1991	1993	1995	1997	1999	2001	2003
Females	(N=2,306)	(N=3,133)	(N=2,271)	(N=3,008)	(N=2,745)	(N=2,319)	(N=2,542)
Pill only	21.9 (1.9)	18.1 (1.4)	16.6 (1.6)	14.4 (1.4)	15.2 (1.4)	15.7 (1.2)	14.2 (1.4)
Condom only	35.0 (2.0)	42.0 (1.4)	44.7 (2.6)	44.4 (1.4)	44.6 (3.1)	44.0 (1.8)	49.3 (1.5)
Pill and condom	3.1 (0.5)	4.1 (0.5)	3.5 (0.4)	6.1 (1.0)	4.9 (0.8)	5.2 (0.8)	6.1 (0.8)
Withdrawal	19.1 (1.9)	16.5 (0.8)	15.1 (1.4)	15.5 (1.1)	11.7 (0.9)	12.8 (1.4)	10.9 (1.1)
Injectable	u	u	u	u	3.9 (0.6)	3.5 (0.5)	3.2 (0.6)
Injectable and condom	u	u	u	u	1.1 (0.3)	2.2 (0.3)	1.8 (0.4)
Other method	2.4 (0.4)	2.3 (0.6)	1.9 (0.5)	4.2 (1.0)	1.5 (0.4)	1.7 (0.3)	2.0 (0.4)
Other and condom	0.1 (0.0)	0.1 (0.1)	0.5 (0.2)	0.5 (0.2)	0.2 (0.1)	0.1 (0.1)	0.4 (0.2)
No method	17.6 (1.2)	16.0 (1.1)	17.0 (1.4)	14.7 (1.0)	16.0 (1.5)	14.1 (1.1)	11.6 (1.0)
Not sure	0.9 (0.3)	0.9 (1.3)	0.6 (0.2)	0.3 (0.1)	0.9 (0.2)	0.8 (0.2)	0.5 (0.1)
<i>Pregnancy risk score</i>	<i>27.9 (1.0)</i>	<i>26.5 (0.9)</i>	<i>27.2 (0.9)</i>	<i>25.1 (0.9)</i>	<i>26.0 (0.9)</i>	<i>23.9 (0.8)</i>	<i>22.1 (0.9)***</i>
Males	(N=2,333)	(N=3,204)	(N=2,129)	(N=2,960)	(N=2,745)	(N=2,234)	(N=2,521)
Pill only	13.2 (1.3)	11.5 (1.4)	9.0 (1.4)	8.3 (0.9)	8.6 (2.2)	9.0 (0.8)	8.5 (0.8)
Condom only	51.0 (1.9)	55.9 (1.7)	55.2 (2.9)	57.8 (1.6)	62.2 (2.2)	58.0 (1.3)	63.2 (1.3)
Pill and condom	3.3 (0.6)	3.2 (0.5)	5.0 (1.1)	4.6 (0.9)	2.8 (0.4)	5.7 (0.7)	4.5 (0.7)
Withdrawal	15.4 (1.2)	11.6 (0.7)	12.4 (1.5)	9.6 (1.0)	8.3 (0.9)	9.5 (0.8)	7.3 (0.8)
Injectable	u	u	u	u	1.1 (0.4)	1.7 (0.4)	1.6 (0.4)
Injectable and condom	u	u	u	u	0.5 (0.2)	1.2 (0.3)	0.8 (0.2)
Other method	1.5 (0.4)	2.4 (0.4)	2.7 (0.6)	2.8 (0.6)	2.1 (0.4)	1.5 (0.3)	2.2 (0.6)
Other and condom	0.3 (0.2)	0.3 (0.1)	0.5 (0.4)	0.3 (0.1)	0.4 (0.2)	0.4 (0.2)	0.7 (0.3)
No method	13.8 (1.3)	13.6 (1.0)	13.2 (1.4)	14.3 (1.2)	11.9 (1.3)	10.7 (0.9)	8.9 (0.7)
Not sure	1.6 (0.3)	1.6 (0.4)	2.1 (0.5)	2.3 (0.7)	2.2 (0.5)	2.4 (0.6)	2.3 (0.5)
Total	100.0						

***Trend in pregnancy risk from 1991 to 2003 significant at p<.001. Notes: Figures in parentheses are standard errors. The pregnancy risk score is based on method-specific contraceptive failure rates and the proportion using each method. u=unavailable. Percentages may not total 100.0 because of rounding.

which corrects for the clustering inherent in complex survey designs, was used to carry out the regression.²⁰ We calculated the confidence intervals of the annual rates of change using a first-order Taylor series, which simplifies computations by transforming difficult functions into sums of easily calculable components. Finally, t tests were performed to test for significance of differences in rates of use. All differences reported in the text are significant at p≤.05.

RESULTS

Between 1991 and 2003, contraceptive use improved in several ways. The proportion of sexually active female high school students reporting use of withdrawal declined (from

19% to 11%—Table 2), as did the proportion reporting no method use (from 18% to 12%); the proportion who said they used condoms, alone or with another method, increased (from 38% to 58%). Use of the pill, with or without a condom, was reported by 25% in 1991 and 20% in 2003. Overall, use of hormonal methods (pill and injectable only or with condoms) changed little during this time, as the decline in pill use was offset by use of injectables (5% in 2003). Dual use was reported by 8% overall in 2003, up from 3% in 1991. Among those using hormonal contraceptives at last intercourse in 2003, 31% were dual users (not shown). The risk of pregnancy was 27.9 pregnancies per 100 sexually active women in 1991, and 22.1 per 100 in 2003. Thus,

TABLE 3. Percentage distribution of sexually active female high school students, by contraceptive method used at last sexual intercourse, and pregnancy risk score, both according to race or ethnicity, 1991 and 2003

Method	1991			2003		
	White (N=927)	Black (N=811)	Hispanic (N=443)	White (N=979)	Black (N=744)	Hispanic (N=678)
Pill only	24.6 (3.0)	18.3 (2.1)	16.5 (2.6)	18.4 (1.6)	8.5 (1.7)	8.3 (1.9)
Condom only	35.0 (2.8)	35.3 (2.6)	26.2 (2.9)	47.5 (1.7)	56.1 (2.6)	47.3 (4.2)
Pill and condom	3.0 (0.8)	4.2 (1.1)	0.2 (0.2)	7.7 (1.1)	3.0 (0.9)	3.7 (1.5)
Withdrawal	21.4 (2.4)	13.6 (2.0)	19.2 (3.1)	11.7 (1.6)	7.2 (1.3)	12.2 (1.8)
Injectable	u	u	u	2.9 (0.7)	5.2 (1.3)	2.3 (0.9)
Injectable and condom	u	u	u	1.3 (0.3)	4.0 (1.2)	1.1 (0.6)
Other method	2.1 (0.6)	2.5 (0.9)	4.8 (2.6)	1.6 (0.6)	2.2 (0.7)	2.7 (0.7)
Other and condom	0.1 (0.1)	0.1 (0.1)	0.5 (0.3)	0.3 (0.2)	0.6 (0.4)	0.1 (0.1)
No method	13.4 (1.4)	25.6 (1.9)	28.8 (3.3)	8.5 (1.1)	11.6 (2.0)	21.4 (3.5)
Not sure	0.5 (0.3)	0.4 (0.3)	3.8 (2.0)	0.1 (0.1)	1.8 (0.6)	0.8 (0.4)
Total	100.0	100.0	100.0	100.0	100.0	100.0
<i>Pregnancy risk score</i>	<i>22.8 (1.0)</i>	<i>37.9 (1.3)</i>	<i>39.3 (2.8)</i>	<i>17.2 (0.9)***</i>	<i>29.0 (1.4)***</i>	<i>31.8 (2.5)*</i>

*Trend in pregnancy risk from 1991 to 2003 significant at p<.05. ***Trend in pregnancy risk from 1991 to 2003 significant at p<.001. Notes: Figures in parentheses are standard errors. The pregnancy risk score is based on method-specific contraceptive failure rates and the proportion using each method. u=unavailable. Percentages may not total 100.0 because of rounding. White and black include non-Hispanics only.

TABLE 4. Percentage distribution of sexually active female high school students, by contraceptive method used at last sexual intercourse, and pregnancy risk score, both according to grade, 1991 and 2003

Method	1991				2003			
	9 (N=316)	10 (N=551)	11 (N=619)	12 (N=818)	9 (N=346)	10 (N=547)	11 (N=746)	12 (N=895)
Pill only	4.1 (1.0)	20.2 (3.5)	23.9 (3.9)	28.0 (2.3)	8.2 (3.1)	7.8 (1.2)	16.2 (2.5)	20.2 (2.3)
Condom only	46.1 (3.7)	33.1 (3.4)	37.7 (3.5)	30.0 (2.6)	60.7 (5.1)	58.5 (3.5)	46.0 (3.0)	40.1 (2.4)
Pill and condom	4.2 (1.9)	3.3 (1.1)	2.9 (0.9)	2.6 (0.7)	3.2 (1.4)	5.5 (1.5)	7.5 (1.4)	6.7 (1.4)
Withdrawal	17.2 (3.4)	22.1 (3.4)	17.2 (2.1)	19.4 (2.8)	6.7 (2.2)	9.4 (1.8)	11.3 (1.4)	13.9 (2.0)
Injectable	u	u	u	u	2.8 (1.5)	3.1 (0.9)	2.7 (0.6)	4.0 (0.7)
Injectable and condom	u	u	u	u	2.4 (1.1)	1.7 (0.7)	1.9 (0.6)	1.5 (0.6)
Other method	1.6 (1.0)	3.6 (1.5)	1.4 (0.7)	2.5 (1.3)	0.6 (0.4)	1.8 (0.7)	1.9 (0.6)	3.0 (0.9)
Other and condom	0.0 (0.0)	0.0 (0.0)	0.2 (0.2)	0.1 (0.1)	0.5 (0.5)	0.9 (0.6)	0.2 (0.2)	0.2 (0.2)
No method	25.7 (4.7)	17.0 (2.2)	16.2 (2.7)	16.1 (2.1)	14.2 (3.0)	10.6 (2.0)	11.8 (1.5)	10.5 (1.0)
Not sure	1.2 (0.8)	0.8 (0.5)	0.5 (0.4)	1.2 (0.6)	0.8 (0.5)	0.7 (0.3)	0.8 (0.3)	0.0 (0.0)
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Pregnancy risk score	35.0 (3.6)	27.8 (1.6)	26.0 (2.1)	26.7 (1.7)	25.2 (2.3)**	21.8 (1.7)**	22.0 (1.2)**	20.7 (0.9)**

**Trend in pregnancy risk from 1991 to 2003 significant at $p < .01$. Notes: Figures in parentheses are standard errors. The pregnancy risk score is based on method-specific contraceptive failure rates and the proportion using each method. u=unavailable. Percentages may not total 100.0 because of rounding.

the risk of pregnancy among sexually active high school women declined 21% between 1991 and 2003.

Although men were more likely to report condom use and less likely to report their partners' use of hormonal methods, trends among men were similar to those among women. Changes in contraceptive use among men between 1991 and 2003 included an increase in condom use (from 55% to 69%) and declines in use of withdrawal (from 15% to 7%) and no method (from 14% to 9%). Use of hormonal methods among partners of young men changed little over time, as a decline in pill use (from 17% to 13%) was offset by use of injectable contraception (2% in 2003). In 2003, 5% of all men were dual users, as were 34% of those whose partners were using a hormonal contraceptive (not shown).

Similar trends were found for the three most common racial or ethnic groups in the YRBS. Women in each group showed increases in condom use and decreases in use of the pill, withdrawal and no method between 1991 and 2003 (Table 3). In 2003, compared with other racial or ethnic groups, whites were the most likely to use the pill (26%, compared with 12% for both blacks and Hispanics), although condoms were still the most common method among whites (57%). Blacks had the highest rate of condom use (64%, compared with 57% for whites and 52% for Hispanics) and of injectable use (9%, compared with 4% for whites and 3% for Hispanics); Hispanics were the most likely not to use a method (21%, compared with 9% of whites and 12% of blacks). The pregnancy risk score fell significantly for each group; the decline was 25% among whites, 23% among blacks and 19% among Hispanics between 1991 and 2003. Patterns of contraceptive use by race or ethnicity were similar for men (not shown).

Contraceptive use at last intercourse showed clear differences by grade in high school (Table 4). In 2003, 67% of ninth and 10th graders used condoms, compared with 56% of 11th graders and 49% of 12th graders. Seventeen percent of ninth graders used hormonal methods; this proportion was roughly the same among 10th graders, but was significantly different among 11th and 12th graders (28%

and 32%, respectively). In 2003, use of withdrawal increased with grade from 7% of women in ninth grade to 14% of those in 12th grade. In both 1991 and 2003, pregnancy risk was highest for ninth graders. However, ninth graders also showed the greatest improvement; between 1991 and 2003, their pregnancy risk score fell 28%.

Using our method for summarizing risk of pregnancy between 1991 and 2003, we calculated the proportion of pregnancies resulting from failure to use a method of contraception and from contraceptive failure. In 2003, an estimated 46% of pregnancies among sexually active high school students resulted from failure to use a method, and 54% from contraceptive failure. In 1991, an estimated 54% of pregnancies resulted from failure to use a method, and 46% from contraceptive failure. This change from 1991 to 2003 is compatible with the increasing proportion of sexually active high school females who are using contraceptives.

DISCUSSION

Between 1991 and 2003, the risk of pregnancy among sexually active high school women in the United States declined 21%, primarily as a result of increased use of condoms and decreased use of both withdrawal and no method at all. Risk of pregnancy was highest among Hispanics, primarily because they were the most likely to use no method; Hispanics also showed the smallest decline in risk of pregnancy over time. Trends in contraceptive use reported by high school men were similar to those for high school women. We estimate that in 2003, almost half of the pregnancy risk could be attributed to a failure to use contraceptives, and slightly more than half to contraceptive failures.

These different components of pregnancy risk may require different types of interventions. Nonusers need messages about the importance of using a method when sexually active and motivational interventions on the importance of preventing pregnancy and STDs. Current users should receive messages about dual protection and how to correctly and consistently use the method they prefer, as well as counseling that identifies and addresses misperceptions about

The high level of dual use... suggests that an increasing number of teenagers are seeking protection against both disease and pregnancy.

side effects. This counseling can address ways to manage true side effects, and it can also provide teenagers with memory cues to promote consistent use and help to strengthen social skills that may be needed if partners object to use of a particular method.

Condoms have emerged as the most important contraceptive method among teenagers, particularly young teenagers. More than one-half of sexually active high school women now use condoms, and many who use hormonal contraceptive methods also use a condom (almost one-third in our study). Although failure with typical use of condoms is not uncommon, we found that steady and considerable increases in condom use were accompanied by important declines in risk of pregnancy. This seeming paradox—that a method with a relatively high typical-use failure rate could be associated with lower pregnancy risk—is the result of adolescents' shifting from nonuse and withdrawal to the use of condoms. Nonuse carries a significant risk—in fact, the highest risk—of pregnancy. Likewise, withdrawal is the contraceptive method with the highest rate of failure. Condoms alone, however, if used consistently and correctly, provide good protection against pregnancy; combined with a hormonal or long-acting method, they provide excellent protection against pregnancy and good protection against many STDs, including HIV.

The condom is the method that teenagers most commonly use at first intercourse.²¹ Its popularity may be attributable to a variety of factors, including accessibility to this method through retail outlets, clinics and community-based programs, as well as to efforts that have increased the acceptability of condom use among adolescents and young unmarried adults. Increased concern among teenagers about STDs and HIV also appears to be driving this trend of increased use of condoms.²²

Despite the introduction over the past decade of new hormonal methods, use of hormonal contraception by high school students has shown little change. Although this may reflect teenagers' preference for methods that also protect against STDs or personal concerns about other methods (such as the pill), this pattern also suggests that U.S. teenagers continue to face considerable barriers to accessing health care services.²³ By contrast, European high school students display greater use of hormonal methods than do youth in the United States, which may indicate both fewer personal concerns and better access to care.²⁴ The high level of dual use in the present study suggests that an increasing number of teenagers are seeking protection against both disease and pregnancy.

These data suggest that the improved use of contraceptives and the declining risk of pregnancy among high school students cannot be explained by increases in use of any single contraceptive method. Rather, it is the result of a complex set of changes in the use of methods, including the greater use of any method of contraception and greater use of condoms, both alone and with other methods.

Striking differences in contraceptive use were found by grade level. Pregnancy risk is lower among students in high-

er grades. Ninth graders were the least likely to use hormonal contraception, and the most likely to use condoms. We assume that this reflects less planning for sexual intercourse by younger teenagers and more difficulties in accessing health care services, as a visit to a health care provider is required to obtain hormonal methods but not condoms.

Trends in contraceptive use data from the YRBS parallel trends for teenagers found in the NSFG.²⁵ Data from the 1988, 1995 and 2002 rounds of the NSFG demonstrate increases in use of condoms, increases in dual use and declines in nonuse—just as we found here. We found a small decline (in the early 1990s) in the use of the pill by high school females; in the NSFG, pill use among teenage women declined from 1988 and 1995, and rose between 1995 and 2002.

The NSFG and YRBS are not directly comparable, as data collection and sampling vary considerably, the teenagers in the YRBS are systematically younger (most are 14–17 years old) than those in the NSFG (aged 15–19), and contraceptive method use varies by age²⁶ (for example, use of the pill is higher among teenagers in the NSFG than among those in the YRBS because the NSFG sample is older). YRBS data are limited to adolescents attending high school and so cannot be directly compared with data from population-based surveys, such as the NSFG, that include older teenagers and dropouts. Data from the National Center for Education Statistics suggest that 4% of 16-year-olds and 8% of 17-year-olds have dropped out.²⁷ Levels of pregnancy, sexual activity and failure to use contraceptives are significantly elevated among out-of-school youth.²⁸

Limitations

The YRBS provides limited information about contraceptive behaviors. Data on the use of the implant and other infrequently used methods are not collected, and data on injectable contraceptives were first collected in 1999. The YRBS does not include questions on correct or consistent use, or on postcoital contraception. Postcoital contraception may explain as much as 43% of the decline in abortions between 1994 and 2000.²⁹

Another limitation of these analyses was the use of method-specific contraceptive failure rates by race or ethnicity for women of all ages rather than for teenagers. Although adolescents' rates are similar to those among older women, our methodology cannot account for potential interaction effects between age and race or ethnicity. A further concern is that our data on contraceptive failure came from the 1988 and 1995 rounds of the NSFG; failure rates based on the 2002 NSFG were not available. Given these limitations, we cannot estimate changes in pregnancy risk that are due to changes in the correctness of use.

Implications

These data demonstrate that the nation has made progress toward improving contraceptive practice among teenagers,³⁰ but they also suggest that there is considerable room for improvement. Overall, 12% of sexually active high school fe-

males in 2003 used no contraceptive method at last intercourse, and we estimate that almost half of teenage pregnancies occur in this group. Getting nonusers to use any method would dramatically reduce teenage pregnancy rates. Increasing use of the most effective methods would also have a considerable impact on pregnancy risk. Finally, promoting dual use would reduce both the risk of pregnancy and the risk of acquiring STDs. Programs to prevent pregnancy among sexually active teenagers need to encourage contraceptive use among teenagers who do not use it and should stress correct and consistent use among those who do.

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