

# The Use of Condoms with Other Contraceptive Methods Among Young Men and Women

By John S. Santelli, Charles W. Warren, Richard Lowry, Ellen Sogolow, Janet Collins, Laura Kann, Rachel B. Kaufmann and David D. Celentano

In a nationally representative sample of sexually experienced youths aged 14–22, 37% of young women and 52% of young men said the condom was the primary method used to prevent pregnancy at last intercourse. (An additional 8% and 7%, respectively, said they used a condom at last intercourse; much of this represents dual use.) Condom use at last intercourse was reported by 25% of young men whose partner was using the pill. Significant independent predictors of condom use with the pill among men included younger age, black race, engaging in fewer nonsexual risk behaviors and having received instruction about HIV in school. Among young women, 21% of those relying on the pill reported also using a condom at last intercourse. For women, independent predictors of dual use included younger age, black race, older age at first sex, fewer nonsexual risk behaviors, having no partners in the previous three months and having talked to parents or other adult relatives about HIV. (*Family Planning Perspectives*, 29:261–267, 1997)

Because the contraceptive methods most effective in preventing pregnancy and those most protective against sexually transmitted diseases (STDs), including HIV, are not the same, experts in reproductive health care now recommend that couples who wish to minimize both risks use two methods—an effective nonbarrier contraceptive such as the pill or the IUD and a barrier method, usually the condom.<sup>1</sup> The decision by a couple to use contraceptives for both purposes necessarily involves both partners, since most methods that are highly effective against pregnancy are female-controlled and the method most commonly used against STD infection is male-controlled.

Few published national data exist on the combined use of barrier and nonbarrier methods. Recently, however, several empirical studies have examined contraceptive use related to the dual goals of averting pregnancy and preventing STDs.<sup>2</sup> A local study from Baltimore,<sup>3</sup> for example, demonstrated considerable dual use among black women, with the highest rates among adolescents and users of oral

contraceptives. Demographic surveys of contraceptive use in the United States typically have collected and reported data only on use of single methods; when more than one method is described by a respondent, the one reported by the investigator is usually the method that most effectively prevents pregnancy.<sup>4</sup> Likewise, studies of HIV and STD risk often do not include data on contraceptive use for pregnancy prevention.

Of all age-groups, adolescents have the highest risk of infection with STDs<sup>5</sup> and the largest share of unintended pregnancies in the United States.<sup>6</sup> Several studies<sup>7</sup> have demonstrated that, despite their increased risk of STD infection, adolescents who engage in sexual risk behaviors (e.g., those having multiple partners) are less likely to use condoms. Problem behavior theory<sup>8</sup> postulates that adolescent risk behaviors (e.g., drug use, delinquency, early sexual involvement and having sex with multiple partners) often occur as part of a syndrome, with risk-taking in one area correlated with that in other areas. For example, adolescents who engage in early drug use appear to be more likely than those who do not to engage in early sexual behavior, and vice versa.<sup>9</sup> This covariation presumably reflects underlying personality characteristics such as unconventionality,<sup>10</sup> risk-taking<sup>11</sup> or sensation-seeking.<sup>12</sup>

Early age at initiation of sexual intercourse may be a marker for adolescent psychosocial risk<sup>13</sup> and has been associated with adult sexual risk behaviors and risk for STDs.<sup>14</sup> An extension of problem

behavior theory has looked at psychosocial protective factors.<sup>15</sup> Protective factors, including a positive orientation to health, positive relationships with adults and such behaviors as attending church and using seat belts, show a negative correlation with adolescent risk behaviors, although these associations are not as strong as the correlations between risk behaviors.

This study, which is based on data from the Youth Risk Behavior Survey (YRBS) supplement to the 1992 National Health Interview Study (NHIS), examines use of condoms with other contraceptives among youths aged 14–22 years.<sup>16</sup> We explore two questions: What is the prevalence of combined use by age and gender among adolescents and what are the demographic and behavioral determinants of combined use and use of condoms alone among adolescents? In short, how do sexual and nonsexual risk behaviors, healthy behaviors and other potentially protective factors influence the use of condoms, either alone or with other contraceptives?

## Methods

The NHIS is an annual household interview survey of the civilian, noninstitutionalized population of the United States.<sup>17</sup> The NHIS, which oversamples minority families, uses a complex weighted design to obtain data representative of the U.S. population. The 1992 survey enumerated all youths aged 12–21 from sampled households, including those who were married and those who no longer lived in the household. The 1992 YRBS, conducted as a follow-back survey to the NHIS, randomly selected youths from this list, oversampling those who were out of school. A weighting factor was applied to each YRBS record to adjust for nonresponse and oversampling.

Youths were surveyed between April 1992 and March 1993, approximately four months after the initial household survey. To allay adolescents' concerns about confidentiality during in-home interviews, data were collected using an innovative audiocassette technology.<sup>18</sup> Adolescents listened to the questionnaire using headphones and recorded their responses on an answer sheet that contained only numbers

John S. Santelli and Richard Lowry are medical epidemiologists, Charles W. Warren is assistant director for science, Ellen Sogolow is a research psychologist, Janet Collins is chief of the Surveillance and Evaluation Research Branch and Laura Kann is chief of the Surveillance Research Section, Division of Adolescent and School Health, Centers for Disease Control and Prevention (CDC), Atlanta, GA. Rachel B. Kaufmann is an epidemic intelligence service officer in the Division of Reproductive Health, CDC, and David D. Celentano is a professor in the Johns Hopkins University School of Hygiene, Baltimore, MD.

**Table 1. Percentage distribution of never-married young women aged 14–22, by method used at last intercourse, according to selected characteristics, 1992 YRBS**

Characteristic	N	Pill only (N=484)	Condom only (N=745)	Pill and condom (N=134)	Withdrawal† (N=267)	Other‡ (N=67)	None (N=348)	Total
<b>Total</b>	<b>2,045</b>	<b>24.5</b>	<b>37.3</b>	<b>6.6</b>	<b>13.0</b>	<b>3.2</b>	<b>15.3</b>	<b>100.0</b>
<b>DEMOGRAPHIC FACTORS</b>								
<b>Age§</b>								
14–15	252	9.3	50.1	2.1	17.2	2.1	19.2	100.0
16	252	12.8	46.6	7.2	14.7	2.6	16.2	100.0
17	275	23.5	43.1	5.9	11.0	2.5	14.0	100.0
18	272	22.5	36.8	7.0	16.9	3.9	12.9	100.0
19	283	24.9	36.8	6.4	14.2	2.3	15.5	100.0
20	356	32.9	28.4	7.1	10.9	3.6	19.2	100.0
21–22	355	38.1	26.6	9.6	7.9	4.8	13.9	100.0
<b>Race/ethnicity††</b>								
White	1,240	28.7	36.3	6.1	12.5	3.0	13.5	100.0
Black	444	14.9	42.6	11.8	8.6	3.5	18.5	100.0
Hispanic	280	15.5	33.6	2.9	21.9	4.4	21.8	100.0
<b>SEXUAL BEHAVIOR FACTORS</b>								
<b>Age at first intercourse</b>								
≤13	312	22.0	29.4	3.3	11.9	6.1	27.3	100.0
14–15	733	23.0	37.5	5.0	16.1	3.2	15.2	100.0
≥16	986	26.5	39.2	8.8	11.1	2.4	12.0	100.0
<b>No. of partners in previous 3 months</b>								
0	376	9.1	53.1	6.0	9.9	2.6	19.2	100.0
1	1,361	28.8	34.8	7.2	12.5	3.4	13.2	100.0
≥2	295	24.5	28.1	5.0	19.2	2.8	20.4	100.0
<b>Lifetime no. of partners</b>								
1	611	18.3	50.6	6.0	11.0	2.7	11.5	100.0
2	377	20.9	44.1	8.0	12.0	1.5	13.4	100.0
3	265	29.7	29.5	8.6	11.3	3.6	17.3	100.0
4	200	25.6	27.4	8.6	19.1	5.0	14.3	100.0
5	132	31.0	27.7	3.4	16.8	2.2	18.9	100.0
≥6	444	31.3	23.2	5.5	14.1	4.8	21.1	100.0
<b>OTHER FACTORS</b>								
<b>Risk behavior score</b>								
0	223	14.6	43.4	12.8	8.3	5.6	15.3	100.0
1	479	20.8	47.2	6.4	11.8	1.6	12.1	100.0
2	479	27.0	39.0	5.8	12.9	3.9	11.4	100.0
3	424	31.4	29.0	5.2	13.9	2.2	18.2	100.0
4	283	23.5	32.8	6.8	14.5	5.0	17.3	100.0
5–6	157	25.2	24.4	4.9	17.6	2.3	25.6	100.0
<b>Frequency of seat belt use</b>								
Never or rarely	364	21.3	28.2	4.2	18.1	1.6	26.6	100.0
Sometimes	463	25.5	37.1	7.4	11.3	2.8	16.0	100.0
Usually	545	25.1	40.0	4.7	13.0	3.3	14.0	100.0
Always	673	25.1	39.8	8.8	11.6	4.2	10.6	100.0
<b>Had HIV education in school</b>								
Yes	1,642	23.6	38.4	6.5	13.0	3.2	15.3	100.0
No	345	29.5	31.0	7.1	12.6	3.9	16.0	100.0
<b>Discussed HIV with adult relatives</b>								
Yes	1,536	24.6	37.1	7.8	12.2	3.0	15.2	100.0
No	457	24.9	37.5	3.0	14.9	3.8	15.8	100.0

†Includes those who combined withdrawal and the condom at last intercourse. ‡Includes those who combined other methods and the condom. §Age 14–15 includes 83 14-year-olds and 169 15-year-olds; age 21–22 includes 300 21-year-olds and 55 22-year-olds. ††N=1,964; 81 respondents belonged to other racial or ethnic groups. Note: All percentages in Tables 1 and 2 are based on weighted data.

(for questions) and letters (for responses).

Of the 13,789 selected youths who were 12–21 at the time of the core survey, 10,645 (77%) were located and agreed to be interviewed. (Of the youths who were 21 years of age at the time of the core NHIS survey, 126 were 22 at the time of follow-up.) Youths aged 12–13 (N=2,195) were not asked about their sexual activity and were excluded from this analysis. Also excluded were young men and women who re-

ported ever having been married (N=1,187), those who said they had never had sexual intercourse (N=2,906) and those for whom data on condom and contraceptive use were missing (N=97). This left 4,260 never-married adolescents aged 14–22 who had ever had sexual intercourse.

We used cross-tabulations and logistic regression to identify predictors of condom use at last intercourse. Potential predictors included demographic variables (age, race

and ethnicity, family income and poverty status), sexual behavior variables (age at first coitus, use of alcohol or drugs at last sexual intercourse, lifetime number of sexual partners and number of sexual partners in the previous three months), other risk behaviors (ever having tried tobacco, ever having tried marijuana, ever having tried cocaine or any other illicit drug, having had five or more drinks in a row on one or more occasions in the previous 30 days, having carried a weapon one or more days in the previous 30 days and having been in a fight one or more times in the previous 12 months), healthy behaviors (frequency of exercise and seat belt use) and potentially protective factors (having received HIV education in school and having talked about HIV with parents or other adult relatives). All data were reported by the youths themselves, except for family income, marital status and race and ethnicity, which were reported by the adult who completed the core NHIS interview.

Each sexual risk behavior variable was examined as a separate item. A scale for other risk behaviors was constructed by combining responses to the six individual items; the scale varied from zero to six, with zero indicating participation in none of the behaviors and six indicating participation in all of them. Cronbach's alpha for the scale was 0.58 for women and 0.61 for men, indicating a moderate level of internal consistency. When a scale including both sexual and nonsexual risks was constructed, the value for Cronbach's alpha was similar.

We created a measure of the use of condoms and other contraceptives at last intercourse from responses to two questions, one that asked what method had been used to prevent pregnancy and a second that asked if the respondent had used a condom. The measure included the following categories—use of condoms with the pill, use of the pill alone, use of condoms alone, use of withdrawal, use of other methods and use of no method. No other combination (i.e., condoms with other methods) was common enough to provide stable estimates.

We followed two approaches in analyzing the data. First, we examined cross-tabulations of potential predictors and the created measure of condom and contraceptive use. In this part of the analysis, the respondents who reported having used condoms with withdrawal or condoms with "other" methods were classified as having used withdrawal or other methods. However, these respondents were excluded from the logistic regression analy-

ses because use of such combinations was too rare to be examined analytically.

We stratified the remaining sample into respondents who had used the pill and those who had not. We used logistic regression to estimate the influence of each independent variable on use of condoms in each group. Separate analyses were conducted for young men and young women. We performed the regression analyses using SUDAAN software to account for the complex, weighted sampling design.

## Results

The most common methods used by young women at last intercourse to prevent pregnancy were the condom and the pill (37% and 31%, respectively), followed by withdrawal (13%) and other methods (3%). Sixteen percent reported using no method for contraception.

While 37% of young women reported that they had used a condom at last intercourse to prevent pregnancy, a total of 44% said they had used a condom. Most of the additional women had used a condom in combination with another method. Dual use was most common among women who had used the pill at last intercourse (21%), followed by 8% of women who had used "other" methods and 6% of women who had relied on withdrawal; in addition, 4% of women who had used no method for pregnancy prevention had used a condom.

Among young men, 52% had used a condom at last intercourse to prevent pregnancy and 18% had relied on pill use by their partner, while 12% had relied on withdrawal and 3% had used another method; 16% had used no method. While 52% said they had relied on a condom to prevent pregnancy, a total of 58% reported having used a condom. Most of the additional men had used a condom in conjunction with another method. Dual use was most common among young men whose partner was using the pill (25%), followed by men who used other methods (14%) and those who relied on withdrawal (9%); 5% of young men who had used no method to prevent pregnancy also reported using a condom at last intercourse.

Table 1 presents descriptive data on contraceptive and condom use among young women by demographic factors, sexual risk behaviors and potentially protective factors. Women's method choices were strongly influenced by age. Use of the pill alone rose sharply with age, while use of the condom alone declined. Use of condoms with the pill rose from 2% among those aged 14–15 to 10% among those aged

**Table 2. Percentage distribution of never-married young men aged 14–22, by method used at last intercourse, according to selected characteristics**

Characteristic	N	Pill only (N=303)	Condom only (N=1,153)	Pill and condom (N=98)	Withdrawal† (N=284)	Other‡ (N=56)	None (N=321)	Total
<b>Total</b>	<b>2,215</b>	<b>13.7</b>	<b>52.4</b>	<b>4.5</b>	<b>12.0</b>	<b>2.5</b>	<b>14.9</b>	<b>100.0</b>
<b>DEMOGRAPHIC FACTORS</b>								
<b>Age§</b>								
14–15	279	1.5	70.8	2.4	9.8	0.9	14.7	100.0
16	258	4.7	53.7	4.2	12.8	1.9	22.7	100.0
17	296	10.3	62.3	3.8	10.1	2.9	10.7	100.0
18	316	14.1	46.7	6.1	15.3	3.9	13.9	100.0
19	322	17.9	52.8	4.0	9.8	1.7	13.8	100.0
20	366	20.2	42.6	4.8	13.9	2.4	16.1	100.0
21–22	378	21.2	45.0	5.9	11.8	3.2	13.0	100.0
<b>Race/ethnicity††</b>								
White	1,260	16.8	50.4	4.5	13.4	2.3	12.7	100.0
Black	434	8.2	58.2	6.0	6.9	4.0	16.8	100.0
Hispanic	422	11.0	51.1	3.1	12.7	0.7	21.4	100.0
<b>SEXUAL BEHAVIOR FACTORS</b>								
<b>Age at first intercourse</b>								
≤13	610	9.9	48.8	5.4	11.9	3.0	20.9	100.0
14–15	718	13.3	53.5	3.3	12.3	1.3	16.4	100.0
≥16	884	16.5	53.8	5.1	11.6	3.1	9.9	100.0
<b>No. of partners in previous 3 mos.</b>								
0	559	6.4	59.8	2.2	12.0	2.0	17.7	100.0
1	1,041	19.3	49.4	5.5	11.3	2.8	11.8	100.0
≥2	607	11.2	50.5	5.2	13.1	2.4	17.6	100.0
<b>Lifetime no. of partners</b>								
1	521	8.9	58.1	3.0	12.7	2.5	14.8	100.0
2	314	13.3	53.1	7.1	12.8	1.9	12.0	100.0
3	290	15.3	58.1	3.4	9.3	3.0	11.0	100.0
4	183	16.0	50.2	3.1	11.0	1.8	17.8	100.0
5	152	13.2	53.1	8.2	14.6	2.6	8.2	100.0
≥6	743	16.3	46.2	4.6	12.0	2.5	18.4	100.0
<b>OTHER FACTORS</b>								
<b>Risk behavior score</b>								
0	173	11.2	62.6	3.8	12.5	0.2	9.7	100.0
1	399	9.1	58.2	5.6	10.1	3.6	13.5	100.0
2	478	12.0	55.3	5.8	9.0	2.5	15.3	100.0
3	419	14.0	53.7	4.3	10.0	3.6	14.5	100.0
4	384	18.3	45.2	4.1	14.8	2.3	15.2	100.0
5	258	16.7	46.7	3.1	15.2	0.8	17.6	100.0
6	104	18.3	34.0	1.8	23.0	2.4	20.5	100.0
<b>Frequency of seat belt use</b>								
Never	209	14.5	41.1	2.7	15.2	0.9	25.6	100.0
Rarely	407	12.1	46.6	4.7	14.0	3.2	19.5	100.0
Sometimes	509	16.0	50.0	5.4	11.9	2.2	14.5	100.0
Usually	527	12.3	58.3	4.5	11.7	3.4	9.9	100.0
Always	562	14.0	57.5	4.4	9.7	1.9	12.5	100.0
<b>Had HIV education in school</b>								
Yes	1,832	12.4	53.6	5.0	12.1	2.6	14.3	100.0
No	314	18.6	48.2	2.6	12.0	2.0	16.8	100.0
<b>Discussed HIV with adult relative</b>								
Yes	1,525	13.2	54.1	5.3	12.7	2.2	12.5	100.0
No	611	15.0	47.5	3.1	10.9	2.9	20.6	100.0

†Includes those who used both withdrawal and the condom at last intercourse. ‡Includes those who combined other methods and the condom. §Age 14–15 includes 99 14-year-olds and 180 15-year-olds; age 21–22 includes 310 21-year-olds and 68 22-year-olds. ††N=2,116; 99 respondents belonged to other racial or ethnic groups.

21–22. Black women had the highest rate and Hispanic women the lowest rate of dual condom-pill use. Black women also had a higher rate of condom use alone. Family income was not strongly associated with dual condom and pill use or with use of condoms alone, although women whose annual family income was below poverty level were more likely to combine

condom use and pill use (not shown).

As the age at initiation of sexual activity increased, combined use of condoms with the pill and use of condoms alone rose, while use of no method declined. When compared with women who had had no partners or two or more partners in the previous three months, those who had had one partner were more likely to have combined

**Table 3. Odds ratios (and 95% confidence intervals) for factors associated with condom use, in combination with the pill or alone, among women aged 14–22**

Method and factor	Odds ratio
<b>Pill and condom (N=605)</b>	
Age†	0.85* (0.74–0.98)
Race/ethnicity	
Black	3.65* (2.08–6.43)
Hispanic	1.04 (0.46–2.36)
White	1.00
Risk behavior score‡	0.84 (0.69–1.01)
Age at first intercourse	
≤13 years	0.39* (0.16–0.94)
14–15 years	0.56* (0.33–0.98)
≥16 years	1.00
No. of partners in previous 3 mos.	
0	3.05* (1.31–7.08)
1	1.00
≥2	1.18 (0.52–2.66)
Discussed HIV with adult relatives	2.80* (1.22–6.42)
<b>Condom only (N=1,080)</b>	
Age†	0.85* (0.79–0.93)
Race/ethnicity	
Black	0.87 (0.60–1.26)
Hispanic	0.48* (0.30–0.77)
White	1.00
Risk behavior score‡	0.83* (0.74–0.93)
Age at first intercourse	
≤13	0.27* (0.17–0.45)
14–15	0.65* (0.44–0.94)
≥16	1.00
Seat belt use§	2.51* (1.72–3.70)

\*Significant at p<.05. †The increase in odds for each one-year increase in age. ‡A seven-point scale with a range of 0–6. Odds ratio reflects the increase in odds for each one-point increase in the score. §Mostly or always vs. sometimes or never.

condom and pill use and to have used the pill alone. Combined use was higher among women with 2–4 lifetime partners than among those with one partner or with five or more partners. Use of drugs or alcohol at last intercourse had little relation to the use of condoms, either alone or in combination with the pill (not shown).

The median risk behavior score was two for females; 34% had a score of 0–1, and 8% had a score of 5–6. The risk behavior score and most individual risk behaviors (not shown) were negatively associated with use of condoms, alone or with the pill, while use of no method increased as the risk behavior score rose.

Several of the potentially protective factors examined appeared to influence method use. Use of condoms (alone or with the pill) was higher among young women who always used seat belts than among those who rarely or never did so. Exposure to HIV education was associated with increased use of condoms alone but not with dual use of condoms and the pill. Talking with parents or other adults in the family increased dual use but not use of condoms alone. The frequency of exercise (data not shown) had no relation to use of any method.

Table 2 (page 263) presents data re-

ported by young men on condom use and on contraceptive use by their partner at last sexual intercourse. As was the case with young women, reliance on the pill alone rose with age, and use of condoms alone declined. Dual condom and pill use, use of withdrawal and use of no method were not associated with age.

Black men were more likely than white or Hispanic men to use condoms alone or in conjunction with the pill. Family income and poverty status had no association with condom use, either alone or combined with pill use (not shown).

The median risk behavior score was three for males; 26% of men had scores of 0–1 and 16% had scores of 5–6. The cross-tabulations suggest that sexual risk factors had less impact on condom use among young men than among young women. Age at first intercourse, lifetime number of partners and use of alcohol or drugs at last intercourse (not shown) had no relation to the prevalence of condom use with the pill. A greater lifetime number of partners was associated with less use of condoms alone.

Having received HIV education and having talked with parents or other adult relatives about HIV were associated with increased use of condoms, both alone and in combination with the pill. As seat belt usage increased, reliance on condoms alone increased and use of no method declined. The frequency of exercise revealed no relationship to use of any method (data not shown).

We used logistic regression to identify the independent factors that predicted condom use at last sexual intercourse among young men and women. Because the prevalence of dual use of condoms and the pill in the cross-tabulations is influenced by the prevalence of either method, we examined condom use separately for young men and women relying on the pill and for those using no method to prevent pregnancy. (These analyses excluded those using withdrawal or other methods.)

Initially, we entered all potential independent variables into the logistic regression; we then removed nonsignificant variables and recomputed the results. If variables approached statistical significance (p<.05) in the initial analysis, we added them back one at a time to determine whether they should be included in the final model.

We found that several alternative models predicted condom use at last sexual intercourse among young women using the pill. In the first model (Table 3), independent predictors included age, race and ethnicity, risk behavior score, age at initiation of sexual intercourse, number of partners in the

previous three months and having talked with parents or other adult family members about HIV. Women with higher risk behavior scores were less likely to use condoms (odds ratio=0.84), although this effect was not significant (p=.06).

In the two alternative models (not shown), either age at first sexual intercourse or the risk behavior score was removed from the model. Eliminating either variable increased the effect size and decreased the p value for the other. For example, with age at first sexual intercourse removed, the risk behavior score had an odds ratio of 0.78 (p=.01). This statistical effect may be explained by the correlation between the two variables (Pearson R=–0.26).

In all three models, younger women and black women were more likely than other women to use condoms with the pill. Women who had had no sexual partners in the previous three months were more likely than those with one partner to have used a condom at last sexual intercourse. There was no difference in condom use between women with two or more partners and those with only one. Finally, women who reported having talked with parents or other adult family members about HIV were more likely to have used a condom.

Independent predictors for use of condoms alone by young women at last sexual intercourse included age, race and ethnicity, risk behavior score, age at first

**Table 4. Odds ratios (and 95% confidence intervals) for factors associated with condom use, in combination with the pill or alone, among men aged 14–22**

Method and factor	Odds ratio
<b>Pill and condom (N=385)</b>	
Age†	0.82* (0.70–0.96)
Race/ethnicity	
Black	2.22* (1.10–4.49)
Hispanic	0.81 (0.35–1.88)
White	1.00
Risk behavior score	0.79* (0.66–0.96)
HIV education in school	2.94* (1.23–7.03)
<b>Condom only (N=1,410)</b>	
Age†	0.89* (0.82–0.96)
Race/ethnicity	
Black	1.03 (0.67–1.59)
Hispanic	0.66* (0.45–0.97)
White	1.00
Risk behavior score‡	0.89* (0.80–0.99)
Age at first intercourse	
≤13	0.34* (0.21–0.55)
14–15	0.48* (0.32–0.73)
≥16	1.00
No. of partners in previous 3 mos.	
0	0.69 (0.48–1.00)
1	1.00
≥2	0.89 (0.59–1.33)
Discussed HIV with adult relatives	1.90* (1.30–2.78)

\*Significant at p<.05. †The increase in odds for each 1-year increase in age. ‡A seven-point scale with a range of 0–6. Odds ratio reflects the increase in odds for each one-point increase in the score.

intercourse and seat belt use (Table 3). Women who were younger, had lower risk behavior scores and had delayed initiation of sexual intercourse were more likely to have used condoms. Hispanics were less likely than whites to have used condoms (odds ratio of 0.48), while condom use among blacks was similar to that among whites. Frequent or consistent use of seat belts was associated with increased condom use.

Among young men whose partners were using the pill (Table 4), the model predicting use of condoms at last sexual intercourse included age, race and ethnicity, risk behavior score and having received HIV education in school. Condom use was higher among younger men, blacks, those with lower risk behavior scores and those who reported having received HIV education. Neither age at first intercourse nor number of partners in the past three months was a significant predictor of condom use for young men whose partners were using the pill.

The independent predictors for use of condoms alone by young men included age, race and ethnicity, risk behavior score, age at first intercourse and discussion of HIV with family members. Younger men and those with lower risk behavior scores were more likely to have used a condom. Hispanic adolescents and adolescents who had first had sex when they were 15 or younger were less likely to have used a condom. Young men who reported having talked about HIV with parents or other adult relatives were more likely than those who had not to have used a condom. Those who had had no sexual partners in the previous three months also were more likely to have used a condom at last intercourse, although this effect was of borderline statistical significance. We found no significant interaction between either age or ethnicity and any significant variable in the final models for men or women.

## Discussion

A number of important patterns emerge from these data. Many adolescents had used no method to protect against STDs or pregnancy at last intercourse or had used ineffective methods such as withdrawal. Most had used a single method, usually the condom or the pill. Some adolescents had used two methods of protection; the most common combination was the pill and the condom. Among respondents who had used oral contraceptives, about one in five young women and one in four young men had also used a condom. That dual use was less common

than condom use overall suggests that, for many adolescents, the condom is primarily a means of avoiding pregnancy and that prevention of HIV and other STDs is not a separate goal.

Demographic factors, risk behaviors and several protective factors were associated with condom use among adolescents using the pill. Although condoms are a male-controlled method, factors predicting condom use for young men and women were similar—age, race and ethnicity, nonsexual risk behavior score and (for condoms used alone) age at first coitus. These similarities probably reflect, in part, demographic similarities between partners. The comparable effect of one sexual risk behavior variable (age at first sex) and the nonsexual risk behavior scale also suggests a global effect of risk behavior.

Young black men and women were more likely to use the pill and the condom together than were members of other ethnic groups. African-American communities have been particularly devastated by HIV, other STDs and unintended pregnancy. As a result, black youths may be making more specific choices in protecting themselves against the dual risks of STD infection and unintended pregnancy.

Younger respondents of both sexes were consistently more likely than older youths to have used a condom at last intercourse, either alone or in combination with another method. Previous studies have suggested that condom use is higher at first sexual intercourse, among persons in newer relationships and among those whose sexual activity is sporadic rather than regular.<sup>19</sup> All of these situations are more common among younger adolescents. With increased age and time in a relationship, many couples switch to female-controlled methods.<sup>20</sup> Remarkably, even among pill users, younger adolescents were more likely than older youths to use condoms, suggesting an influence independent of this switch, perhaps an effect of social norms. In addition, other contraceptive methods are less accessible to young adolescents. (We found that only 11% of 14–15-year-olds were using oral contraceptives.)

This age effect also may reflect shorter relationships and increased concern about STDs among younger teenagers. Nevertheless, the number of partners in the past three months (an indicator of relationship stability) was independently predictive in only two models, and its effect differed between the two. More refined measures of partner relationships (e.g., length of relationship or type of partner) would be

needed to clarify these results.

Both sexual and nonsexual risk behaviors were independently associated with lower rates of condom use. The scale of nonsexual risk factors was predictive in three of four logistic models in Tables 3 and 4 and was of borderline statistical significance ( $p=.06$ ) in the fourth. These behaviors had remarkably similar effects: Each had an odds ratio of about 0.85, which corresponds to an average decrease of 15% in condom use for each additional risk factor.

Similarly, young age at first coitus was associated with lower odds of condom use in three of four logistic models; youth who began sexual intercourse at or before age 13 had the lowest rates of current condom use. This result supports Greenberg's finding that young age at first intercourse is a risk marker for sexual risk behavior among women 15–44 who have been sexually active for at least five years.<sup>21</sup>

Several concepts have been used to explain adolescent risk behavior, including problem behavior theory<sup>22</sup> and sensation-seeking.<sup>23</sup> The latter suggests that people with a predisposition to sensation-seeking may be more likely to engage in a variety of risk behaviors, including nonuse of condoms. Jessor suggests that biological, social environmental, perceived environmental, personality and behavioral factors influence adolescent risk behaviors. Early initiation of intercourse has been related to sexual abuse,<sup>24</sup> which may in turn influence personality variables such as self-esteem and the value placed on health. These, in turn, could influence condom use.

Jessor and his colleagues have also found evidence that adolescents who report healthy behaviors such as exercising and eating a healthy diet are less likely to exhibit risk behaviors,<sup>25</sup> although the relationship between healthy behaviors and risk behaviors is not as strong as the relationship between individual risk behaviors. We found a similar pattern: Seat belt use was independently predictive in only one of four models, and frequency of exercise was not predictive in any model.

Having received HIV education in school was associated with higher rates of condom use at last intercourse, but only among males whose partners were using the pill. Communication about HIV with parents and other adults in the family also appeared to have a protective effect among women using the pill and among men relying on condoms alone. In other studies, health education has been found to boost condom use in certain subgroups;

the influence of family communication on condom use is less established and deserves further exploration.

### Limitations

The YRBS was designed as a behavioral surveillance tool rather than as a means of collecting in-depth information about single behaviors. It also provides little information on environmental or personality factors such as those examined by Jessor<sup>26</sup> or factors such as self-efficacy or peer norms, which have been shown to influence condom use.<sup>27</sup> The YRBS also does not distinguish between homosexual and heterosexual activity.

It is difficult to validate self-reported behavioral data. Reliability testing of the paper-and-pencil version of the YRBS has demonstrated good reliability.<sup>28</sup> Pretesting of the household YRBS conducted for CDC found that adolescents were more comfortable with the audiocassette than with a face-to-face interview because they felt it provided more privacy.

Self-reports may specifically underestimate combined usage; this depends in part on how the questions are asked. The YRBS questionnaire inquires about what method a respondent used as protection against pregnancy at last sexual intercourse and asks separately whether a condom was used. Pretesting with the YRBS suggested that a young person using the pill and a condom would answer the question about their method of pregnancy prevention as "oral contraceptives" and the condom question as "yes."

Combined use is difficult to measure. First, when only one partner is interviewed, he or she may lack knowledge about the other partner's behavior. For example, men may not know about a partner's use of female-controlled methods, particularly early in a relationship. Women may not be able to recall use of a condom if sex occurred in the dark or if they were intoxicated.

A further problem is that the meaning of "last sexual intercourse" may not always be clear. "Last sexual intercourse" does not distinguish well between last act of intercourse and last time together. Some of the less common contraceptive combinations may reflect this imprecision. Couples may have coitus several times in a single evening and might use several methods during that time (e.g., condom, then withdrawal, then no method). Likewise, the use of condoms by men for sex with other men would be reported as condom use but no method for pregnancy prevention.

Finally, young people decide to com-

bine contraceptive methods for widely varying reasons. Use of condoms with the pill or with other contraceptive methods may reflect a dual concern about pregnancy and STDs, a fear of method failure, caution in regard to a new sexual relationship or a response to health care provider's instructions to use a backup method in the first month of pill use. Given this variety of reasons, researchers need to refine ways of measuring condom and contraceptive use.

### Implications

Health care practitioners and health educators have essential roles in promoting the appropriate use of dual protection. A previous report among women in Baltimore suggested that counseling provided in family planning clinics may be contributing to increased dual use.<sup>29</sup> Our study finds evidence that both school health education about HIV and communication with parents and other adult family members encourage this trend.

Counseling and education should clearly define the efficacy of current methods of protection against STD infection and unintended pregnancy and should clarify the distinct risk factors for these two consequences. STDs and unintended pregnancy share certain risk factors, such as early age at first coitus; however, the shared factors are not equally important to each outcome. The frequency of unprotected coitus is the primary risk for pregnancy, while unprotected sex with multiple sexual partners is the primary risk for STDs.

Clearly, there is a need for methods of protection that are safe, easy to use and highly effective against both pregnancy and STD infection. The need for new STD prevention methods that women can control is particularly urgent.

Prevention efforts encouraging dual use should target adolescents who are at the highest risk. Young people engaged in nonsexual risk behaviors are vulnerable to HIV and other STDs because they are less likely to use condoms and more likely to have multiple partners than adolescents who avoid nonsexual risks. Many high-risk adolescents are out of school and must be approached through street outreach, community recreation centers, STD clinics and mass media. Likewise, there is a need for adolescent-specific clinical care that is accessible, affordable and confidential.

Many younger high-risk adolescents are still in school. It is critical to reach young people in elementary and middle school before they begin engaging in sex-

ual risk behaviors. School nurses, school counselors, coaches and teachers can help adolescents obtain health services, prevention education and counseling.

### References

1. W. Cates, Jr., and K. M. Stone, "Family Planning, Sexually Transmitted Diseases and Contraceptive Choice: A Literature Update—Part I," *Family Planning Perspectives*, 24:75–84, 1992; —, "Family Planning, Sexually Transmitted Diseases and Contraceptive Choice: A Literature Update—Part II," *Family Planning Perspectives*, 24:122–128, 1992; R. Kirkman and E. Chantler, "Contraception and the Prevention of Sexually Transmitted Diseases," *British Medical Bulletin*, 49:171–181, 1993; D. J. Hunter and J. K. Mati, "Contraception, Family Planning, and HIV," in L. C. Chen, J. S. Amor and S. J. Segal, eds., *AIDS and Women's Reproductive Health*, Plenum Press, New York, 1991; and J. A. McGregor and H. A. Hammill, "Contraception and Sexually Transmitted Diseases: Interactions and Opportunities," *American Journal of Obstetrics and Gynecology*, 168:2033–2041, 1993.
2. L. Ku, F. L. Sonenstein and J. H. Pleck, "Patterns of HIV Risk and Preventive Behaviors Among Teenage Men," *Public Health Reports*, 107:131–138, 1992; C. S. Weisman et al., "Consistency of Condom Use for Disease Prevention Among Adolescent Users of Oral Contraceptives," *Family Planning Perspectives*, 23:71–74, 1991; C. Galavotti and D. J. Schnell, "Relationship Between Contraceptive Method Choice and Belief About HIV and Pregnancy Prevention," *Sexually Transmitted Diseases*, 21:5–7, 1994; and S. B. Plichta et al., "Partner-Specific Condom Use Among Adolescent Women Clients of a Family Planning Clinic," *Journal of Adolescent Health*, 13:506–511, 1992.
3. J. S. Santelli et al., "Combined Use of Condoms with Other Contraceptive Methods," *Family Planning Perspectives*, 27:74–78, 1995.
4. W. D. Mosher and W. F. Pratt, "Contraceptive Use in the United States, 1973–88," *Advance Data from Vital and Health Statistics*, No. 182, 1990, pp. 1–12.
5. T. A. Bell and K. K. Holmes, "Age-Specific Risks of Syphilis, Gonorrhea, and Hospitalized Pelvic Inflammatory Disease in Sexually Experienced U.S. Women," *Sexually Transmitted Diseases*, 11:291–295, 1984.
6. Institute of Medicine, Committee on Unintended Pregnancy, "Patterns of Contraceptive Use," in S. S. Brown and L. Eisenberg, eds., *The Best Intentions: Unintended Pregnancy and the Well-Being of Children and Families*, National Academy Press, Washington, DC, 1995.
7. F. L. Sonenstein, J. H. Pleck and L. C. Ku, "Sexual Activity, Condom Use and AIDS Awareness Among Adolescent Males," *Family Planning Perspectives*, 21:152–158, 1989; R. L. DiClemente et al., "Determinants of Condom Use Among Junior High School Students in a Minority, Inner-City School District," *Pediatrics*, 89:197–202, 1992; L. K. Brown, R. J. DiClemente and T. Park, "Predictors of Condom Use in Sexually Active Adolescents," *Journal of Adolescent Health*, 12:651–657, 1992; D. M. Upchurch et al., "Prevalence and Patterns of Condom Use Among Patients Attending a Sexually Transmitted Disease Clinic," *Sexually Transmitted Diseases*, 19:175–180, 1992; and D. P. Orr and C. D. Langefeld, "Factors Associated with Condom Use by Sexually Active Male Adolescents at Risk for Sexually Transmitted Disease," *Pediatrics*, 91:873–879, 1993.
8. J. E. Donovan and R. Jessor, "Structure of Problem Behavior in Adolescence and Young Adulthood," *Journal of Consulting Clinical Psychology*, 53:890–904, 1985; and R. Jessor, "Risk Behavior in Adolescence: A Psychosocial Framework for Understanding and Action," *Journal of Adolescent Health*, 12:597–605, 1991.

9. F. L. Mott and R. J. Haurin, "Linkages Between Sexual Activity and Alcohol and Drug Use Among American Adolescents," *Family Planning Perspectives*, **20**:128-136, 1988.
10. J. E. Donovan and R. Jessor, 1985, op. cit. (see reference 8).
11. C. E. Irwin and S. B. Millstein, "Biopsychosocial Correlates of Risk-Taking Behaviors During Adolescence," *Journal of Adolescent Health*, **7**:82S-96S, 1986.
12. C. S. Alexander et al., "A Measure of Risk Taking for Young Adolescents: Reliability and Validity Assessments," *Journal of Youth and Adolescence*, **19**:559-569, 1990; and M. Zuckerman, "Sensation Seeking: A Comparative Approach to a Human Trait," *Behavioral and Brain Sciences*, **7**:413-471, 1984.
13. D. P. Orr, M. Beiter and G. Ingersoll, "Premature Sexual Activity as an Indicator of Psychosocial Risk," *Pediatrics*, **87**:141-147, 1991.
14. J. Greenberg, L. Magder and S. Aral, "Age at First Coitus: A Marker of Risky Sexual Behavior in Women," *Sexually Transmitted Diseases*, **19**:331-334, 1992.
15. J. E. Donovan, R. Jessor and F. M. Costa, "Structure of Health-Enhancing Behavior in Adolescence: A Latent Variable Approach," *Journal of Health and Social Behavior*, **34**:346-362, 1993; and R. Jessor et al., "Protective Factors in Adolescent Problem Behavior: Moderator Effects and Developmental Change," *Developmental Psychology*, **31**:923-933, 1995.
16. P. F. Adams et al., "Health Risk Behaviors Among Our Nation's Youth: United States, 1992," *Vital and Health Statistics*, Series 10, No. 192, 1995; and V. Benson and M. A. Marano, "Current Estimates from the National Health Interview Survey 1992," *Vital and Health Statistics*, Series 10, No. 189, 1994.
17. Ibid.
18. P. F. Adams et al., 1995, op. cit. (see reference 16).
19. L. Ku, F. L. Sonenstein and J. H. Pleck, "The Dynamics of Young Men's Condom Use During and Across Relationships," *Family Planning Perspectives*, **26**:246-251, 1994; and —, 1992, op. cit. (see reference 2).
20. —, 1994, op. cit. (see reference 19).
21. J. Greenberg, L. Magder and S. Aral, 1992, op. cit. (see reference 14).
22. J. E. Donovan and R. Jessor, 1985, op. cit. (see reference 8); and R. Jessor, 1991, op. cit. (see reference 8).
23. C. S. Alexander et al., 1990, op. cit. (see reference 12); and M. Zuckerman, 1984, op. cit. (see reference 12).
24. S. Nagy, R. J. DiClemente and A. G. Adcock, "Adverse Factors Associated with Forced Sex Among Southern Adolescent Girls," *Pediatrics*, **96**:944-946, 1995.
25. J. E. Donovan, R. Jessor and F. M. Costa, 1993, op. cit. (see reference 15).
26. J. E. Donovan and R. Jessor, 1985, op. cit. (see reference 8).
27. K. Basen-Engquist and G. S. Parcel, "Attitudes, Norms, and Self-Efficacy: A Model of Adolescents' HIV-Related Sexual Risk Behavior," *Health Education Quarterly*, **19**:263-277, 1992; M. A. Shafer and C. B. Boyer, "Psychosocial and Behavioral Factors Associated with Risk of Sexually Transmitted Diseases, Including Human Immunodeficiency Virus Infection, Among Urban School Students," *Journal of Pediatrics*, **119**:826-833, 1991; and J. S. Santelli et al., 1995, op. cit. (see reference 3).
28. N. D. Brener et al., "Reliability of the Youth Risk Behavior Survey Questionnaire," *American Journal of Epidemiology*, **141**:575-80, 1995.
29. J. S. Santelli et al., 1995, op. cit. (see reference 3).