

# Impact of a High School Condom Availability Program on Sexual Attitudes and Behaviors

By Mark A. Schuster, Robert M. Bell, Sandra H. Berry and David E. Kanouse

**Context:** While making condoms available in high schools has provoked much debate, evidence on the actual effects of such programs on students' attitudes and behavior is sparse.

**Methods:** Prior to implementation of a condom availability program in a Los Angeles County high school, 1,945 students in grades 9–12 (98% of eligible students) completed a self-administered anonymous survey on their sexual behavior and on related knowledge and attitudes; one year later, 1,110 students (59% of eligible students) completed a follow-up survey.

**Results:** There was no significant change over time in the percentage of males or females who had ever had vaginal intercourse or who had had vaginal intercourse during the year prior to the survey. The percentage of males who reported using condoms every time they engaged in vaginal intercourse during the past year increased significantly, from 37% to 50%, and the percentage of males who reported condom use at recently initiated first vaginal intercourse increased from 65% to 80%. On the other hand, female respondents showed no significant change in their condom use. The self-reported likelihood of using a condom for vaginal intercourse during the following year did not change significantly for students who had had vaginal intercourse, but it increased dramatically for those who had never had vaginal intercourse. The students' attitudes toward sex and condom use either remained the same between surveys or changed in a direction favoring less sexual behavior and greater risk prevention.

**Conclusions:** The condom availability program appears not to have produced an increase in sexual activity among high school students, and it appears to have led to improved condom use among males. The apparent strong effect on students' intention to use condoms and on males' use at first vaginal intercourse suggests that such programs may have a particular impact on the least sexually experienced adolescents.

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Across the United States, schools and school districts have been establishing condom availability programs in response to fears about HIV, other sexually transmitted diseases (STDs) and pregnancy among teenagers. While some districts have considered such programs and decided against them,<sup>1</sup> by early 1995, at least 431 schools in 50 school districts had established programs making condoms available to students.<sup>2</sup>

Proposals to institute condom availability programs in high schools have generally sparked heated debate and strong opposition.<sup>3</sup> Proponents claim that these programs provide adolescents with greater access to condoms, create a social environment in which suggesting condom use to a sex partner is easier and decrease the number of unprotected sexual acts. Opponents, however, argue that such programs lead students to believe that schools condone their engaging in sexual activity, and thus encourage students to have sex.

These opposing, but not mutually exclusive, views raise important questions about program impact. The American Academy of Pediatrics, in addition to stating that

schools are an appropriate site for condom availability programs, has called for research to evaluate such programs.<sup>4</sup> There have been several studies of condom availability programs.<sup>5</sup> Some have indicated that students generally respond favorably to such programs, that males are more likely than females to take condoms that are available at school, and that students are most likely to take condoms if schools provide easy access (e.g., place condoms in bowls).<sup>6</sup> One study also showed a small but statistically significant increase in condom use and no change in rates of sexual activity.<sup>7</sup>

In this article, we report the results of a pretest-posttest evaluation of a school-based condom availability program that provided unrestricted access to condoms. We report on changes in sexual behavior and condom use, and on changes in knowledge, attitudes and perceptions related to sexual activity.

## Methods

### Program Description

We examined the condom availability program in an urban high school that serves a racially and socioeconomically diverse

community in Los Angeles County. The program, which began in April 1992, consisted of making available to students plastic packets containing two male condoms, an instruction sheet and a card warning that "Condoms are not 100% effective in preventing AIDS/HIV, sexually transmitted diseases or pregnancy during sexual intercourse. Abstinence is! Not all teenagers are sexually active. THINK BEFORE YOU ACT! The consequences may be for a lifetime."

Packets were available in baskets placed in four classrooms and outside of the nurse's office; some of these sites were accessible at times when students could obtain condoms unnoticed by others. A can was placed next to each basket with a sign requesting that students leave a quarter for each packet they took. Implementation of the program was publicized within the school.

The district had an existing ninth-grade health curriculum that covered sexual behavior and risk prevention and an AIDS Awareness Week that included assemblies and other educational programs. No new curricula were added to supplement the condom program. Unlike many condom availability programs, this one did not require parental consent, so all students were allowed to take condoms.

During the first year of the program, between 1,800 and 2,000 condom packets were taken each month, and almost no money was collected. Forty-eight percent of stu-

Mark A. Schuster is a senior natural scientist at RAND, Santa Monica, CA, and is assistant professor of pediatrics in the Department of Pediatrics, University of California, Los Angeles. Robert M. Bell is a senior statistician, Sandra H. Berry is director of the Survey Research Group and David E. Kanouse is a senior behavioral scientist, all at RAND, Santa Monica, CA. Support for this study was provided by the Agency for Health Care Policy and Research, Rockville, MD (grant HS08055-1); the American Foundation for AIDS Research, Los Angeles; the Brotman Foundation of California, Encino, CA; the California Wellness Foundation, Woodland Hills, CA; and the Robert Wood Johnson Clinical Scholars Program, Los Angeles. The opinions expressed in this article are those of the authors and do not necessarily reflect the opinions of their institutional affiliations or the funding agencies. The authors are indebted to the students, parents, school and district personnel and school board members who contributed to this study, and to John Adams, Robert H. Brook, Rebecca Collins, Phyllis L. Ellickson, Arleen Leibowitz, Linda G. Martin and Martin F. Shapiro for their comments on drafts of this article.

dents reported that they had personally taken school condoms during the school year, and an additional 5% had not personally taken school condoms but had obtained them from another student. Thirty percent of all respondents, 54% of students who had obtained school condoms and 78% of students who had ever had vaginal intercourse and who had obtained school condoms had used them for sexual activity.<sup>8</sup>

### Survey Design and Implementation

The evaluation consisted of a baseline survey of students in grades 9–12, administered in April 1992 before the condom program began, and a follow-up survey of students in grades 9–12 administered one year after the program began. Respondents completed an anonymous, self-administered survey during a regular class period and sealed it in an opaque envelope. Survey administrators unaffiliated with the school district proctored the classes. Consent and administration procedures received Human Subjects Protection Committee approval.

The baseline and follow-up surveys covered demographic information; knowledge, attitudes and beliefs about sex, HIV and other STDs, pregnancy and contraception; specific sexual behaviors; and condom use. Separate versions of the survey for males and females were identical except for appropriate differences in pronouns and in sexual behaviors.

To minimize confusion about types of sexual behaviors, we used both precise technical language and anatomic descriptions, and we avoided euphemistic language. For example, the male version of the survey included the question, "How old were you the first time you had vaginal intercourse (put your penis in a girl's vagina)?" We adapted descriptions from a Centers for Disease Control and Prevention survey<sup>9</sup> and from the 1986 Surgeon General's Report on Acquired Immune Deficiency Syndrome.<sup>10</sup> All terms

and concepts used are covered in the district's ninth-grade health curriculum.

The survey covered lifetime history of vaginal intercourse, as well as history of vaginal intercourse during the prior year; for other sexual activity, questions covered experiences during the prior year. For some statistical analyses, we divided students into those who had ever had vaginal intercourse and those who had not. Although students who had never had vaginal intercourse may have engaged in other sexual activities,<sup>11</sup> we were unable to divide the students into those who had or had not engaged in any activities for which condoms are generally recommended (including anal intercourse and fellatio) because the survey did not cover lifetime history of all such sexual activities. For an analysis of those students who had recently initiated vaginal intercourse, we included students whose current age and age at first vaginal intercourse were the same or one year apart.

Survey items covering attitudes, knowledge and perceptions generally used Likert-scale response alternatives. Response alternatives for attitude items included "strongly agree," "sort of agree," "uncertain," "sort of disagree" and "strongly disagree." Possible responses to knowledge questions were "true," "false" or "don't know." Participants were asked their perception of the percentage of students in their grade who had ever had vaginal intercourse, and of these, the percentage who had used a condom every time. These responses were coded as 0–20%=1, 21–40%=2, 41–60%=3, 61–80%=4 and 81–100%=5. Participants were also asked what proportion of their friends had ever had vaginal intercourse (none=1, some=2, about half=3, most=4 and all=5), and how often these friends had used condoms for vaginal intercourse (never=1, rarely=2, about half the time=3, most of the time=4 and every time=5).

Prior to administration of the baseline survey, the school district sent parents a letter informing them of the study and giving them the opportunity to withhold permission for their children to participate by signing a form (passive consent). This procedure was selected by the school district superintendent, in consultation with the school board, because it was the standard approach to school surveys in the district.

For the follow-up survey, the research team used active consent (parents signed a form to allow their children to participate), after discussions with some parents in the district who preferred active consent and with the approval of the super-

intendent. This procedure was explained in letters and information sheets sent to parents and distributed to students.

For both the baseline and follow-up surveys, students gave oral consent to participate, and their names were not recorded. Respondents were instructed to skip questions they preferred not to answer. In addition, the section covering respondents' own sexual behavior began with instructions telling them what page to turn to if they preferred to skip the entire section.

Shortly before the follow-up survey was administered, a group of parents contended that specific questions about students' sexual activities were inappropriate and threatened the welfare of students exposed to the survey, and also argued that the active consent process was inadequate. These parents sought a temporary restraining order against the survey, and the controversy prompted media attention about the study. After hearing the case, the court ruled that active consent and the privacy procedures implemented offered appropriate protection for the rights of parents and students, and the survey was administered as planned.

### Analytic Approach

• *Weighting procedures.* The switch to an active consent procedure and the local controversy may have led to selective participation in the follow-up survey; as a result, the follow-up sample may have differed from the baseline sample in terms of characteristics that should not have been affected by the program, but that may have been related to outcomes of interest. Thus, to adjust for differences in response, we developed analysis weights that assumed the distribution of certain demographic and other characteristics of students in the school was the same for both years. We also assumed that given the extremely high response rate at baseline, the baseline respondents provided an adequate approximation of the true distribution of characteristics among students attending the school.

To calculate the actual weights, we analyzed all responses from the baseline and follow-up surveys combined.\* The characteristics accounted for in the weighting included race and ethnicity, mother's education, father's education, grade, age relative to grade, respondent's educational expectations, self-reported grades, importance of religion in the respondent's life and presence of two parents in the household. Characteristics that could have been affected by the condom program (e.g., respondent's sexual history) were not used for creating weights.

\*The model used to compute the weights assumed complete response at baseline but allowed the probability of response at follow-up to vary with a set of characteristics. Thus, we adjusted for these differences by weighting the follow-up data—with weights  $w(x)=1/r(x)$ —to reproduce the distribution of baseline characteristics. For a student selected at random from the combined sample of baseline and follow-up surveys, the student's particular set of characteristics  $x$  determines the probability  $p(x)$  that he or she came from the follow-up group. The equation for this probability is  $p(x)=r(x)/[1+r(x)]=1/[w(x)+1]$ . Rearranging the terms, we have the weight for each set of characteristics:  $w(x)=[1-p(x)]/p(x)$ . We calculated these weights by using logistic regression to estimate  $p(x)$ . The logistic regression produced predicted probabilities,  $\hat{p}(x)$ , which we transformed into follow-up weights,  $w(x)=[1-\hat{p}(x)]/\hat{p}(x)$ .

Because most analyses were done separately for males and females, the weights were computed separately by sex. The weighting strategy assumes that once we control for the predictors in the logistic regression model, responses occur at random.<sup>12</sup> Consequently, these weights cannot correct for any additional nonresponse bias not associated with the variables used to create the weights. Table 1 indicates that the weighted follow-up data match the baseline data for key sample characteristics.

• *Statistical analysis.* We compare distributions of outcomes at follow-up with distributions at baseline. We report percentages for binary outcomes and means for nonbinary outcomes. All results from the follow-up survey are based on the weighted data. Because two-sample t-tests and chi-square tests do not work properly for weighted data (they are generally too lib-

**Table 1. Percentage distribution of students at a Los Angeles county high school at 1992 baseline, and unweighted and weighted percentage distributions at 1993 follow-up, by characteristic**

Characteristic	Baseline (N=1,945)	Follow-up	
		Unweighted (N=1,112)	Weighted (N=1,112)
<b>Sex</b>			
Male	52	50	52
Female	48	50	48
<b>Grade</b>			
9	25	24	25
10	27	28	27
11	26	28	25
12	22	21	23
<b>Race/ethnicity</b>			
White	48	55	48
Black	9	6	8
Hispanic	27	22	27
Asian/Pacific islander	10	13	10
Other	6	4	7
<b>No. of parents who completed college</b>			
Neither	44	39	45
≥1	56	61	55
<b>Educational expectations</b>			
No college	18	13	18
College	33	32	31
Graduate/ prof. school	49	55	51
<b>Primary language spoken at home</b>			
English	71	74	71
Other	29	26	29
<b>Household composition</b>			
Two parents	47	49	47
Other	53	51	53
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Note: Ns apply only to the total number of respondents in each column; the number of respondents for each characteristic may vary because of item nonresponse.

eral), we used corrections based on the linearization method. This method produces asymptotically consistent standard errors that serve as the basis for all inferences reported in this article.<sup>13\*</sup>

To the extent that some individuals completed both the baseline and the follow-up surveys and gave responses that correlated positively across surveys, chance differences would tend to be smaller than those from two independent samples. Consequently, our statistical tests, which do not account for overlap, would tend to be conservative.

• *Data quality.* Analysis of multiple questions about experience with specific sexual behaviors indicated that response inconsistencies were rare. For example, at both survey waves, among adolescents who indicated that they had engaged in vaginal intercourse one or more times during the prior year, fewer than 2% reported that they had never had vaginal intercourse (a question asked more than 10 items earlier).

### Sample

Approximately 2,500 students were enrolled in the school at the time of the survey. Students enrolled in English-as-a-second-language classes (about 16% of the school population) and students in intensive special education classes were excluded from the study, at the request of the principal. An alternative school for about 125 students considered at high risk for dropping out of school was not included in the evaluation.

Approximately 12% of eligible students were absent from school on the day of the baseline survey. Of the 1,985 eligible students present, 1,945 students (98%) turned in usable surveys; 35 students (2%) did not take the survey, and five turned in unusable surveys. Fifteen percent of eligible students were absent on the day of the follow-up survey. Of the 1,878 eligible students present, 1,112 (59%) turned in usable surveys; 764 (41%) did not take the survey (most because of lack of parental consent), and two students turned in unusable surveys. While the controversy over the survey undoubtedly influenced some parents' and students' decisions about participation,

**Table 2. Percentage of high school students who engaged in sexual activity, by sex and timing of survey, according to type of activity**

Activity	Male		Female	
	Baseline	Follow-up	Baseline	Follow-up
<b>OPPOSITE-SEX PARTNER</b>				
<b>Lifetime experience</b>				
Vaginal intercourse	55.8	55.0	45.4	46.1
<b>Experience in prior year</b>				
Vaginal intercourse	50.6	51.8	42.0	44.0
Masturbation of partner	64.6	63.6	52.7	58.0
Masturbation by partner	64.2	64.3	55.0	60.8
Fellatio with ejaculation	45.1	45.8	29.5	35.1*
Cunnilingus	41.1	40.2	38.0	45.3*
Anal intercourse	18.0	20.5	5.5*	8.8*
<b>SAME-SEX PARTNER</b>				
<b>Experience in prior year</b>				
Masturbation of/by partner	2.7	5.3*	1.6	2.8
Oral intercourse	2.3	3.5	0.8	2.0
Anal intercourse	1.4	2.9	na	na

\*.01 ≤ p < .05.

the magnitude of influence is not clear, given that comparable response rates have been reported for other school surveys on sensitive topics (primarily drug use behaviors) conducted with active consent.<sup>14</sup>

Comparison of the baseline and follow-up samples indicates similar distributions by gender and grade (Table 1). Compared with the baseline survey, the unweighted follow-up survey had fewer black (6% vs. 9%) and Hispanic (22% vs. 27%) students and more white (55% vs. 48%) and Asian and Pacific islander students (13% vs. 10%). Students participating at follow-up were more likely to have parents who were college graduates and were more likely to expect to attend graduate or professional school than were those surveyed at baseline.

## Results

### Sexual Behavior

There was no significant change between the baseline and the follow-up surveys in the percentage of males or females who had ever had vaginal intercourse or who had had vaginal intercourse during the prior year (Table 2). There was also no significant change in the percentage of males who reported engaging in each of the remaining sexual activities during the prior year. The percentage of females reporting fellatio with ejaculation, cunnilingus (with a male partner) and anal intercourse increased significantly, generally moving closer to percentages reported by males.

Among students who had engaged in vaginal intercourse at least once, there was

\*All inference was performed using the hreg and hlogit commands in Stata, Version 3.1 (see: Stata Corporation, *Stata Reference Manual: Release 31*, 6th ed., College Station, TX: Stata Corporation, 1993).



**Table 3. Among high school students who had engaged in sexual activity with opposite-sex partner in preceding year, mean number of times they engaged in selected sexual behavior, by sex, according to timing of survey**

Sexual behavior	Baseline		Follow-up	
	Mean	N	Mean	N
<b>Males</b>				
Vaginal intercourse	10.6	442	10.4	224
Masturbation of partner	9.8	562	9.9	292
Masturbation by partner	9.2	565	9.0	295
Fellatio with ejaculation	7.4	397	8.3	211
Cunnilingus	6.8	360	8.2	178
Anal intercourse	5.2	158	6.5	78
<b>Females</b>				
Vaginal intercourse	11.6	337	12.0	230
Masturbation of partner	10.4	418	10.4	293
Masturbation by partner	10.2	442	10.5	309
Fellatio with ejaculation	8.1	236	7.9	186
Cunnilingus	7.3	304	7.2	229
Anal intercourse	2.2	44	3.0	43

Note: For frequency of sexual acts during the prior year, options included: "never," "1 time," "2-5 times," "6-10 times," "11-20 times" and "more than 20 times." Means were calculated using the midpoint for each range (e.g., 3.5 was used for "2-5 times"). The most conservative value, 21, was used for "more than 20 times."

no significant change in the reported number of times that either males or females had done so during the prior year (Table 3). There were also no significant changes in the number of times respondents had engaged in any other opposite-sex sexual activities for the prior year among respondents who had engaged in them at least once. (Frequencies of same-sex sexual activities were not analyzed because reported prevalence was too low to obtain meaningful results.) Among respondents who had ever engaged in vaginal intercourse, there was no significant change in the percentage of males (from 51% to 48%) or females (from 38% to 35%) with a lifetime history of vaginal intercourse with three or more partners. In addition, no significant changes in sexual behavior were found by grade (not shown).

**Condom Use**

Among males who had engaged in vaginal intercourse during the prior year, there was a significant increase in the percentage who reported using condoms every time (Table 4), from 37% at baseline to 50% at follow-up (p=.005). The percentage of males reporting that they had used a condom at first vaginal intercourse (not shown) increased from 46% to 56% (p=.020). In addition, among males who had recently initiated vaginal intercourse, the percentage who reported condom use at first intercourse also increased, from 65% at baseline to 80% at follow-up (p=.038). There was no significant change in any of these measures of condom use for vaginal intercourse among females.

The percentage of males reporting condom use every time for anal intercourse with a female partner increased from 28% to 42%, but the change was not statistically significant (p=.053); there was no significant change in this behavior among females. There also was no significant change in either males' or females' condom use during male-female fellatio with ejaculation. Condom use among males who reported engaging in same-sex fellatio with ejaculation and same-sex anal intercourse was not analyzed because of small sample sizes.

Among students who had ever had vaginal intercourse, the expected likelihood of using a condom for vaginal intercourse during the following year did not change significantly: from 70% to 72% among males and from 67% to 63% among females. However, there was a dramatic increase in anticipated condom use among students of both sexes who had never had vaginal intercourse—from 62% at baseline to 90% at follow-up among males, and from 73% to 94% among females (p<.001 for both). At both survey points, 10-13% of students responded that they definitely would not have vaginal intercourse during the following year.

**Attitudes, Self-Efficacy and Knowledge**

Males agreed more at follow-up than at baseline with the statement "People my age should not be having vaginal intercourse," while females did not change their level of agreement (Table 5). Both males and females were more likely at follow-up than at baseline to disagree that having condoms makes one more likely to have vaginal intercourse.

In response to the item "Imagine you and your partner both want to have vaginal intercourse. You really want to use a condom but your partner doesn't want to. What do you think would happen?" there

**Table 4. Among high school students who had engaged in sexual activity with opposite-sex partner in preceding year, percentage who always used condoms, by sex and type of sexual activity, according to timing of survey**

Activity	Baseline		Follow-up	
	%	N	%	N
<b>Males</b>				
Vaginal intercourse	37	433	50**	219
Fellatio with ejaculation	7	390	6	209
Anal intercourse	28	153	42	77
<b>Females</b>				
Vaginal intercourse	27	331	32	227
Fellatio with ejaculation	4	232	3	186
Anal intercourse	12	43	16	42

\*\*Distribution at follow-up differs significantly from that at baseline at .001<p<.01.

was a significant increase in disagreement with the response "We would have vaginal intercourse without a condom" (means of 3.86 at baseline and 4.01 at follow-up, p=.005).

Condom knowledge increased over time for two of the three true-false items, and there was a corresponding reduction in responses of "don't know" (Table 6). Notably, the only item that showed an increase in incorrect answers between the baseline and the follow-up surveys (concerning the permeability of natural and latex condoms to HIV) was a topic not addressed on the information sheet included in the condom packets.

**Perceived Peer Sexual Activity**

Respondents' perceptions of the percentage of males in their grade who had ever had vaginal intercourse (scored on a range of one representing 1-20% and five representing 81-100%) decreased over the year between surveys, from a mean of 3.48 at baseline to 3.34 at follow-up (p=.001); comparable figures for females were 3.20 and 3.11, respectively (p=.041). The measure of the perceived percentage of students in the respondents' grade who used condoms every time during vaginal intercourse increased from 2.57 to 2.71 (p=.009). Measures of perceptions of the proportion of friends (of either sex) who had ever had vaginal intercourse remained the same (2.94 before and 2.91 after), while measures of the perceived frequency of condom use for vaginal intercourse among friends increased from 2.96 to 3.09 (p<.001).

**Discussion**

Our results show a substantial increase in the percentage of males who reported that they used condoms every time they had vaginal intercourse in the year following the introduction of a school-based condom availability program. This finding is reinforced by evidence that at follow-up, males who recently had initiated vaginal intercourse were more likely to have used a condom at their first intercourse than were males who recently had initiated intercourse at baseline. However, there was no similar increase in condom use among females.

One reason for this difference between males and females may be that the types of sexual activity assessed in this study did not necessarily take place with partners from the same school. Unpublished data from a recent national study of high school students found that about half of males' relationships and almost 60% of females' relationships were with partners who did not attend their school.<sup>15</sup> In this sample, being

**Table 5. Mean level of agreement (and standard deviation) on selected attitudes about sex and condom use, by sex and timing of survey**

Attitude	Male		Female	
	Baseline	Follow-up	Baseline	Follow-up
People my age should not be having vaginal intercourse	3.71 (1.28)	3.43 (1.32)***	3.03 (1.38)	3.04 (1.32)
Having condoms with you makes it more likely that you will decide to have vaginal intercourse	3.03 (1.38)	3.25 (1.38)**	3.50 (1.38)	3.76 (1.30)***
If a girl is [if you are] taking birth control pills, it's safe to have vaginal intercourse without a condom if you think she [he] doesn't have the AIDS virus (HIV)	3.74 (1.32)	3.91 (1.23)*	4.04 (1.23)	4.26 (1.12)***
My friends think you should always use a condom for vaginal intercourse, even if the girl is [you are] taking birth control pills	2.26 (1.24)	2.22 (1.18)	2.11 (1.26)	2.00 (1.18)
A girl has as much responsibility as a boy for making sure that they will use a condom	1.26 (0.68)	1.20 (0.56)	1.12 (0.50)	1.07 (0.32)*
If I carried condoms with me and my classmates found out, they would think I was too promiscuous ("easy, loose")	3.67 (1.30)	3.74 (1.20)	3.01 (1.38)	3.33 (1.36)***
If I have to pay for them, condoms are too expensive to make them worth using	4.12 (1.29)	4.16 (1.26)	4.54 (0.96)	4.67 (0.79)**

\*Significant at  $p < .05$ . \*\*Significant at  $p < .01$ . \*\*\*Significant at  $p < .001$ . Note: Level of agreement was coded as 1=strongly agree, 2=sort of agree, 3=uncertain, 4=sort of disagree and 5=strongly disagree.

male is a strong predictor of whether the condom last used for vaginal intercourse was obtained from school,<sup>16</sup> so increases in condom use at the site of the condom availability program may register for males but not for females, who are more likely to have partners from other schools.

Our findings suggest that interventions aimed at increasing condom use may be effectively targeted at males. This is not to say that such interventions cannot successfully be targeted at females, but greater effort may be necessary to address issues that may influence females more than males, such as embarrassment when obtaining condoms,<sup>17</sup> discomfort when proposing condom use to partners and a particular interest in contraceptive methods that are most effective in preventing pregnancy (e.g., oral contraceptives).

In assessing changes in sexual behavior associated with condom availability programs, the question often arises whether condom availability programs encourage some students to engage in sexual activities from which they might otherwise refrain. Another important question is whether the ready availability of condoms encourages those who are engaging in a sexual activity to do so more often or with more partners.

With regard to vaginal intercourse, we found neither to be the case for males and females. Among males we found no evidence of either outcome for the other sexual behaviors covered in the study (i.e.,

masturbation with a partner, oral sex and anal intercourse); among females who had engaged in sexual activities in the past, we found no increase in the frequency of their occurrence. However, at follow-up, a higher percentage of females reported having engaged with male partners in sexual activities other than vaginal intercourse. These increases could reflect changes in behavior associated with the program or with some other factor. However, if a condom program were to increase the number of students engaging in sexual activity, one might expect it to have its biggest impact on activities most associated with condom use—namely, vaginal intercourse.

These findings could also reflect a greater willingness among females to report these activities at the follow-up survey, perhaps because of the schoolwide experience from the baseline survey that answers did in fact remain anonymous and confidential. Such a reporting bias could be greater among females, who might be more concerned about stigma and thus more reluctant to disclose such information without being certain about confidentiality. Another possibility is that females in our sample substituted less risky sexual activities for vaginal intercourse, although without an associated decrease in vaginal intercourse, the evidence for substitution is weak.

Our tests for statistically significant changes were somewhat conservative, but our findings are consistent with those of

two previous reports. Prior research on the impact of reproductive health services at school-based or school-linked clinics found that adolescents with access to such services neither initiated intercourse earlier nor increased the frequency with which they had intercourse; contraceptive use either increased or remained the same.<sup>18</sup> The availability of condoms to adolescents in nonschool settings also does not appear to increase sexual activity.<sup>19</sup>

Among youths who had had vaginal intercourse, expectations that they would use condoms for vaginal intercourse in the future did not change significantly, but the expectations of those who had never had vaginal intercourse (similar at baseline to those of their peers who had) were significantly higher at follow-up. While expectations are imperfect predictors of future behavior, one reason for failure to use condoms at first intercourse is lack of planning. A change in expectations could translate into greater preparation for first vaginal intercourse and a consequent increase in condom use.

We note that after the program began, males who recently had initiated intercourse were more likely to use a condom than were males who had initiated intercourse shortly before the program began. Furthermore, many students who had never had vaginal intercourse had obtained school condoms and examined them in some way.<sup>20</sup> Greater familiarity with condoms prior to first intercourse could plausibly lead to greater use of them

**Table 6. Percentage distribution of responses to condom knowledge items, by timing of survey**

Question and response	Baseline	Follow-up
<b>Water-based lubricants are better than oil-based ones because the oil makes condoms more likely to break</b>		
True	32	40
False	12	14
Don't know	56	46***
<b>You should squeeze the air out of the tip of the condom before putting it on to leave room for the semen (fluid from the penis)</b>		
True	59	79
False	8	7
Don't know	32	14***
<b>The AIDS virus can pass through lambskin condoms but not latex condoms</b>		
True	38	40
False	20	32
Don't know	42	27***
Total	100	100

\*\*\*Difference is significant at  $p < .001$ . Note: The correct answer for all three questions is "true."

if and when intercourse occurs in the future. An evaluation over several years, or a shorter-term evaluation that tracked the specific timing of first intercourse, would allow assessment of this potential effect.

Shifts in attitudes, while slight in magnitude, suggest that engaging in sexual activity became less normative and using condoms more normative in the year during which the evaluation took place. Perceptions about the sexual activities of peers also suggest an environment in which fewer people have sex and those who do are more likely to use condoms.

### Limitations

We could not conduct a randomized controlled experiment because the district had only two schools, one of which was a small alternative school. Therefore, we cannot exclude other factors in the social environment of the school or the larger community as a reason for change between baseline and follow-up.

Data from the nationwide Youth Risk Behavior Survey, however, provide a comparison of national trends in sexual activity. In 1991 (the year before our baseline survey), 54% of students in grades 9–12 reported that they had ever had sexual intercourse, compared with 53% in 1990.<sup>21</sup> Condom use also increased over a time span similar to that of our study. In 1991, 55% of male and 38% of female high school students who had had sexual intercourse during the three months prior to the national survey reported condom use at last intercourse; in 1993, these proportions were 59% and 46%, respectively.<sup>22</sup>

The males in our study showed a much greater change in condom use over a one-year period than did those in the national study conducted over a two-year period. However, we must be cautious in drawing conclusions from such a comparison. The two studies asked different questions and covered different time periods. Furthermore, our study population would not necessarily be influenced by the same social trends as would the nation. Nonetheless, we know of no changes or events in the school community, other than the condom availability program, that would account for the large increase in male condom use during this period.

In addition, it is unknown whether the set of characteristics used in weighting was adequate to adjust for differences in the characteristics of those participating in the two surveys. Some other characteristic (measured or unmeasured) may have influenced the probability of participation in the follow-up survey. If other

factors did influence participation, and if these factors were correlated with the outcome variables, then weighting would not adjust for the bias introduced by differential nonresponse.

Although we cannot rule out this possibility, we found generally low correlations between the factors included in the regression model used for the weighting procedure and the sexual behaviors measured at baseline. We could not use items such as students' sexual behavior or students' opinions about the condom program in constructing weights because they could have changed over time due to the condom program. We cannot be sure whether such characteristics played a large role in determining participation, so our findings must be considered with this caution in mind. Even if the program were directly responsible for all of the changes we observed, local factors can affect reactions to any new program, and generalization to other school districts should be done with restraint.

In addition, our findings are based on self-reported data, and their accuracy is therefore difficult to validate. Adolescents (like adults) may overreport socially desirable activities and underreport socially undesirable ones, particularly when reporting on their sexual behavior.<sup>23</sup>

Our results are broadly consistent with those of a recent evaluation of New York City's condom availability program,<sup>24</sup> which found no evidence of program effects on sexual behavior but indicated a modest yet significant effect on frequency of condom use at last intercourse (61% in New York vs. 56% in Chicago, which had no condom program). Although our study and the New York study employed different outcome measures, the program effect on condom use seems to have been greater at the California site than in New York City, possibly because California students did not have to go to a staff member to obtain condoms. Similarity in results across the two studies is encouraging, especially because the study designs have different limitations: The New York evaluation had a comparison group but no baseline survey, whereas ours had baseline and follow-up surveys but no comparison group. Nonetheless, further research is needed to gain a fuller understanding of the impact of condom programs.

### Conclusions

Condom availability programs have met with strong reactions and have been associated with a wide range of expecta-

tions. In the program described here, fears of increases in sexual activity generally were not borne out, nor did students develop more favorable attitudes towards vaginal intercourse. Hopes for increases in condom use, however, were only partially realized. While males reported a large increase in condom use, females showed little change. Since condom use may be more directly under males' than females' control, these findings are especially intriguing and deserve further study. Our findings also suggest that the availability of condoms has a strong impact on the intention to use condoms in the future among those who have never had vaginal intercourse, and on males' use at first vaginal intercourse. Thus, such programs may have their greatest impact on adolescents who have the least experience with vaginal intercourse.

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