

Adolescent Sexual Behavior: Estimates and Trends From Four Nationally Representative Surveys

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Context: Accurate information about trends over time in adolescent sexual behavior is essential to understand changes in adolescent pregnancy and sexually transmitted diseases and to monitor the progress of health promotion activities in the United States

Methods: Estimates from the National Survey of Family Growth (NSFG), the National Survey of Adolescent Males (NSAM), the Youth Risk Behavior Survey (YRBS) and the National Longitudinal Study of Adolescent Health (Add Health) were compared. While methodologies and populations varied by survey, adolescents aged 15–17 who attend high school were a common subpopulation among all four. For each survey, the prevalence of sexual intercourse, contraceptive use and multiple sexual partners was measured in this population.

Results: Trend comparisons fell into four categories. First, some similar significant trends were found across surveys. The proportion of all males and of white males who reported ever having had sexual intercourse decreased significantly, while condom use rose significantly among males in both the NSAM and the YRBS. For such behaviors as ever having had sexual intercourse (among Hispanic males and black females), using the pill and using the condom (among all females) and having four or more lifetime sexual partners (among white males), a significant trend was found in one survey while a similar but nonsignificant trend was found in another. Several trend comparisons were not significant in any survey. Finally, having had intercourse in the past three months (among all males and all females), having had two or more partners in the past three months (for males) and having had four or more lifetime sexual partners (among white females and all males) showed a significant trend in one survey but lacked a parallel nonsignificant trend in another. Prevalence estimates in 1995 differed significantly in at least one comparison of surveys for all behaviors except having four or more lifetime sexual partners (both genders) and having two or more recent sexual partners (females). Gender differences within the YRBS and between the NSFG and the NSAM generally were consistent.

Conclusions: Trends over time and gender differences were similar across surveys, underscoring their value for tracking adolescent sexual behaviors. Differences in prevalence estimates across surveys probably result from differences in question wording, diverse interview settings and modes of data collection, and varying statistical power. These findings suggest a need to increase our understanding of how methodologies influence survey response in research on adolescents.

Family Planning Perspectives, 2000, 32(4):156–165 & 194

Adolescents in the United States have a higher proportion of pregnancies that are unintended and that end in abortion than do adults.¹ Moreover, adolescents who have initiated sexual intercourse have some of the highest age-specific rates of sexually transmitted diseases (STDs),² which along with unintended pregnancy impose enormous costs in human pain and suffering, in social and economic opportunity, and in social welfare and health care.³ Early initiation of sexual intercourse, frequency of intercourse, number of sexual partners and use of con-

doms and other forms of contraception are key behavioral determinants of unintended pregnancy and STDs, including HIV.⁴ Recognizing the impact of these behaviors, the public health community has set national goals for delaying the initiation of intercourse, increasing abstinence among sexually experienced adolescents and increasing the use of condoms and other contraceptives.⁵

Trends in adolescent sexual behaviors influence rates of adolescent pregnancy and STDs, and are used to monitor the progress of health promotion activities. In

the 1970s, the National Survey of Young Women (NSYW) recorded large increases in rates of premarital sexual intercourse among teenage women living in metropolitan areas.⁶ Retrospective analyses using the 1982 National Survey of Family Growth (NSFG) suggest that this increase began in the late 1960s.⁷

In the 1980s, national surveys documented increases in rates of initiation of sexual intercourse for both adolescent females and males, gains in condom use and decreases in oral contraceptive use.⁸ Data from three national surveys suggest that during the late 1980s and the 1990s, the historic increase in sexual experience reversed among adolescent men and either stopped or reversed among adolescent women. Additionally, condom use continued to increase and pill use continued to decline.⁹ Decreases in adolescent pregnancy rates and birthrates between 1991 and 1997 provide some validation of these trends.¹⁰ These unprecedented changes in teenage sexual behaviors have important implications for adolescent health and well-being.

Given the difficulties of obtaining valid and reliable data from adolescents about their sexual behavior, survey reports of changes in teenage sexual behavior should be interpreted with care. If adolescents fear a loss of privacy or if they perceive certain

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responses as socially undesirable, they may not provide information on sensitive personal behaviors.¹¹ Younger adolescents may have difficulty understanding questions, resulting in either underreporting or overreporting of behaviors.

Cognitive processes that may influence adolescents' responses to survey questions include comprehension, information retrieval, judgment and response generation.¹² Adolescents' responses also may be affected by the mode of data collection (self-administered paper-and-pencil, interviewer-administered face-to-face or self-administered on computer), the setting of survey administration, the sensitivity of specific questions, the location of questions within the questionnaire and of topics covered earlier, and the readability or complexity of questions.¹³

Differential rates of research participation by adolescents who are engaged in certain sexual behaviors also may bias the reported prevalence of behaviors.¹⁴ Some parents may be reluctant to provide permission for adolescents to participate in behavioral research studies, although few parents refused to do so in the surveys we examined. Validating adolescent sexual behavior against external criteria is often considered unworkable, although several recent studies have attempted to validate self-reported data using incident STD infections.¹⁵

Currently, three national surveys are available to monitor trends in adolescent sexual behavior: the NSFG, the National Survey of Adolescent Males (NSAM) and the Youth Risk Behavior Survey (YRBS). Each has a unique purpose, methodology and frequency of administration. All employ stratified cluster sampling with statistical weighting to obtain nationally representative estimates; all were conducted at least twice between 1988 and 1997, and all included data collected in 1995. A fourth nationally representative survey, the National Longitudinal Study of Adolescent Health (Add Health), was also conducted in 1995.* The coincidence of survey administration in 1995 and the existence of a common subgroup of adolescents (i.e., 15–17-year-olds in high school) in the four surveys makes it possible to compare and contrast their results.

Although these surveys are the centerpiece of current national efforts to monitor and understand trends in adolescent sexual behavior, little attention has been given to comparing the estimates of behaviors across surveys.¹⁶ Identifying similar trends across surveys would demonstrate that these data systems are reliable. Previous comparisons of estimates for

adolescent sexual activity in three national studies found generally comparable estimates, but showed some disagreement for teenagers younger than 16.¹⁷

Given the widespread use of data from these four surveys and the unprecedented changes in adolescent sexual behavior, the extent to which the estimates of teenage behaviors are comparable (and therefore reliable) across surveys must be considered. Accordingly, we compare trends in adolescent sexual behaviors over time from the three ongoing surveys; we also compare estimates for specific behaviors and patterns by gender and race or ethnicity among the four surveys for 1995.

Methods

Comparison of Surveys

Although all four national surveys collect information about adolescent sexual behavior, their purpose, design and implementation strategies differ in many ways. Table 1 (page 158) summarizes the methodology used in each survey and each survey year. (Complete information about the design of each survey has been published elsewhere.¹⁸)

The NSFG is the only survey not limited to teenagers; it has collected detailed information on fertility-related behavior among a nationally representative household sample of women aged 15–44. The NSAM was designed as a male counterpart to the teenaged subsample of the NSFG, with an increased emphasis on STDs and HIV; the survey interviewed a nationally representative household sample of males aged 15–19.

The YRBS and Add Health, in contrast, used school-based samples and measured a broader range of adolescent health behaviors. The YRBS was designed to produce a nationally representative sample of both male and female students in public and private schools in grades 9–12, primarily to monitor levels of adolescent risk behaviors. Add Health, using a national sample of students enrolled in grades 7–12, was designed to explore the antecedents of health-related behaviors among adolescents, with an emphasis on social context. The NSFG, the YRBS and Add Health used samples drawn from all 50 states and the District of Columbia, whereas the NSAM used a sample from the coterminous United States.

In the NSFG and the NSAM, trained interviewers conducted face-to-face interviews in the respondents' home or other confidential locations. Both written parental permission and adolescent assent were required for teenagers under the age

of 18. A self-administered questionnaire lasting 5–15 minutes covered many of the most sensitive questions, but the data presented here come from responses to the face-to-face interview questions. In contrast, the YRBS used a paper-and-pencil, self-administered questionnaire in classroom settings. The YRBS employed a combination of active and passive parental permission, depending on the usual practices of the sampled school. Although the initial stage of data collection was a school-based survey, the sexual behavior data from Add Health examined here were collected during follow-up, in-home interviews, using audio-enhanced computer-assisted self-interviewing.

Response rates for the NSAM and the NSFG reflect both parent and adolescent acceptance. Response rates for the YRBS and Add Health reflect school acceptance and parent plus adolescent acceptance. Schools refusing to participate in Add Health were replaced with schools having comparable social and demographic characteristics. Overall response rates for the surveys ranged from 60% to 79% (Table 1).

The four surveys generally employed multistage, stratified, clustered sampling and oversampled black and Hispanic adolescents; the 1988 NSFG, however, oversampled only black adolescents. Add Health oversampled only selected subgroups of black teenagers (those with higher parental education) and certain Hispanic adolescents (those identified as Puerto Rican and Cuban), but we did not use these oversamples for our analyses. Each survey developed weights to compensate for the probability of selection and nonresponse. All weights were poststratified to align with well-recognized external data sources.

Analytic Sample

Since the four surveys were designed to achieve different objectives and had different sampling criteria, they include respondents of differing characteristics (e.g., adolescents in school versus those out of school). To compare measures across the four sets of surveys, we needed to create analytic subsamples based on common criteria. We settled on respondents aged 15–17 who were enrolled in high school at the time of the interview. We needed the analytic subsamples to be similar because previous studies have documented considerable behavioral differences among adolescents by age and by school atten-

*A longitudinal follow-up was conducted one year later; only 1995 baseline data are reported here.

Table 1. Selected attributes of survey design and implementation, National Survey of Adolescent Males (NSAM), National Survey of Family Growth (NSFG), Youth Risk Behavior Survey (YRBS) and National Longitudinal Study of Adolescent Health (Add Health), by year

Attribute	NSAM		NSFG		YRBS				Add Health
	1988	1995	1988	1995	1991	1993	1995	1997	1995
Survey design									
Purpose	Sexual and repro. behavior	Sexual and repro. behavior	Fertility	Fertility	Health risk behaviors	Health risk behaviors	Health risk behaviors	Health risk behaviors	Health risk behaviors
No. surveyed									
Males	1,880	1,729	na	na	5,984	8,020	5,356	8,057	5,779
Females	na	na	8,450	10,847	6,283	8,233	5,499	8,195	6,322
Age/grade	15–19 yrs.	15–19 yrs.	15–44 yrs.	15–44 yrs.	Grades 9–12	Grades 9–12	Grades 9–12	Grades 9–12	Grades 7–12
Marital status	Ever-married excluded	All	All	All	All	All	All	All	All
Oversampled	Black, Hispanic	Black, Hispanic	Black	Black	Black, Hispanic	Black, Hispanic	Black, Hispanic	Black, Hispanic	Black,* Hispanic,* Asian
Sampling frame	Household	Household & group quarters	Household	Household	Pub. & priv. schools†	Pub. & priv. schools†	Pub. & priv. schools†	Pub. & priv. schools†	All U.S. high schools with 11th grade & >30 students
Geographic range	48 coterminous states & DC	48 coterminous states & DC	50 states & DC	50 states & DC	50 states & DC	50 states & DC	50 states & DC	50 states & DC	50 states & DC
Adjusted for	Nonresponse & oversampling	Nonresponse & oversampling	Nonresponse & oversampling	Nonresponse & oversampling	Nonresponse & oversampling	Nonresponse & oversampling	Nonresponse & oversampling	Nonresponse & oversampling	Nonresponse & sampling probability‡
Poststratification	March 1987 CPS	1995 Census pop. estimates	June 1988 Census pop. estimates	June 1994 Census pop. estimates	USDOE data national student population	USDOE data national student population	USDOE data national student population	USDOE data national student population	Quality Education database & Census pop. estimates
Survey mode§	Face-to-face, administered by interviewer	Face-to-face, administered by interviewer	Face-to-face, administered by interviewer	Face-to-face, administered by interviewer	Paper & pencil interview, self-administered	Paper & pencil interview, self-administered	Paper & pencil interview, self-administered	Paper & pencil interview, self-administered	Audio computer-assisted self-interview
Interview location	Home	Home	Home	Home	School	School	School	School	Home
Implementation									
Response rate	74%	75%	79% (15–19, 81%)	79% (15–17, 83%)	75% (school), 90% (student), 68% (overall)**	78% (school), 90% (student), 70% (overall)**	70% (school), 86% (student), 60% (overall)**	79% (school), 87% (student), 69% (overall)**	77% (school), 79% (student), 60% (overall)**
Length	57 minutes	68 minutes	70 minutes	103 minutes	1 class period	1 class period	1 class period	1 class period	90 minutes
When fielded	April–Dec.	Feb.–Nov.	Jan.–Aug.	Jan.–Oct.	Feb.–April	Feb.–April	Feb.–April	Feb.–April	April–Dec.
Parental permission	Active for minors	Active for minors	Active for minors	Active for minors	28% active, 72% passive	24% active, 77% passive	36% active, 64% passive	37% active, 63% passive	Active for minors
Survey firm	Institute for Survey Research (Temple Univ.)	Research Triangle Institute	Westat	Research Triangle Institute	Macro	Macro	Macro	Macro	National Opinion Research Center

*Selected subgroups. †Including vocational schools, but not alternative schools. ‡Schools and individuals. §For questions used in this analysis. **Overall response rate was calculated by multiplying school response rate and student responsive rate. Notes: CPS=Current Population Surveys, U.S. Bureau of the Census. USDOE=U.S. Department of Education.

dance.¹⁹ Age was measured comparably between surveys and across waves.

The second and more difficult criterion to measure was school status. The YRBS included only youth who were present at school during initial survey administration or on one of several make up days. In contrast, because they were household surveys, the NSAM and the NSFG included both in-school and out-of-school youth. Add Health included teenagers registered in school, regardless of current attendance. To limit our data to in-school youth, we used the following criteria: currently attending grades 9–12, attended

grades 9–12 in the last 30 days or, if interviewed in summer, attended school in May or any subsequent month in grades 9–11. We excluded respondents who reported having completed grade 12 or who had received a high school degree or a general equivalency diploma. Respondents were identified as being in school whether they reported attendance during the day or night or full- or part-time.

To create this common analytic sample, we had to exclude substantial numbers of respondents from each survey. From the NSAM and the NSFG samples, we did not include out-of-school youth, in-school

teenagers not in grades 9–12 and those older than 17. We excluded adolescents younger than 15 and older than 17 from the YRBS and Add Health. Additionally, we did not include adolescents in grades 7 and 8 from Add Health. In all, we eliminated 25–50% of the original sample of teenagers from each survey and 92% of the full sample from the NSFG. The numbers of eligible respondents in the analytic samples are reported in Table 2, as are the proportions of the total numbers of adolescents these respondents represent.

We found that the final samples we used for our analyses were similar by age,

Table 2. Percentage distribution of analysis sample of high school adolescents aged 15–17 and percentage of original sample of those aged 19 or younger, by demographic characteristics, according to sex, survey and year

Characteristic	Males							Females						
	NSAM		Add Health	YRBS				NSFG		Add Health	YRBS			
	1988	1995	1995	1991	1993	1995	1997	1988	1995	1995	1991	1993	1995	1997
Age (in years)														
15	33.2	33.6	32.8	30.1	30.0	30.2	28.6	30.7	33.0	33.4	33.3	30.6	29.9	31.1
16	32.9	35.4	33.2	37.0	34.2	33.8	35.9	33.6	35.4	34.7	34.6	33.5	33.8	34.0
17	33.8	31.0	34.0	33.0	35.8	36.0	35.5	35.6	31.6	31.8	32.1	35.9	36.3	34.9
Race/ethnicity														
White	72.6	68.1	66.7	71.6	72.4	69.3	64.1	70.4	65.1	67.1	69.0	70.6	66.2	60.7
Black	14.8	14.6	15.8	13.5	13.5	12.3	10.9	14.8	15.4	16.7	15.6	14.7	15.6	14.1
Hispanic	9.2	12.3	12.4	7.7	8.0	9.6	10.0	10.7	12.3	11.7	9.3	8.8	11.0	9.7
Other	3.4	5.1	5.2	7.2	6.2	8.8	15.0	4.1	7.2	4.6	6.1	6.0	7.1	15.6
Grade														
9	14.1	22.5	28.2	22.7	20.0	20.6	19.1	17.1	17.1	25.7	19.9	17.5	16.6	18.0
10	30.2	32.7	29.6	35.1	31.5	33.4	32.0	33.2	34.1	33.9	33.7	30.7	32.8	31.5
11	31.2	28.9	25.5	29.1	32.0	31.2	32.1	32.9	31.7	26.4	29.4	31.8	31.1	32.6
12	24.5	15.9	8.4	13.1	16.5	14.8	16.8	16.8	17.1	9.6	16.9	20.0	19.5	18.0
Marital status														
Married	0.0	0.1	0.1	na	na	na	na	0	0.5	0.4	na	na	na	na
Unmarried	100.0	99.9	99.9	na	na	na	na	100.0	99.5	99.6	na	na	na	na
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N*	991	992	2,782	3,995	5,550	3,654	5,643	624	739	3,126	4,365	6,020	4,000	5,948
% of original sample <20 years	58	58	48	71	72	72	73	51	53	49	72	74	75	74
N by race/ethnicity														
White	393	376	1,842	1,949	2,370	1,692	2,191	360	436	1,993	1,855	2,491	1,568	1,880
Black	362	283	460	818	1,197	1,032	1,391	187	155	601	1,082	1,402	1,442	1,750
Hispanic	205	299	337	943	1,552	671	1,526	55	110	359	1,126	1,691	751	1,746

*Total includes adolescents identifying as other than white, black or Hispanic. Notes: Percentages are weighted; Ns are unweighted. Column percentages used in every case. na=not applicable.

race and ethnicity, and marital status. The distributions differed somewhat by grade: Add Health included more ninth graders and fewer 12th graders than the other three surveys. In addition, the NSAM had a somewhat higher grade distribution in 1988 than it did in 1995.

Variables

We selected six sexual behaviors to measure: ever having had sexual intercourse; having had sexual intercourse in the last three months; pill use at last intercourse; condom use at last intercourse; number of partners in the last three months; and number of lifetime partners. (Each of these behaviors is targeted in Healthy People 2000.²⁰) We measured pill use and condom use at last intercourse, regardless of whether they were used alone or in combination with another method. Males and females were asked about all behaviors; questions, therefore, referred to their partner’s use of contraceptives at times (e.g., the condom use question asked of the female).

While four of the six behaviors could be measured across all four data sources, the surveys used different approaches to eliciting information.* Both the wording and the questions’ context varied across surveys. In addition, one survey measured

some behaviors directly through a single question, whereas in others we needed to combine responses to multiple questions. For example, the 1995 YRBS asked a single question, “During the past three months, with how many people did you have sexual intercourse?” In comparison, both the NSAM and the NSFG collected partner histories that included the date of first and last sexual intercourse for each partner. By comparing these dates with the date of the interview, we could calculate the number of partners in the last three months.

The four surveys also treated missing data differently. The NSFG imputed values for missing data, and thus its analytic sample included virtually all eligible respondents. (Imputed values amounted to no more than 2.6% of responses to any one variable used in these analyses.) The NSAM, the YRBS and Add Health, in contrast, excluded respondents with missing data for a specific item from analyses using that item. Across surveys, the level of nonresponse on specific questions varied from less than 1% to 9%.

Analysis

We calculated measures for the six behaviors under study for each survey and survey year; all reported estimates are

based on weighted data. Measures were calculated separately by race and ethnicity (non-Hispanic black, non-Hispanic white and Hispanic) for cases in which the unweighted number of respondents in a cell exceeded 100. Where multiple cells in a table contained fewer than 100 respondents, we do not present breakdowns by race or ethnicity. (This situation occurs in the tables showing oral contraceptive use, condom use and multiple sexual partners in the past three months.)

Within all of the surveys except Add Health (which had a single 1995 cross-sectional administration), we tested for trends over time; we also examined trends separately by gender and by race and ethnicity. The surveys covered overlapping but not identical time periods.

For the NSAM and the NSFG, which had two waves of data collection in 1988 and 1995, we examined differences between these two years. Specifically, we estimated the weighted proportions of respondents with the given behaviors and standard errors using SUDAAN or WESVAR software

*A document itemizing the survey questions used to measure each behavior, the subsample of respondents that received each question and item nonresponse is available from the authors upon request.

Table 3. Percentage (and standard error) of high school adolescents aged 15–17 who reported ever having had sexual intercourse, by gender and survey, according to race and ethnicity

Survey, year and comparison	Total*	White	Black	Hispanic
FEMALES				
YRBS				
1991	50.6 (2.2)	47.3 (2.4)	75.1 (2.2)	44.5 (2.5)
1993	50.7 (1.3)	48.1 (1.5)	68.8 (2.7)	50.0 (2.5)
1995	52.1 (2.9)	48.9 (3.5)	66.8 (3.0)	55.0 (5.2)
1997	48.4(1.9)	44.7 (2.9)	67.2 (2.8)	48.1 (2.3)
Trend over time	ns	ns	p<.05	ns
NSFG				
1988	34.3 (2.6)	32.2 (3.2)	49.1 (4.5)	nc
1995	36.5 (1.9)	34.3 (2.5)	45.4 (4.5)	47.8 (5.3)
Trend over time	ns	ns	ns	nc
Add Health				
1995	44.6 (1.9)	44.1 (2.0)	57.3 (3.5)	33.6 (3.1)
Differences between surveys in 1995				
YRBS vs. NSFG	p<.001	p<.001	p<.001	ns
NSFG vs. Add Health	p<.01	p<.01	p<.05	p<.05
YRBS vs. Add Health	p<.05	ns	p<.05	p<.001
MALES				
YRBS				
1991	55.5 (2.2)	50.1 (2.0)	87.3 (2.4)	66.1 (3.3)
1993	54.5 (1.7)	47.8 (1.8)	89.5 (1.5)	63.8 (2.3)
1995	52.9 (2.7)	47.5 (3.2)	80.8 (3.2)	62.6 (5.9)
1997	46.8 (1.8)	41.0 (1.9)	78.9 (2.0)	56.8 (2.7)
Trend over time	p<.001	p<.001	p<.001	p<.05
NSAM				
1988	49.5 (2.6)	44.3 (3.3)	77.8 (3.3)	53.5 (5.7)
1995	41.3 (1.9)	32.8 (2.8)	76.8 (3.0)	47.4 (4.6)
Trend over time	p<.05	p<.01	ns	ns
Add Health				
1995	45.0 (2.0)	39.0 (2.1)	73.2 (2.3)	49.9 (2.8)
Differences between surveys in 1995				
YRBS vs. NSAM	p<.001	p<.001	ns	p<.05
NSAM vs. Add Health	ns	ns	ns	ns
YRBS vs. Add Health	p<.05	p<.05	ns	ns

*Includes adolescents identifying themselves as other than white, black or Hispanic. Notes: The denominator for analyses includes all high school-attending adolescents aged 15–17 who completed the survey. nc=not calculated because cell size was less than 100. ns=non-significant.

to adjust for the complex sample designs.²¹ We tested the differences using a two-tailed t-test for proportions, permitting an assumption of unequal variances.

To test for trends in the YRBS, we pooled the four years of data (1991, 1993, 1995 and 1997), and we used logistic regression to test for linear, higher order (i.e., quadratic and cubic) and overall time effects. The final logistic models included significant time effects. We also compared the use of logistic regression applied to the four years of YRBS data with the use of t-tests, contrasting 1991 and 1997; the two methods produced the same pattern of results, although p values varied slightly.

Each table presents the results of significance testing for time trends. (We used p<.05 as our cutoff for statistical significance.) We considered but rejected adjusting p values for multiple comparisons, as our analyses deliberately selected specific behaviors and specific comparisons.

Breakdowns by race and ethnicity often resulted in very small sample sizes, particularly for Hispanic adolescents. For example, the analysis sample from the 1988 NSFG included only 55 Hispanic women, precluding the use of this subgroup in any of our analyses.

Results

Ever Having Had Sexual Intercourse

• *Trends over time.* Overall, trends in the proportions who reported ever having had sexual intercourse were more marked among males than among females (Table 3). The proportion of males reporting intercourse declined nine percentage points in the YRBS from 1991 to 1997 and eight percentage points from the 1988 NSAM to the 1995 NSAM. Significant declines were found among white, black and Hispanic males in the YRBS (8–9 percentage points) and among white males in the NSAM (12 percentage points). The NSAM had a sim-

ilar but nonsignificant downward trend among Hispanic males (six percentage points). For both the YRBS and the NSAM, declines in the proportions ever having had sexual intercourse have previously been reported in their full samples of males (p<.01 and p=.06, respectively).²³ To compare prevalence estimates across surveys in 1995, we used t-tests to compare estimates between each pair of surveys. We compared prevalence estimates for both the overall groups and each racial and ethnic group. We used STATA to calculate the standard errors for Add Health data.²² Tables 3–6 report significance testing for differences between surveys in 1995.

Finally, we used the t-test method to compare the prevalence of behaviors by gender within the YRBS and Add Health and between the NSFG (females) and the NSAM (males). Significance testing for gender comparisons is reported in the text, but not in the tables.

For the six behaviors examined, confidence intervals were larger for the NSAM and the NSFG than for the other two surveys, in part because sample sizes were smaller for the former. Correspondingly, we found more statistically significant associations in the YRBS and Add Health.

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Among females, the only significant change in the proportions ever having had sexual intercourse was an eight-percentage-point decline among black females in the YRBS. A similar but nonsignificant trend (of four percentage points) was found among black females in the NSFG. Other racial or ethnic groups did not show significant change over time. Nonsignificant declines in the proportions ever having had sexual intercourse have been seen in the full samples of females in both the YRBS and the NSFG.²⁴

• *Comparisons of 1995 point estimates.* Considerable differences in 1995 prevalence estimates were found across surveys, with larger differences for females. For both females and males, the YRBS had the highest estimates for the proportion who had ever had sexual intercourse (52% and 53%, respectively), the NSFG and the NSAM had the lowest (37% and 41%, respectively) and Add Health results were intermediate (both 45%). A 16-percentage-point difference was found between the YRBS and the NSFG for the total samples of females. (All differences in prevalence estimates for the total sample of females between pairs of the three relevant surveys were significant.) Estimates for white and black females showed similar patterns of significant differences, with the highest estimates from the YRBS and the lowest from the NSFG. An exception to this pattern of rankings was found among Hispanic females, where the estimate from Add Health was lowest.

Between the YRBS and the NSAM, there was a 12-percentage-point difference in the proportion of males reporting ever having had sexual intercourse (53% vs. 41%, respectively); an eight-percentage-point difference was found in the estimates for the YRBS and Add Health (53% vs. 45%). Estimates from the NSAM and Add Health were not significantly different. We found the same pattern of differences between surveys for white males, but did not find statistically significant differences for black males. Among Hispanic males, the YRBS estimate was significantly higher than that of the NSAM.

Within each survey, white males and females consistently had lower estimated rates than their black counterparts. Among males, Hispanic adolescents fell between

white and black teenagers on each survey. Among females, rankings were more variable, with Hispanic adolescents ranking highest in the NSFG and black teenagers highest in the YRBS and Add Health.

• **Gender differences in 1995.** We found no significant differences by gender in the proportions reporting ever having had sexual intercourse, when we compared all females with all males in the NSFG and the NSAM (37% vs. 41%, $p=.08$), in the YRBS (52% vs. 53%) and in Add Health (45% vs. 45%). Differences between black females and black males were always significant ($p<.001$, $p<.01$ and $p<.001$, respectively). Only in Add Health were there significant differences between Hispanic females and Hispanic males (34% vs. 50%, $p<.001$). No gender differences were found for white adolescents in any comparison.

Intercourse in the Past Three Months

• **Trends over time.** Few significant trends over time were found in the proportions of adolescents who reported having had intercourse within the past three months (Table 4). This proportion grew significantly only in the YRBS, where it increased among all females (by three percentage points), among white females (by five percentage points), among all males (by seven percentage points) and among white males (by 10 percentage points). In the latter three, the largest increases occurred from 1995 to 1997, the time period subsequent to the last round of both the NSFG and the NSAM. YRBS data have previously indicated no significant trend in sexual intercourse in the past three months among the full sample of high school students,²⁵ using all adolescents as the denominator. We found no significant trends in the NSFG or the NSAM, but the latter showed a nonsignificant downward trend among white males that approached statistical significance ($p=.06$).

• **Comparisons of 1995 point estimates.** Differences across surveys were smaller than those we had found for the proportions who report ever having had intercourse. Again, the YRBS had the highest estimates, the NSFG and the NSAM the lowest, and Add Health an intermediate level. Among females overall, estimates varied by a maximum of seven percentage points, with significant differences between the YRBS and the NSFG and between the YRBS and Add Health. For white and black females, the YRBS also provided significantly higher estimates than did Add Health (79% vs. 72% and 75% vs. 67%, respectively).

Among males overall, estimates for cur-

rent sexual activity differed significantly only between the YRBS and Add Health (65% and 61%, respectively). No differences across surveys were seen for Hispanic or for white males. For black males, the estimate for Add Health (58%) was significantly lower than the estimates for both the YRBS (74%) and the NSAM (68%).

• **Gender differences in 1995.** Estimates were consistently higher for females than they were for males in the YRBS (78% vs. 65%, $p<.001$) and in Add Health (71% vs. 61%, $p<.001$) and in a comparison between the NSFG and the NSAM (71% vs. 60%, $p<.05$). The same differences by gender were found for white adolescents; indeed, most overall gender differences were the result of differences between white females and white males. No significant gender differences were found for Hispanic teenagers. Only for Add Health did we find a significantly higher estimate for black females than for black males (67% vs. 58%, $p<.05$).

Pill Use at Last Intercourse

• **Trends over time.** We noted a significant decline (by 13 percentage points) in the use of oral contraceptives at last intercourse by currently sexually active women only in the NSFG (Table 5, page 162). Females in the YRBS showed a similar, but nonsignificant, trend (by six percentage points). These findings are consistent with significant declines in the full NSFG sample of adolescents and in the full YRBS.²⁶ Among males, neither the NSAM nor the YRBS showed a change over time for female partners. We could not conduct comparisons by race and ethnicity because of multiple cells with samples of less than 100.

• **Comparisons of 1995 point estimates.** For females, Add Health provided a significantly higher estimate (seven percentage points higher) than did the YRBS. The YRBS and

Table 4. Percentage (and standard error) of high school adolescents aged 15–17 who reported having had sexual intercourse in the past three months, by gender and survey, according to race and ethnicity

Survey, year and comparison	Total*	White	Black	Hispanic
FEMALES				
YRBS				
1991	75.0 (1.5)	76.7 (1.9)	71.5 (2.0)	74.3 (3.2)
1993	73.7 (1.5)	72.9 (2.0)	75.2 (2.7)	78.6 (2.5)
1995	77.6 (1.7)	78.9 (2.1)	75.3 (3.1)	70.8 (4.6)
1997	77.9 (1.7)	82.1 (1.3)	71.2 (2.2)	70.9 (3.4)
Trend over time	$p<.05$	$p<.01$	ns	ns
NSFG				
1988	72.0 (3.2)	73.9 (4.1)	nc	nc
1995	70.5(3.1)	70.9 (4.2)	nc	nc
Trend over time	ns	ns	nc	nc
Add Health				
1995	71.1 (1.3)	72.4 (1.6)	67.4 (2.5)	70.9 (4.3)
Differences between surveys in 1995				
YRBS vs. NSFG	$p<.05$	ns	ns	ns
NSFG vs. Add Health	ns	ns	ns	ns
YRBS vs. Add Health	$p<.01$	$p<.05$	$p<.05$	ns
MALES				
YRBS				
1991	62.6 (1.8)	59.4 (2.0)	71.0 (2.4)	64.1 (3.5)
1993	65.3 (1.7)	63.5 (2.0)	71.6 (3.5)	64.2 (3.3)
1995	65.1 (1.0)	63.2 (1.3)	73.5 (2.4)	57.9 (4.9)
1997	69.3 (1.8)	69.7 (2.2)	75.8 (2.9)	62.6 (3.1)
Trend over time	$p<.05$	$p<.01$	ns	ns
NSAM				
1988	67.4 (3.3)	67.2 (4.8)	68.5 (3.5)	63.5 (7.9)
1995	59.7 (3.8)	52.9 (5.9)	68.3 (3.4)	69.5 (4.5)
Trend over time	ns	ns	ns	ns
Add Health				
1995	61.3 (1.6)	63.2 (1.9)	58.2 (3.2)	59.3 (4.4)
Differences between surveys in 1995				
YRBS vs. NSAM	ns	ns	ns	ns
NSAM vs. Add Health	ns	ns	$p<.05$	ns
YRBS vs. Add Health	$p<.05$	ns	$p<.001$	ns

*Includes adolescents identifying themselves as other than white, black or Hispanic. Notes: The denominator for analyses includes high school-attending adolescents aged 15–17 who reported ever having had sexual intercourse and who completed the survey. nc=not calculated because cell size was less than 100. ns=nonsignificant.

the NSFG estimates were similar. For males, the NSAM estimate was twice as high as that of the YRBS (25% and 12%, respectively), and the Add Health estimate also was significantly higher (20% vs. 12%).

• **Gender differences in 1995.** In the YRBS, estimates of recent oral contraceptive use were significantly higher among females than were males' reports of their partner's use (18% vs. 12%, $p<.05$); a similar pattern was seen in Add Health (26% vs. 20%, $p<.05$). Estimates for the NSFG (21%) and the NSAM (25%) suggested a reversed pattern, but were not significantly different.

Condom Use at Last Intercourse

• **Trends over time.** In general, trends in reported condom use at last intercourse among sexually active youth were consistent across surveys (Table 5). Among males, significant increases were found for

Table 5. Percentage (and standard error) of sexually active high school adolescents aged 15–17 who reported using oral contraceptives at last intercourse, who reported using condoms at last intercourse or who had two or more sexual partners in the past three months, by survey, according to gender

Survey, year and comparison	Used oral contraceptives		Used condoms		Had ≥2 partners	
	Females	Males	Females	Males	Females	Males
YRBS						
1991	23.6 (3.0)	13.9 (1.2)	39.7 (3.0)	57.4 (2.1)	18.0 (1.3)	39.1 (2.1)
1993	19.4 (1.1)	11.7 (1.1)	47.8 (1.4)	61.6 (2.1)	19.2 (1.3)	39.6 (1.9)
1995	18.3 (1.7)	11.7 (1.9)	49.2 (2.8)	61.6 (2.8)	16.1 (1.8)	37.5 (2.8)
1997	17.6 (1.8)	11.3 (1.6)	51.9 (1.7)	63.8 (1.4)	19.2 (1.3)	34.0 (1.9)
Trend over time	ns	ns	p<.001	p<.05	ns	p<.05
NSFG/NSAM						
1988	33.8 (3.7)	27.6 (3.4)	38.4 (4.3)	61.5 (4.3)	8.7 (2.6)	19.0 (3.1)
1995	20.7 (3.2)	24.7 (4.4)	41.5 (3.6)	72.1 (3.2)	15.3 (2.8)	20.5 (3.4)
Trend over time	p<.01	ns	ns	p<.05	ns	ns
Add Health						
1995	25.6 (1.8)	20.1 (1.7)	53.1 (2.0)	64.2 (2.3)	u	u
Differences between surveys in 1995						
YRBS vs. NSFG/NSAM	ns	p<.01	ns	p<.05	ns	p<.001
NSFG/NSAM vs. Add Health	ns	ns	p<.01	p<.05	na	na
YRBS vs. Add Health	p<.01	p<.01	ns	ns	na	na

Notes: The denominator for analyses includes all high school–attending adolescents aged 15–17 who reported having had sexual intercourse in the past three months and who completed the survey. Estimates for racial and ethnic subgroups are not presented, as multiple cells contained less than 100 respondents. Comparable data on number of partners are not available from Add Health. ns=non-significant. na=not applicable. u=unavailable.

the NSAM (11 percentage points) and the YRBS (six percentage points); among YRBS females reporting their male partner's use, there was a 12-percentage-point difference. A similar but nonsignificant trend was found among NSFG females. The YRBS, the NSAM and the NSFG have all shown increases in condom use in their full samples of adolescents.²⁷

• *Comparisons of 1995 point estimates.* The prevalence estimates for condom use varied across surveys. For females, estimates were highest in Add Health (53%), lowest in the NSFG (42%) and intermediate in the YRBS (49%). The NSFG and Add Health estimates differed significantly for females. For males, condom use estimates were highest in the NSAM (72%), lowest in the YRBS (62%) and intermediate in Add Health (64%). The NSAM and YRBS estimates were significantly different, as were those of the NSAM and Add Health.

• *Gender differences in 1995.* Across surveys, reported condom use was consistently higher among males. The difference was 12 percentage points in the YRBS (p<.001), 31 percentage points between the NSAM and the NSFG (p<.001) and 11 percentage points in Add Health (p<.001).

Multiple Partners in Past Three Months

• *Trends over time.* We found no trends over time in the proportions reporting having had two or more partners in the past three months, with one exception (Table 5). The proportion of males in the YRBS reporting

two or more sexual partners declined from 39% in 1991 to 34% in 1997 (p<.05). Most of this decrease occurred between 1995 and 1997, the time period following the last round of the NSFG and the NSAM.

• *Comparisons of 1995 point estimates.* The estimates for females were similar in the YRBS and in the NSFG (16% and 15%, respectively). However, among males, estimates from the YRBS (38%, based on three-month recall) and the NSAM (21%, based on calendar data) differed substantially.

• *Comparisons of gender differences in 1995.* A substantial difference by gender was found within the YRBS (16% for females and 38% for males, p<.001), but not between the NSFG and the NSAM (15% and 21%, respectively).

Four or More Partners

• *Trends over time.* Across surveys, there were no changes over time in the proportions of all female adolescents who reported four or more sexual partners in their lifetime (Table 6). Among white females, the proportion reporting four or more partners in their lifetime decreased significantly in the NSFG (from 27% to 15%), but not in the YRBS. Cell sizes were too small to calculate estimates for black and Hispanic females in the NSFG.

In the YRBS, the proportion of males with four or more partners decreased significantly among all males (from 39% to 35%) and among white males (from 30% to 24%). Most of these decreases occurred between

1995 and 1997, a period not covered by the NSAM. Significant changes were not found in the NSAM. A nonsignificant downward trend among white males in the NSAM (from 36% to 32%) paralleled the significant decline seen among white males in the YRBS.

• *Comparisons of 1995 point estimates.* No significant differences across surveys were found in point estimates in 1995 for any possible comparison. Comparing rankings by race and ethnicity among males, we found that black adolescents had the highest proportions with four or more partners across surveys (66% in the YRBS and 68% in the NSAM) and that white teenagers had the lowest proportions (29% and 32%, respectively). Hispanic males reported intermediate levels (39% and 58%, respectively).

• *Gender differences in 1995.* Females in the YRBS were less likely to have had four or more partners than were males in the YRBS (25% vs. 38%, p<.001); this was also the case for the NSFG–NSAM comparison (20% vs. 47%, p<.001). Similar, significant differences by gender were also found for all racial and ethnic subgroup comparisons in the YRBS, except among white teenagers. In this comparison, females were less likely than males to report having had four or more sexual partners (23% vs. 29%), but the differences were not statistically significant (p=.12).

Discussion

Across surveys, the data generally demonstrate comparable trends over time in key sexual behaviors among adolescents, but they show considerable variation in point estimates. Specific time-trend findings can be grouped into four categories. First are significant trends that are similar across surveys. In both the NSAM and the YRBS, we found decreases in the proportion of all males and of white males who reported ever having had sexual intercourse and increases in condom use among all males.

A second group of trends reveals a significant finding in one survey with a parallel but nonsignificant change in another. For example, we found a significant decrease in the proportion of black females who reported ever having had intercourse in the YRBS, a trend suggested in the NSFG. Similarly, the decline in the proportion of Hispanic males reporting ever having had intercourse was significant in the YRBS and was nonsignificant in the NSAM. The decrease in the proportion of white males who reported having had four or more lifetime sexual partners was significant in the YRBS and was

suggested in the NSAM. (This difference may be the result of the YRBS's larger sample size.) For several of these trend comparisons, significant changes that are limited to the YRBS may have been due to larger proportionate changes from 1995 to 1997, a period that could not be examined for either the NSFG or the NSAM.

Third, we found no significant trends in any survey regarding ever having had sexual intercourse among all females, white females and Hispanic females; oral contraceptive use among the partners of male respondents; having two or more sexual partners in the past three months among females; and having four or more lifetime sexual partners among all females, black and Hispanic females, and black and Hispanic males.

Finally, we discovered some categories that show a trend in one survey without a parallel nonsignificant trend in the comparable survey. The largest discrepancies across surveys appear among those who reported having had sexual intercourse in the past three months. There were significant increases in the proportions of all males, white males, all females and white females reporting having had sexual intercourse in the past three months in the YRBS; the trend was downward but nonsignificant in the NSFG and the NSAM for these groups. An explanatory factor may be the method of data collection, which varied considerably across surveys.

The prevalence estimates for 1995 vary considerably across surveys; they differed significantly in at least one comparison of surveys for all behaviors except having four or more lifetime sexual partners (for both genders) and having two or more recent sexual partners (for females). More research is needed to explain these differences. Factors worth investigating include the wording of questions, the sampling frames (schools versus households), the location of interviews, privacy considerations (anonymous or confidential administration), social desirability, modes of data collection and when in the year the data were collected. These differences may influence adolescents' comprehension or their perception of privacy. Proxy reporting (e.g., asking a male about his female partner's use of hormonal contraception) introduces another potential source of bias.

Further research is also needed on how (or whether) adolescents understand the use of data and the purpose of surveys; the effect of different response rates on estimates of sensitive behaviors; the effect of context within a questionnaire; adolescents' understanding of concepts such as "sexual in-

tercourse" and "sexual partners"; the susceptibility of adolescents to reporting errors such as telescoping (i.e., reporting that an event occurred within a specific time frame when it actually took place before that time);²⁸ and the effects of incentives on respondent effort and motivation. Additionally, the influence of parent refusals on sample composition needs to be examined.

Multiple methodological differences no doubt have contributed to the higher 1995 estimates in the YRBS than in the NSFG and the NSAM for the proportions reporting ever having had sexual intercourse and having had sexual activity in the past three months. We do not know for certain whether these differences derive from overreporting in the YRBS, underreporting in the other surveys or both. Given adolescents' concerns about confidentiality, use by the NSFG and the NSAM of face-to-face, interviewer-administered questionnaires and interviews in the adolescent's home may have contributed to underreporting of these sexual behaviors. The administration of the YRBS in schools (and away from parents) and the anonymity of the questionnaire may have contributed to a greater sense of privacy and an increased willingness to disclose behaviors.

Add Health, which generally yielded intermediate estimates, conducted interviews in homes, but used computer-assisted self-interviewing to address adolescents' need for privacy. A randomized experiment in the 1995 NSAM found considerable differences between self-administered, paper-and-pencil questionnaires and computer-assisted self-interviews for highly sensitive behaviors (e.g., male-male sex, illegal drug use and drug use before intercourse) among adolescent males, but no differences for more common sexual behaviors, such as those examined here.²⁹

Overreporting in the YRBS also could have contributed to differential estimates for ever having had intercourse. The YRBS question

asked simply, "Have you ever had sexual intercourse?" while the other questionnaires attempted to be more specific by defining sexual intercourse as male-female intercourse or by using adolescent slang to clarify question meaning (e.g., "going all the way"). Perhaps some students misinterpreted the YRBS questions to include behavior other than vaginal intercourse. If true, this may help explain the lower rates of contraceptive use in the YRBS; contraceptives are less likely to be used in nonpenetrative sexual activity. Although the use of a self-administered questionnaire in the YRBS may well have led to some overreporting related to misunderstanding of the question, we should note that the YRBS displays good test-retest reliability among students in grades 9-12.³⁰

Methods of data collection may have affected estimates for multiple sexual partners in the last three months. These estimates were similar across surveys for females, but much higher among males in the YRBS than in the NSAM. In the NSFG and the NSAM, this measure was constructed from calendar data, whereas it came from a single question in the YRBS.

Table 6. Percentage (and standard error) of sexually experienced high school adolescents aged 15-17 who reported having had four or more sexual partners in their lifetime, by gender and survey, according to race and ethnicity

Survey, year and comparison	Total*	White	Black	Hispanic
FEMALES				
YRBS				
1991	26.1 (1.7)	25.3 (2.5)	32.5 (2.9)	20.2 (2.7)
1993	29.3 (1.4)	26.9 (1.3)	38.6 (3.1)	23.3 (2.5)
1995	25.1 (2.7)	22.9 (3.3)	32.1 (2.6)	19.4 (3.3)
1997	29.7 (2.4)	27.3 (2.2)	38.2 (4.4)	21.2 (3.7)
Trend over time	ns	ns	ns	ns
NSFG				
1988	24.7 (3.4)	27.1 (4.9)	nc	nc
1995	20.0 (2.7)	15.3 (3.0)	nc	nc
Trend over time	ns	p<.05	nc	nc
Difference between surveys in 1995				
YRBS vs. NSFG	ns	ns	ns	ns
MALES				
YRBS				
1991	39.2 (1.6)	30.1 (2.0)	69.4 (3.0)	36.1 (2.7)
1993	39.1 (1.4)	28.9 (1.9)	67.3 (2.7)	39.5 (2.9)
1995	38.4 (2.0)	29.1 (2.1)	66.0 (3.5)	39.4 (4.9)
1997	35.1 (1.5)	24.3 (1.7)	64.1 (2.6)	33.0 (2.5)
Trend over time	p<.05	p<.05	ns	ns
NSAM				
1988	44.4 (4.2)	36.3 (5.5)	69.6 (4.2)	45.3 (12.3)
1995	46.9 (4.3)	32.3 (7.2)	68.3 (5.2)	58.0 (8.6)
Trend over time	ns	ns	ns	ns
Difference between surveys in 1995				
YRBS vs. NSAM	ns	ns	ns	ns

*Includes adolescents identifying as other than white, black or Hispanic. Notes: The denominator for analyses includes all high school-attending adolescents aged 15-17 who reported having ever had sexual intercourse and who completed the survey. Comparable data from Add Health are not available. nc=not calculated, as cell size was less than 100. ns=nonsignificant.

Substantially different cognitive processes are involved in recalling details of each specific partner and exact dates of last sexual intercourse than are utilized in providing a total number of partners within a specific time period. How this was manifested in the differences in the estimates is not clear, but the collection of calendar data may encourage more careful reporting because each partner is addressed separately. In this case, difficulties with three-month recall may have inflated estimates for males in the YRBS. We have no explanation for finding bias among males and not among females; perhaps males are more prone to inflate estimates for partner numbers and the calendar method suppresses this tendency.

Both reporting and methodological considerations could have contributed to discrepancies in levels of reported condom use at last sexual intercourse. The denominators for these analyses included adolescents who reported both ever having had sexual intercourse and having had sexual intercourse in the past three months; these denominators are subject to the underreporting or overreporting biases discussed above. In the NSAM and the NSFG, estimates for recent sexual activity were based on calendar data; in contrast, in the YRBS these data came from one question enumerating number of sexual partners in the past three months and in Add Health they came from one question asking the month and year of last intercourse. Overreporting or underreporting on these two behaviors would change the denominator for these analyses, thereby influencing these estimates. Other research has shown that adolescents cannot reliably report the date of first sexual intercourse when asked to give the month and year, as in Add Health.³¹

These data suggest both increased condom use and decreased pill use over the late 1980s and 1990s. While desirable from the perspective of STD and HIV prevention, these shifts by themselves suggest reduced effectiveness of pregnancy prevention efforts. While we could not measure these shifts in our analyses, other changes in contraceptive use are consistent with the declines found in adolescent pregnancy rates in the 1990s. These changes include overall increases in contraceptive use at first intercourse (resulting from the shift to condoms) and gains in adolescents' use of highly effective long-acting hormonal methods, which were introduced in the early 1990s.

Patterns by gender and race or ethnicity were generally consistent across sur-

veys, suggesting reliability across methods for these estimates. (These patterns are also consistent with those found in other surveys of adolescents.) Within the YRBS and Add Health and between the NSAM and the NSFG, males provided higher estimates for ever having had sexual intercourse, for use of condoms and for number of recent and lifetime sexual partners, and lower estimates for recent sexual activity and (in all but one case) partner's use of oral contraceptives.

The reporting of more numerous recent sexual partners by young males than by young females may represent true differences in behavior or systematic differences in reporting by gender. Studies among adults show the same gender differential,³² but these studies have often interpreted the difference as reflecting reporting biases between men and women.³³ We should note that teenagers in the sample do not necessarily draw from the corresponding opposite-gender age-group for their sexual partners. For example, the recent male partners of females aged 15–19 in 1995 were on average two years older.³⁴ Reporting by black adolescents of estimates higher than their white and Hispanic counterparts for ever having had sexual intercourse and for having four or more sexual partners is not unexpected, given prior research documenting similar patterns in other sexual behaviors by gender and race or ethnicity.³⁵

Limitations

Our attempt to compare surveys had a number of limitations. The three surveys used to assess trends did not have identical time intervals and generally collected data in different years and in different ways. We attempted to standardize comparisons by creating a common analytic sample and by selecting behaviors that are relatively straightforward. Unfortunately, we could not adjust for many methodologic differences, such as sampling location and mode of survey administration.

Our attempt to create a common analytic sample limited statistical power for these analyses, as we eliminated large numbers of participants from each survey. These restricted analytic samples also reduced our ability to examine specific subgroups of adolescents, such as Hispanics in the NSFG and the NSAM. This was a particular problem for behaviors such as contraceptive use, where denominators were limited to adolescents who were currently sexually active.

In creating a common analytic sample, even issues we presumed to be relatively

straightforward proved troublesome. For example, defining "in school" and "in grades 9–12" was more complex than anticipated. Significant differences in sexual behavior between adolescents who are enrolled in school and those who are dropouts have been documented;³⁶ similar differences probably exist between those who attend regularly and those who do so sporadically. In the YRBS, respondents included those enrolled in high school who were in attendance the days the survey was administered. Adolescents in Add Health were identified from school rolls but were interviewed at home and were not required to have attended recently. Respondents in the NSFG and the NSAM were asked to report on current school attendance and, for those interviewed during the summer months, to report on attendance in the spring or summer and whether they were still "in school." To address these differences, we developed common rules of inclusion for specific groups interviewed in the summer (e.g., high school graduates and those moving from grade eight to grade nine were excluded) and for those interviewed during the school year (e.g., attendance in the past month).

The selection of a specific cutoff for statistical significance (i.e., $p < .05$) is arbitrary; an overemphasis on statistical significance can be misleading, particularly when samples differ in statistical power or multiple comparisons are made. In this study, significant trends were often found in one survey and similar but nonsignificant trends in the comparison survey. In these cases, the patterns of trends may be more important than the specific p values. Given these considerations, we reported both patterns and specific significance testing.

Finally, even with comparable reports of trends across different data systems, there still may be problems of validity. Each survey may be influenced by issues of social desirability, in that adolescents may report what they believe is the normatively desirable answer, not their true behavior.

Implications

These analyses have a number of policy and research implications. First, policymakers and those who use data should generally avoid comparing point estimates for adolescent behaviors across surveys, even if seemingly comparable groups are used. For example, 1997 data from the YRBS should not be compared with 1995 data from the NSFG or the NSAM to suggest trends in adolescent behaviors. Similarly, YRBS data cannot be used directly to track national goals such

as Healthy People 2000, where baseline data come from the NSAM or the NSFG.

In addition, those who design surveys to measure trends in adolescent behavior or who wish to compare local data with national data should be very careful to use comparable methods. The 2001 NSFG will for the first time include men. Much planning has gone into ensuring that these NSFG data will be comparable with the NSAM data already collected to allow comparisons to be made over time between these data sets. The findings reported here suggest, however, that attaining comparability may be difficult.

Given the importance of these data for policymaking, there is a need for greater statistical power, particularly in the household samples. The 2001 NSFG will oversample adolescents, thereby improving its ability to detect smaller changes, particularly within ethnic subgroups.

Our findings suggest a need to improve our understanding of methodological effects in survey research with adolescents. Newer techniques (such as computer-assisted self-interviewing) that address both adolescent comprehension and concerns about confidentiality show promise in improving the accuracy of adolescents' self-reports.³⁷ Adoption of these new techniques creates a dilemma for surveys in which innovation and consistency with past measures must be balanced.

Despite these caveats, the commonalities we found in trends over time and in gender differences suggest that these data are valid. The YRBS provides an important surveillance tool for monitoring trends in health behaviors. The NSFG, the NSAM and Add Health complement and extend this effort by collecting extensive additional information that can be used to better understand the causes and consequences of changes in reproductive health behaviors. These surveys have different missions and sample populations, but together they provide a rich data resource for public health policymakers and researchers interested in improving adolescent reproductive health and well-being. These multiple data sources enable programs to make use of the information on the needs of adolescents according to the groups they target (i.e., school versus community-based populations).

The declines in sexual experience and the increases in condom use reported in these data indicate shifts toward safer and more self-protective behaviors among adolescents. The fact that several surveys show these changes increases our confidence that these trends are real.

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