Condom Availability Programs in Massachusetts High Schools: Relationships With Condom Use and Sexual Behavior

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Objectives. This study assessed relationships between condom availability programs accompanied by community discussion and involvement and adolescent sexual practices.

Methods. Sexual practice and condom use differences were assessed in a representative sample of 4166 adolescents enrolled in high schools with and without condom availability programs.

Results. Adolescents in schools where condoms were available were more likely to receive condom use instruction and less likely to report lifetime or recent sexual intercourse. Sexually active adolescents in those schools were twice as likely to use condoms, but less likely to use other contraceptive methods, during their most recent sexual encounter.

Conclusions. The strategy of making condoms available, an indication of socioenvironmental support for condom use, may improve HIV prevention practices. (*Am J Public Health.* 2003;93:955–962)

There is a continuing need for effective HIV, sexually transmitted disease (STD), and pregnancy prevention programs that discourage early onset of sexual activity and encourage protection among adolescents who are already sexually active. Despite sustained declines during the 1990s in teenage pregnancy and birth rates, as well as rates of certain STDs, approximately 1 million American teenagers continue to become pregnant each year, and three quarters of these pregnancies are unintended.[1–5] The decline in pregnancy rates has been attributed to declines in sexual activity, increased use of condoms, and longer acting hormonal contraceptive methods.[2,5,6] Yet, rates of HIV and other STDs among adolescents remain unacceptably high,[7] and it has been reported that 1 in 3 young people are infected with an STD by the age of 24 years.[8]

According to 1 study, approximately 49% of all adolescents in grades 9 through 12 reported ever having had sexual intercourse (36% within the previous 3 months), and during their most recent sexual encounter, use of condoms (58%) or other birth control methods (16%) was not universal among those who were sexually active.[9] Factors associated with condom use among sexually active youths include the following: (1) positive beliefs or attitudes about condom use (e.g., that they do not reduce sexual pleasure),[10–12] (2) perceiving peer norms as endorsing condom use,[12,13] (3) confidence in knowledge of correct condom use or negotiation techniques,[10,14] (4) believing condoms are effective and protective,[11–14] (5) discussing condom use with partners,[11,14] (6) not using alcohol or drugs in conjunction with sexual activity,[10,13–16] and (7) relationship status (i.e., use is more likely in short-term or casual relationships than in longer term or steady relationships).[17–19] Therefore, interventions designed to enhance beliefs, perceptions, and skills related to condom use could be expected to reduce the number of unprotected sexual encounters among sexually active adolescents.

The majority of school-based programs continue to focus on primary prevention to delay onset of sexual activity, particularly among younger adolescents; however, many school systems, with the support of parents and community members, also provide secondary prevention programs to meet the needs of sexually active students. School health service staff in junior and senior high schools nationwide offer family planning counseling services (these services are available in 28.6% and 38.2% of such schools, respectively), pregnancy screening and testing (16.6% and 20.9%), and STD diagnosis and treatment (15.8% and 19.5%).[20] Not all teachers are comfortable discussing sensitive topics in the classroom,[21–24] but, according to one report, 33% and 58% of middle and senior high school teachers, respectively, provide instruction on condom efficacy, and 17% and 37%, respectively, demonstrate correct condom use techniques.[21]

However, the practice of making condoms available in schools is far more controversial and less likely to be openly endorsed by school administrators. One study estimated that 4.7% of all middle schools and 8.4% of high schools nationwide make condoms available.[20] In another study, 50 school districts nationwide, representing 431 schools, were identified as having condom availability programs (0.35% of all districts and 2.2% of all high schools nationwide).[25] Approximately 42% of these school districts were located in Massachusetts.

The purpose of the present study was to determine whether relationships exist between the presence or absence of condom availability programs in Massachusetts high schools and adolescent sexual practices. When condoms are available in schools and are successfully used by sexually active adolescents, they may be an effective means of preventing potentially harmful outcomes such as HIV/STDs and pregnancy.[26]

In the relatively few evaluations of the use and impact of condom availability programs that have been reported in the literature, number of condoms distributed, changes in attitudes, number of students carrying condoms, and self-reported condom use consistency have been used to measure program effectiveness.[25,27,28] Several evaluations have shown that adolescents in schools with and without programs are equally likely to become sexual active, and in 2 of 3 studies, sexually active youths were more likely to report having used condoms during their most recent sexual encounter.[29,30,31] In the present study, we expected to replicate and possibly

expand on these findings by assessing levels of sexual activity and condom use in a random sample of students in high schools with and without condom availability programs after controlling for demographic differences between communities and students.

METHODS

Environmental Context

The Commonwealth of Massachusetts Board of Education has adopted one of the most progressive and far-reaching state HIV/AIDS education policies in the country. The Board of Education issued a policy on HIV/AIDS prevention education in 1990, and in August 1991 the Board of Education approved a policy addendum that expanded recommendations for HIV prevention programs and directly addressed making condoms available. At the time of approval, several school districts were already considering making condoms available. The Board of Education policy recommends that all district school boards consider making condoms available in secondary schools and that this consideration involve a public dialogue between board members, the superintendent, school administrators, faculty, parents, students, and the local community. Specific venues for making condoms available were recommended for consideration; multiple channel use was encouraged.

Recognizing that making condoms available would not ensure that students would know how to use them properly, the commonwealth advised simultaneous consideration of instruction on proper condom use. Districts were advised that local decisions should include a parental information component, in recognition of the positive impact of parent reinforcement and the desire to have condom use discussed in the context of individual family values. Between 1991 and 1996, 65% of the 348 commonwealth districts held at least 1 public meeting to discuss making condoms available; 45% held discussions with the school board, as recommended by state policy. Twenty-eight percent of the districts developed explicit policies related to condom availability, and 10% of the districts with high schools approved condom availability programs in secondary schools.[32]

Research Design and Procedures

We used the multistage cluster sampling design from the 1995 Massachusetts Youth Risk Behavior Survey (MYRBS) to obtain a representative sample of adolescents enrolled in public high schools.[33] At the first sampling stage, 63 of the state's 299 high schools with 100 or more students in grades 9 through 12 were randomly selected at a probability rate proportional to school size. The school response rate was 94%; 59 schools participated. At the second sampling stage, 3 to 5 required classes per school were randomly selected. Passive consent procedures were used; parents were notified and given the option of refusing to allow their child's participation. Student participation was voluntary, and survey responses were anonymous. Of the 5370 students present in selected classrooms, 4166 completed the survey, yielding a 78% response rate.

Measures

The independent variable in our analysis was whether a condom availability program existed in a given school. Data on the characteristics of condom availability programs were obtained from district health coordinators and verified Massachusetts Department of Education records.[32] Dependent variables included sexual behavior items derived from the MYRBS, lifetime and recent (past 3 months) sexual intercourse, lifetime sexual partners, age at first intercourse, use of alcohol and use of condoms or other contraceptive methods during the most recent sexual encounter, and having ever been pregnant or having ever gotten someone pregnant. In addition, several items focused on receipt of HIV instruction in school, perceptions of condom access, and parental communications regarding HIV/AIDS. Three items (receipt of instruction about how to prevent HIV, receipt of instruction on how to use a condom, and exposure to a presentation made by a person with HIV/AIDS) were combined to reflect the number of topics covered (score range: 0–3).

Data Analysis

To identify social or environmental factors that might influence the findings, we initially made demographic comparisons between school districts with and those without condom availability programs regarding 55 community/district-level variables, including total and percentage minority population, equalized property values, education, median family income, total student population, percentage minority/low-income students, achievement scores, dropout rates, and graduation rates. We also made demographic comparisons (age, grade, ethnicity, sex) between respondents in schools with and without condom availability programs.

After reviewing results from these comparisons, we selected a core set of covariates that we used in all subsequent analyses: 3 individual student variables (age, race, and sex) and 2 community-level indicators. The first community variable was percentage of low-income residents (based on federal guidelines), and the second was a 7-point composite variable reflecting 15 socioeconomic and demographic indicators that, in cluster analyses, differentiated communities from one another (population density and change, family income, education level, unemployment rates, home ownership, percentage of minority, foreign language, school-aged children).

We conducted data analyses assessing relationships between presence (or nonpresence) of a schoolwide condom availability program and the extent to which students engaged in high-risk sexual behaviors, controlling for the student and community-level demographic characteristics just described. We performed analyses of covariance and logistic regression analyses with SAS PROC MIXED (SAS Institute Inc, Cary, NC). Data were weighted to adjust for selection probabilities and to reduce nonresponse bias. Weights included the inverse probability of school and classroom selection, school- and student-level nonresponse adjustments, and poststratification adjustments for students according to sex and grade.

RESULTS

District and School Characteristics

Ten percent of the school districts represented by the MYRBS sample (5 of 48) and 15% of the participating high schools (9 of 59) made condoms available. Statewide, districts with and without condom availability programs did not differ in terms of population size, median family income, number of low-

income families, suspension/dropout rates, or academic achievement scores; however, communities with condom availability programs did tend to have significantly more African American (8% vs 3%; $P \leq .05$) and Asian (4% vs 2%; $P \leq .01$) students, more residents with a bachelor's degree (35% vs 23%; $P \leq .0001$), and more students whose primary language was not English (12% vs 5%; $P \leq .05$). Districts included in this sample differed slightly; communities with condom availability programs were larger and had higher education levels, higher median family incomes, higher academic achievement scores, and more Asian and African American students.

According to a census survey of district health coordinators (response rate: 88%),[32] most districts with condom availability programs distributed condoms through school nurses (62%) or other personnel (48%), frequently gym teachers and assistant principals. Some of these districts distributed condoms through school-based health clinics (38%), but relatively few used barrier-free methods such as vending machines (10%). Parental consent to obtain condoms was not required in the majority of districts. More often than not, changes in district HIV education curricula paralleled adoption of condom availability programs.

Opportunities for public dialogue accompanied the program adoption process. Public discussions were more likely to be held in districts that made condoms available (94% vs 42%; $P \leq .001$) or adopted a policy (87% vs 20%; $P \leq .001$) than in those that did not do so. Furthermore, public discussions were held significantly more often in districts that had adopted a condom availability policy (3.0 vs 1.7 times on average; $P \leq .0001$) or program (18 vs 6 times on average; $P \leq .0001$) than in nonadopting districts. In addition, condom availability districts held discussions with a greater number of constituency groups (on average, 4 vs 2 different constituent groups; $P \leq .0001$).[32]

Student Characteristics

Twenty-one percent of the students were enrolled in schools with condom availability programs (n=865); the remainder (n=3301) were not. Respondents in condom availability schools were more likely to be younger, to be from lower grade levels, and to be members of minority groups (Table 1).

TABLE 1—Distribution of Student Demographic Characteristics in Schools With and Without Condom Availability Programs, 1995

	Overall (N = 4166)	Condoms Not Available (n = 3301)	Condoms Available (n = 865)	*P*
Age, y, mean	16.1	16.1	16.0	.0029
Age group, y, %				
≤12	0.1	0.1	0.1	
13	0.1	0.0	0.3	
14	9.4	9.3	9.7	
15	23.7	23.6	23.8	
16	26.9	25.8	33.2	
17	24.1	24.7	20.4	
18	15.9	16.4	12.5	
Sex, %				NS
Female	49.3	48.8	52.2	
Male	50.7	51.2	47.8	
Grade, %				.0001
9	28.3	28.2	29.2	
10	25.7	25.1	29.3	
11	23.8	23.2	27.0	
12	22.0	23.3	14.5	
Other	0.2	0.2	0.0	
Race/ethnicity, %				.0001
White, non-Hispanic	75.4	79.8	50.8	
Black, non-Hispanic	6.4	3.9	20.3	
Hispanic or Latino	8.2	7.6	11.4	
Asian or Pacific Islander	4.3	3.6	8.5	
American Indian or Alaskan Native	0.9	0.9	1.0	
Other	4.9	4.3	8.1	

Note. NS = nonsignificant.

Differences in HIV-Related Instruction

Adolescents in condom availability schools received a greater range of HIV instruction (a mean of 2.2 vs 1.8 topics covered; $P \leq .0001$). They were more likely to have received instruction in regard to preventing HIV infection, to have heard a presentation from a person with HIV/AIDS, and to have been taught how to use a condom in school (Table 2). Condom availability was not associated with adolescents having talked to their parents about AIDS.

Differences in Onset of Sexual Activity and Condom Use

Adolescents enrolled in schools with condom availability programs were no more likely to report ever having had sexual intercourse or having been sexually active in the preceding 3 months. In fact, they were slightly less likely to report having had sexual intercourse (Table 2). Sexually active adolescents enrolled in condom availability schools were twice as likely to report using condoms during their most recent sexual encounter and using condoms to prevent pregnancy, but they were less likely to have used other pregnancy prevention methods. Similar differences in contraceptive use were found among adolescents who had recently been sexually active (data not shown).

Because responses may have overlapped, we created 2 new variables designed to ascertain use of any contraceptive method and choice of contraceptive method (use of a condom, some other method, both, or neither at most recent sexual intercourse). Adolescents

TABLE 2—Associations Between School-Based Condom Availability Programs, HIV Instruction, and Adolescent Sexual Practices (Adjusted Data)

	Overall (N = 4166)	Condoms Not Available (n = 3301)	Condoms Available (n = 865)	Odds Ratio (95% Confidence Interval)	*P*
HIV-related instruction					
Ever taught about HIV/AIDS in school, %	91	90	94	1.6 (1.1, 2.2)	.0080
Received instruction to prevent HIV/AIDS, %	89	88	92	1.5 (1.1, 2.1)	.0082
Received presentation from a person with AIDS, %	50	46	68	2.6 (2.1, 3.1)	.0001
Taught how to use a condom, %	50	48	61	1.7 (1.4, 2.0)	.0001
Mean no. of instructional topics covered (range: 0–3)	1.9	1.8	2.2	. . .	.0001
Talked to parents about AIDS, %	58	58	61	1.2 (0.9, 1.4)	NS
Lifetime sexual practices					
Ever had sexual intercourse, %	47	49	42	0.8 (0.6, 0.9)	.0037
Mean age at first intercourse, y[a]	14.3	14.3	14.4	. . .	NS
Mean time since first sexual intercourse, y[a]	2.6	2.6	2.5	. . .	NS
Mean no. of lifetime sexual partners[a]	2.8	2.8	2.8	. . .	NS
Used alcohol/drugs before most recent sex, %[a]	30	29	27	0.9 (0.6, 1.2)	NS
Used condom during most recent sex, %[a]	58	56	72	2.1 (1.5, 2.9)	.0001
Used condom to prevent pregnancy during most recent sex, %[a]	52	49	66	2.1 (1.5, 2.8)	.0001
Used "other" pregnancy protection during most recent sex, %[a]	25	26	17	0.5 (0.4, 0.8)	.0026
Used any contraception during most recent sex, %[a]	77	76	85	0.6 (0.4, 0.9)	.0058
Recent sexual practices (past 3 months)					
Had recent sexual intercourse, %	33	35	30	0.8 (0.6, 0.9)	.0252
Mean no. of recent sexual partners[b]	1.6	1.6	1.5	...	NS
Negative outcomes of sexual behavior					
Ever been or gotten someone pregnant, %[a]	12	12	12	1.0 (0.7, 1.6)	NS
Mean no. of times pregnant[a]	0.2	0.2	0.2	...	NS
Condom access: overall, %					
Perceive condoms as easy to access	89	89	91	1.2 (0.8, 1.8)	NS
Most likely to obtain condoms in school	39.0	38.5	38.9	1.0 (0.8, 1.2)	NS
Most likely to obtain condoms in community	48.1	47.8	49.4	1.1 (0.9, 1.3)	NS
Most likely to obtain condoms from parents	3.3	3.4	3.2	1.0 (0.6, 1.6)	NS
Condom access among sexually active students, %					
Perceive condoms as easy to access	89	88	91	1.3 (0.8, 2.1)	NS
Most likely to obtain condoms in school	41.1	40.5	41.7	1.1 (0.8, 1.4)	NS
Most likely to obtain condoms in community	47.1	47.5	45.7	0.9 (0.7, 1.2)	NS
Most likely to obtain condoms from parents	3.8	4.0	3.2	0.8 (0.4, 1.6)	NS

Note. Models controlled for "kind of community," percentage of low-income (federal definition) residents, and age, sex, and race of the student. NS = nonsignificant.
[a]Sexually active students only.
[b]Sexually active students in past 3 months.

in schools with condom availability were more likely to use any contraceptive method (Table 2) and, as shown in Figure 1, more likely to use condoms during their most recent sexual encounter (68% vs 52%), whereas adolescents in schools without programs were more likely to use other contraceptive methods (21% vs 10%; $P<.0001$).

No differences were found among sexually active adolescents in regard to age at first sexual intercourse, recency of sexual intercourse, or number of recent sexual partners (past 3 months). No differences were found in the proportion of adolescents reporting or the number of times adolescents reported having been pregnant or having gotten someone pregnant (Table 2). Sexually active adolescents in schools with condom availability programs were no more likely than those in schools without such programs to report that condoms were easy to obtain, and there were no differences in terms of where students would be most likely to obtain condoms if needed.

Differences After Controls for Condom Use Instruction

Because students in condom availability schools also received a greater range of HIV instruction, we further analyzed these rela-

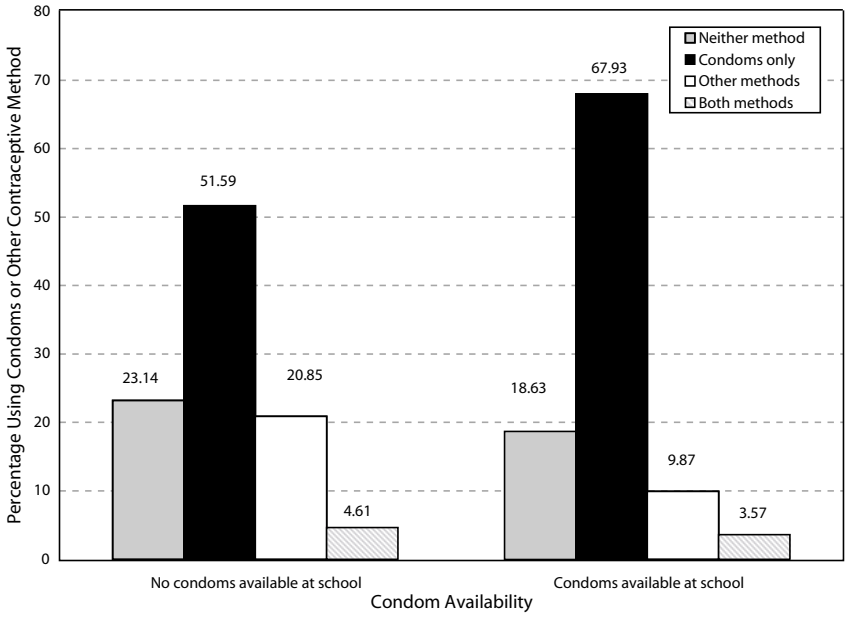

FIGURE 1—Sexually active adolescents reporting condom use, other contraceptive use, or both during their most recent sexual encounter, by condom availability.

tionships to determine whether condom availability programs would continue to have an enhanced effect when condom use instruction was added as a covariate. Adolescents in schools that made condoms available continued to be less likely to report lifetime (odds ratio [OR]=0.728, 95% confidence interval [CI]=0.60, 0.89; $P \leq .001$) or recent (OR=0.776, 95% CI=0.63, 0.96; $P \leq .05$) sexual intercourse. In addition, they were more likely to have used a condom during their most recent sexual encounter (OR=2.0, 95% CI=1.45, 2.77; $P \leq .0001$), more likely to have used a condom specifically to prevent pregnancy (OR=2.1, 95% CI=1.52, 2.84; $P \leq .001$), and less likely to have used other contraceptive methods (OR=0.526, 95% CI=0.35, 0.79; $P \leq .01$).

DISCUSSION

We have described a cross-sectional study designed to assess potential effects of condom availability programs in Massachusetts, a state with a history of exemplary and forward-thinking school health policies and practices.[34,35] The primary purpose of the study was to compare the sexual practices of adolescents enrolled in high schools that did and did not make condoms available, after controls for individual and community-level differences that could influence the outcomes of interest. Similar to previous research,[26,28,36–38] the data supported the potential benefits of making condoms available to sexually active students and the lack of harm in doing so for students who are not sexually active. Our study is important and relevant in that it provides a broad-based look at condom availability programs in a state with experience in implementing quality programs. In reviewing the findings, as well as the published literature, we were able to draw several conclusions and develop questions for future research.

First and foremost, sexual intercourse rates were not higher in schools where condoms were made available, which supports previous research suggesting that condom distribution in schools does not lead to initiation of sexual activity.[26,27,39–41] In fact, adolescents enrolled in condom availability schools were *less* likely to be sexually active or to report recent sexual intercourse, and no associations with age at first intercourse or numbers of sexual partners were found. Thus, the concerns of the small minority of parents who oppose providing condoms or related instruction in schools[27,39] were not substantiated in this study. Second, the presence of a condom availability program was protective; that is, sexually active adolescents in these schools were more likely to report having used condoms during their most recent sexual encounter. This finding also replicated previous research demonstrating relationships between condom availability in schools and students' use of them.[26,28]

Third, positive associations remained significant after controls for condom use instruction, suggesting that such instruction may be a necessary, but by itself insufficient, condition for condom use. These findings must not be interpreted, however, to suggest that condom use instruction is not necessary, because making condoms available to students without concurrently providing instruction may inadvertently result in improper or inconsistent condom use and might potentially increase risks for HIV/STDs and pregnancy. The preponderance of the evidence suggests that skills-based prevention programs can effectively delay onset of sexual activity, increase rates of refusal in regard to sexual activity, and reduce high-risk behaviors among sexually active adolescents.[38,42–45] The benefits of condom availability programs in regard to sexual risk taking as well as pregnancy and HIV/STD rates can be enhanced when such programs are supplemented by skills-based instruction in proper condom use.[26] Appropriately, most condom availability programs in the United States, including those in Massachusetts, are offered within a comprehensive health program framework that includes counseling and sexuality or HIV/AIDS education.[22]

The data also highlight important areas for exploration in future school health policy and program research. Several investigators have cited the need for studies designed to increase our understanding of the school health policy adoption process and its relationship to effective school health programs and practices.[46–50] The present study was conducted 4 years after adoption of a state policy that explicitly encouraged local school board con-

sideration and public discussion of condom availability programs and instruction. Some, but certainly not all, local districts complied with state policy recommendations; 65% had discussed making condoms available, 45% held discussions with the school board (as prescribed by state policy), and 28% adopted a local policy related to condom distribution and instruction. Furthermore, 10% of the school districts statewide, and 15% of this representative sample of high schools, had adopted a condom availability program; these rates represent nearly 30 times the estimated percentage of districts nationwide with such programs (0.35%) and 7 times the estimated percentage of high schools (2.2%).[22,25]

Previous research suggests that community opinion is critical in promoting health policy initiatives.[51] In this study, districts that held public discussions about making condoms available, and those that held more public discussions with a greater number of constituency groups, were more likely to adopt a condom availability program.[32] The findings described here support the premise that state-level policies promoting public discussion have the potential to increase school districts' consideration of sensitive health issues that might otherwise go unaddressed. Furthermore, when an issue such as condom availability is opened to public dialogue, the probability of endorsement may increase (perhaps because most parents support the presence of prevention programs, including condom availability programs, in schools).[24,52–58]

Several questions were also raised by our data. Most notably, we found no differences in perceived condom access or pregnancy rates between adolescents in schools with and without a condom availability program. If greater use of condoms is predicated on increased access to condoms, why were there not more adolescent reports of greater perceived access in schools where condoms were available? And if there were increases in condom use among sexually active adolescents in those schools, why would we have failed to find lower rates of reported pregnancies?

Although increased access is the hypothesized mediating step in the chain between condom availability programs and condom use, several other mediating factors exist: (1) preexisting access levels, (2) program awareness or visibility, (3) structural barriers and supports, and (4) the extent to which such programs influence other important determinants of condom use. Adolescents might already have had significant access to condoms before the program's initiation, an issue particularly relevant in the United States, where condoms are accessible through alternative community sources. It is possible that implementation of a distribution program allowed condom users to obtain condoms in a new place but did not increase perceived access. About 90% of the adolescents in this study indicated that condoms would be easy to access irrespective of whether a condom program existed.

Although we cannot know for sure from the available data, program visibility and awareness were probably not critical factors, because rates of awareness of condom availability programs have been high in other studies, particularly when active parental consent or public debate has been involved.[27,59] Formidable barriers to accessing condoms in schools, however, have been shown in other studies. For example, increases in condom access rates were seen in smaller schools that used barrier-free methods (e.g., baskets or vending machines) or distributed condoms through health clinics rather than school personnel.[36]

One study showed that teenagers preferred purchasing condoms at a store over obtaining free condoms in a health care setting.[60] Yet, in Massachusetts, most schools distributed condoms through school personnel, some did so through a school health center, and almost no schools used vending machines. It could be argued, therefore, that school distribution strategies were not barrier free—that is, because accessing condoms was likely to result in embarrassment, students did not perceive that access to condoms was greater. These explanations still do not address the question of why adolescents in condom availability schools might report greater condom use.

Adoption of a condom availability program may be as much about signaling approval for condom use from individuals in authority (e.g., parents, school officials), along with promoting positive attitudes and social norms for condom use, as it is about facilitating direct access. Making condoms available in schools is a clear indication of social and environmental support for condom use. The literature has shown that positive attitudes about condom use,[10–12,59,61] self-efficacy and perceived condom efficacy,[10–14,62] and subjective social norms[12,13,62–64] consistently predict condom use.

Furthermore, if districts complied with state policy encouraging inclusion of a parental information component promoting family discussion of condom use in the context of family values, parent–child communications related to condom use would have increased, because school-based programs have been found to facilitate communication about sensitive issues.[65] Also, if parents communicated with their teenagers about condom use, greater condom use would have been expected.[66–68] Thus, it may not have been making condoms available per se that was associated with greater rates of condom use, but rather the fact that the adoption of such programs reflected broader community mores, communicated positive social norms and environmental supports, and facilitated communication of family values and norms promoting condom use.

Reasons for the lack of differences in pregnancy rates between students in schools with and without condom availability programs were somewhat clearer. We suspect that the benefits of increased condom use may have been offset by use of other contraceptives among students enrolled in the schools without condom availability programs. Essentially, condom availability programs promote a less efficacious contraceptive method of preventing pregnancy, one that, although recommended for STD/HIV prevention, is less effective than longer acting hormonal contraceptive methods (condom use is subject to human error, occasional slips in usage, and breakage).[2] Our data support this explanation, in that adolescents in schools without condom availability programs were less likely to have used condoms and more likely to have used "other" pregnancy prevention methods during their most recent sexual encounter.

Inconsistent or incorrect use of condoms is also a possibility, albeit one that is difficult to ascertain from our data. The reason for this difficulty is that no information on correct condom use or breakage was collected, and the MYRBS question asked only whether a

condom was used the "last time you had sexual intercourse," making it impossible to know whether condoms were used consistently with all sexual partners.

Several other study limitations must be considered. The data on which these analyses were based were cross sectional—they were not designed to demonstrate causal relationships between the independent and dependent variables. A more compelling analysis would have examined changes in condom use and potential mediators prospectively, using control communities (those not adopting such programs) in a preprogram–postprogram implementation time series analysis. Because no preprogram–postprogram data were available, it is difficult to know whether condom availability programs made a difference in terms of the sexual behaviors of adolescents attending those schools or whether the reported differences were due to other factors.

Undoubtedly, communities that implemented condom availability programs were different in many unknown ways. Districts adopting condom availability programs might have been more inclined to have community norms that supported informing adolescents about the risk of HIV/STDs and promoted condom use, and such differences could be expected to influence sexual behaviors. Other factors such as parent education levels, social norms, and school climate might have influenced sexual behaviors despite our having controlled for community demographic characteristics.

Similarly, although we controlled for student demographic characteristics, other uncontrolled individual differences, such as academic standing or parent and school involvement, might have influenced the findings. Furthermore, the data were limited to self-reports, which can be subject to bias, and we did not have background data or biological markers such as STD data available from communities to substantiate our findings.[69]

Nonetheless, our results suggest that making condoms available, a clear indication of social and environmental support for condom use, may improve HIV prevention practices. Condom availability was not associated with greater sexual activity among adolescents but was associated with greater condom use among those who were already sexually active, a highly positive result. Finally, because we used a large, randomly selected sample of students representing an entire state and controlled for selected demographic characteristics and potential socioenvironmental influences, our findings expand on those of previous research. ■

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This article was accepted May 5, 2002.

Contributors

S.M. Blake conceptualized the study, research design, and data analyses and wrote the article. R. Ledsky executed the data analyses, contributed to the interpretation of the findings, and assisted in writing the article. C. Goodenow collaborated in planning the study, was responsible for data collection, and contributed to the interpretation and summary of the findings. R. Sawyer, D. Lohrmann, and R. Windsor collaborated on study planning and design.

Acknowledgments

The Massachusetts Youth Risk Behavior Survey (MYRBS) data collection reported herein was supported by cooperative agreement U87/CCU109035 from the Division of Adolescent and School Health, Centers for Disease Control and Prevention.

We gratefully acknowledge Kevin Cranston of the Massachusetts Department of Public Health for originally requesting this study, the Massachusetts Department of Education for supporting the research, and the original substantive contributions to this project of Janet Collins, Stephen Banspach, and Sandra Jones from the Division of Adolescent and School Health, Centers for Disease Control and Prevention.

Human Participant Protection

The Centers for Disease Control and Prevention's institutional review board granted clearance for the MYRBS to be administered nationwide. Administrative approvals were obtained from the commissioner of the Massachusetts Department of Education and from superintendents and principals in selected schools. The AIDS Advisory Panel reviewed several iterations of the MYRBS. Parents of students in selected schools were notified of administration in advance and were given the opportunity to refuse their child's participation. Students had the right to refuse to complete all or parts of the survey at the time of administration.

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