Condom Availability in New York City Public High Schools: Relationships to Condom Use and Sexual Behavior

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Introduction

Human immunodeficiency virus (HIV) infection is a major threat to the health of adolescents in the United States. Several recent surveys suggest that the majority of today's high school students are sexually active, do not use condoms consistently,1 and are unaware of their own serostatus, their partners' serostatus, or both.2,3 As condoms are the only effective method of preventing HIV transmission among the sexually active, increasing access to condoms and reducing the barriers to condom use may be an effective method for decreasing the risk of HIV transmission among adolescents.

Condoms are readily available at drugstores, but many adolescents may not have the financial resources or self-confidence to purchase them. Although family planning clinics are a cheaper source of condoms, distance and lack of foresight may prevent teens from obtaining them there. School-based condom availability programs reduce financial and psychological barriers and present opportunities for the discussion of condom use and other safer sex practices.

In the few years that school condom availability has become an acceptable public health strategy, more than 400 schools in the United States have implemented such programs.4-7 Program variations include differences in where and when condoms are made available, who distributes condoms, who is eligible to receive them, whether counseling is mandatory or voluntary, and the extent of parental involvement. Some of the existing programs are pilot projects that use clinic staff through preexisting school-based clinics,4,5,7 but the majority of schools with condom availability programs do not have school-based clinics.6

In this paper we report on an analysis of data from an evaluation of New York City's systemwide school-based condom availability program.

Condom Availability in New York City

In 1991 the New York City (NYC) Board of Education implemented one of the first non-clinic-based, systemwide school condom availability programs.8 Each public high school was mandated to do the following: (1) assemble an HIV/acquired immunodeficiency syndrome (AIDS) team, composed of the principal, assistant principal, teachers, parents, students, health resource staff, and other interested personnel, to oversee the condom availability program; (2) teach a minimum of six HIV/AIDS lessons in each grade; (3) designate and maintain at least one site at the school as a resource room where condoms and AIDS prevention materials are available; (4) staff this site no less than 10 periods a week and post the hours that the site is open; (5) identify at least one male and one female

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This paper was accepted November 14, 1996.
staff member as condom resource room volunteers and apprise students of the names of these individuals; and (6) arrange for an HIV/AIDS information session for parents.

To receive condoms, students must give their student identification numbers to the condom resource volunteer. The volunteer is not supposed to distribute condoms to students whose parents have notified the school that they do not want their children to be eligible for the program. (Less than 2% of parents city-wide have exercised this option.)

Despite the public health advantages of this program, controversy erupted over its initiation. At the heart of the debate were two recurring issues—the fear that the program would increase adolescent sexual activity, and the role of parents vs schools in matters of teen sexuality. While both proponents and opponents of the program held fast to their beliefs, neither could draw upon the support of empirical evidence.9 After a lengthy struggle, the program was approved by the school board and, in conjunction with expanded AIDS education, condoms were made available.10 In spite of the appearance of substantial opposition to condom availability, 69% of parents,11 89% of students,12 and 76% of teachers12 ultimately supported the program.

Methods

A total of 7119 students from 12 randomly selected NYC schools and 5738 students from 10 Chicago schools participated in a cross-sectional survey in the early fall of 1994. The Chicago public school system, a large, unified urban system that, like the NYC system, is ethnically diverse and has a high dropout rate, provides HIV/AIDS education but does not make condoms available to students. The NYC condom availability program was implemented in every public high school before the evaluation began. Thus, the study was a quasi-experimental design with a post hoc–only comparison.

The 12 schools in the NYC sample were randomly selected after all 120 schools in the system were stratified by type of school (comprehensive, vocational, alternative) and socioeconomic status of the student body, as measured by eligibility for free or reduced-price school lunches. Post–sample selection analysis determined that the sample of 12 schools represented the proportions of the student population in the NYC school system with respect to type of school, family income, and borough location. Ten Chicago public high schools were chosen to match the resulting NYC sample of students on relevant demographic characteristics.

In both NYC and Chicago, students completed self-administered questionnaires during required school classes, such as English or physical education. The required classes were randomly selected, using a quota designed to ensure distribution of students across grades 9 through 12. Students had to be in the classroom at the time the survey was conducted to be included in the sample. Trained data collectors administered the survey in both cities. While teachers remained in the classroom, as required by law, they were not involved in the data collection in any way, nor did they observe the responses of individual students.

The survey was designed to measure students’ knowledge, attitudes, and self-reported behavior related to sexual activity, condom use, and HIV risk reduction. Demographic comparisons between the NYC sample and all students in the NYC public high school system revealed that the sample did not differ from the systemwide student population on most characteristics. Girls and Latinos, however, were slightly overrepresented in the sample. The NYC data were then weighted to estimate the age, ethnic, and gender distribution of the NYC public high school system; Chicago data were weighted to approximate the resultant NYC sample; and weighted data were used for all subsequent analyses.

Sexual activity was measured by response to the question, “Have you ever had any form of sex? (Mark all that apply)” Possible answers were (1) oral intercourse (mouth); (2) vaginal intercourse (vagina); (3) anal intercourse (anus); (4) I have “fooled around” but have not had oral, vaginal, or anal intercourse; (5) I have never had sexual intercourse. Pilot tests focused on ensuring that the students who identified themselves as sexually active would include those who had engaged in nonvaginal (i.e., oral or anal) intercourse. Students who marked choices 1, 2, or 3 were considered sexually active for all subsequent analyses. Condom use was explored for those students who reported having had sex within the past 6 months. Condom use was measured by response (yes or no) to the question, “The last time you had sexual intercourse (oral, vaginal, or anal), did you or your partner use a condom?”

Responses to several condom-related questions on the survey were correlated with and supported the validity of the question regarding condom use at last intercourse, for both the NYC and Chicago samples. Correlations between questions and condom use at last intercourse were as follows: ever use a condom ($r = .39, P < .01$); in the past 6 months, used a condom every time ($r = .60, P < .01$); the last time you had sex, used a condom to prevent pregnancy ($r = .78, P < .01$).

We compared NYC students with Chicago students on variables related to sexual behavior and condom use, using weighted and unweighted data and controlling for age, gender, ethnicity, and psychosocial factors. Students who were new to their high school system (i.e., students who had been in an NYC or Chicago public high school for less than 1 year) were categorized as “new students.” As new students, they were unlikely to have been exposed to their school’s HIV/AIDS prevention strategies prior to participating in the survey and thus served as a proxy baseline measure. In an effort to establish a clean baseline, new students in NYC who had obtained a condom at school (n = 95), indicating direct exposure to the program, were eliminated from the analyses. (Eliminating these students did not affect any of the subsequent analyses.) Students who had been in an NYC or Chicago public high school for 1 year or more were categorized as “continuing students.” Continuing NYC students were then compared with continuing Chicago students.

Multivariate logistic models were used to compare continuing Chicago students with continuing NYC students on condom use at last intercourse, overall sexual activity rates, and other outcome variables. Subgroup analyses were performed to determine the relationship between the program and condom use by gender, ethnic group, and HIV risk status. “High-risk” students were those who reported having had three or more sexual partners within the past 6 months.

For all but the demographic comparisions, logistic regression models were tested on the weighted samples with condom use at last intercourse as the dependent variable. In additional models, sexual behavior, drug use, and HIV risk status were used as the dependent variables. The logistic models controlled for age, gender, ethnicity, age at first intercourse, number of partners, and frequency.

of sexual intercourse. In addition, the models controlled for a range of other variables that might influence condom use: salience of HIV/AIDS, defined as knowing someone who is HIV positive; self-efficacy, defined as the degree of confidence students had in their ability to negotiate a series of situations related to sexual activity and condom use (six items, \( \alpha = .62 \)); assessments of peer risk, defined as students' perceptions of the proportion of their friends engaging in risky sexual behaviors (three items, \( \alpha = .68 \)); depression\(^{15} \) (seven items, \( \alpha = .79 \)); locus of control, which measures the extent of control students felt they had over their lives (five items, \( \alpha = .53 \)); and parental support, which measures how comfortable students felt talking to their parents about a variety of problems (four items, \( \alpha = .89 \)).

Finally, to explore the mechanisms by which condom availability might influence condom use, a series of additional models were tested, to which two predictor variables were added: (1) use of the condom availability program, defined as a "yes" response to the question, "In the past 6 months, have you gotten condoms from a teacher or staff person at your school?" and (2) exposure to HIV/AIDS lessons, defined as a "yes" response to the question, "In the last semester, were you taught about AIDS/HIV infection in school?" At the time of the survey, only 42% of Chicago students and 53% of NYC students reported having been exposed to the mandatory HIV/AIDS lessons.

For all logistic models, students missing responses on dependent variables were excluded from the analyses. Nonresponses on independent variables showed no correlation with dependent variables and were therefore replaced with appropriate sample means.

**Results**

Table 1 presents a demographic comparison of the weighted NYC and Chicago samples. The majority of students in the sample were between 15 and 17 years of age. There were slightly more girls than boys. More than a quarter (28%) of the sample were of Hispanic/Latino origin and almost half the sample (47%) were African Americans or Blacks from English-speaking Caribbean countries. These two categories of Blacks are combined because preliminary analyses revealed no differences between the two in sexual activity or other relevant variables.

The two samples were virtually identical with respect to the percentage of students who reported that they had ever had any form of sexual intercourse (new students, 47%; continuing students, 60%). When types of sexual intercourse (vaginal, oral, anal) were compared, the samples were again surprisingly similar. As expected, sexual activity increased with age, and the NYC and Chicago students were remarkably similar in this respect as well as in many other variables related to sexual activity, including age at first intercourse and age of first partner. They were also similar in the percentage of students who reported having had three or more partners in the past 6 months (new students, 23%; continuing students, 19%).

More NYC students than Chicago students (37% vs 25%, \( P < .01 \)) reported that they knew someone with HIV infection or AIDS. Because the prevalence of HIV/AIDS is noticeably higher in NYC than in Chicago (the cumulative AIDS case rate in 1994 was 1230/100 000 in NYC\(^{14} \) and 384/100 000 in Chicago [Chicago Department of Public Health, Office of AIDS Surveillance, February 11, 1996]), students' opportunities for interactions with people with HIV/AIDS are significantly greater in NYC. Despite this difference, students in both cities were equally unlikely to feel vulnerable to HIV infection; 91% of students in both cities said it was "unlikely" or "not at all likely" that they would become infected with HIV in the next 5 years.

Tables 2 and 3 show the proportions of students in both systems who were sexually active and who reported using a condom at last intercourse. Table 2 presents data for new students and Table 3 presents data for continuing students. It should be noted that the mean age of new students did not differ between NYC and Chicago (14.6 years) and, as would be expected, new students were significantly younger than continuing students (mean age = 16.2 years in both NYC and Chicago). A logistic regression for students in NYC determined that new students were significantly less likely to know that condoms were available at their schools (odds ratio [OR] = .33, \( P < .01 \)) or where, when, from whom, and under what circumstances students could get condoms at their schools. These findings support the use of this group as an "unexposed" proxy baseline measure.

In both cities a higher proportion of boys than girls were sexually active and a higher proportion of African-American or Caribbean students than students from other ethnic groups reported having had sex. A slightly higher proportion of NYC Hispanic/Latino students than Chicago Hispanic/Latino students reported having had sex (\( P < .01 \)). These bivariate analyses are descriptive and present only a preliminary view.
As shown in Table 3, the proportions of new students and continuing students who were sexually active were the same in both NYC and Chicago (47% for new students and 60% for continuing students). For condom use at last intercourse, however, a different pattern emerged. A similar percentage of new students in NYC and Chicago (58% and 60%, respectively) reported using condoms at last intercourse, but among continuing students condom use at last intercourse
was significantly higher in NYC (61%) than in Chicago (56%; \(P < .01\)).

The comparisons shown in Tables 2 and 3 are not adjusted for possible confounding variables. Thus, to further explore these differences, we used a logistic regression model for continuing students. In this model we controlled for age, gender, ethnicity, and a range of other variables. As shown in Table 4, reported condom use at last intercourse varied by

- age (\(P < .01\)), indicating that older students were less likely to use condoms;
- gender (\(P < .01\)), indicating that girls were less likely than boys to use condoms;
- ethnicity (\(P < .01\)), indicating that African-American and Caribbean students were more likely than White students to use condoms;
- age at first intercourse (\(P < .01\)), indicating that those who became sexually active at a later age were more likely to use condoms;
- number of partners (\(P < .01\)), indicating that those who had more partners were more likely to use condoms;
- frequency of sex (\(P < .01\)), indicating that those who had sex more frequently were less likely to use condoms;
- self-efficacy (\(P < .01\)), indicating that students who felt more confident in their ability to refuse to have sex without a condom were more likely to use condoms;
- peer risk (\(P < .05\)), indicating that students who reported having friends who took a variety of HIV-related risks were less likely to use condoms;
- locus of control (\(P < .05\)), indicating that students who felt they had little control over their lives were less likely to use condoms;
- depression (\(P < .05\)), indicating that students who were more depressed were less likely to use condoms.

When we controlled for all of these factors, we found that continuing students in NYC were more likely than continuing students in Chicago to have used a condom at last intercourse (OR = 1.36, \(P < .01\)). A logistic model in which sexual activity was used as the outcome variable revealed no such difference between continuing students in NYC and Chicago. Furthermore, a logistic regression model revealed that the differences between the two school systems in condom use at last intercourse were even more pronounced for higher-risk continuing students than for the entire sample of sexually active continuing students (OR = 1.85, \(P < .01\), for the higher-risk group, compared with OR = 1.36 for the entire sample).

We conducted a series of logistic regressions for various subgroups, using the following outcome variables: condom use at last intercourse, sexual activity, drug use, and high-risk status (i.e., having had three or more partners in the past 6 months). Each of the logistic models controlled for the range of variables described earlier. The analyses were conducted for both groups of students, new and continuing.

The only significant findings from this entire series of analyses, shown in Figure 1, are those related to condom use in the sample of continuing students. That is, odds ratios for condom use at last intercourse, representing the difference between NYC and Chicago students, were significant for all continuing students (OR = 1.36, \(P < .01\), whether male (OR = 1.29, \(P < .01\), female (OR = 1.42, \(P < .01\), or higher-risk (OR = 1.85, \(P < .01\)). Odds ratios were not significant for new students’ condom use at last intercourse or for any of the subgroups on other outcome variables, including sexual activity, drug use, and higher-risk status.

Finally, to further elucidate the pathways by which making condoms available increases condom use, we tested an additional logistic model, adding two potential explanatory variables: use of the condom availability program and exposure to HIV/AIDS lessons. There was most likely a self-selection bias for those who used the school program (i.e., students who were already condom users would use the school program to get condoms). Given the potential for selection bias, this model is presented not to demonstrate overall program effect, but rather to identify the possible pathways by which condom availability increases condom use.

In this model, use of the condom availability program significantly increased the odds of condom use at last intercourse (OR = 1.53, \(P < .01\)) among all continuing students, but not among the high-risk subgroup. The significant effect on condom use at last intercourse associated with being exposed to the NYC

| TABLE 4—Logistic Regression Results: Condom Use at Last Intercourse for Continuing and High-Risk Students |
|--------------------------------------------------|------------------|-----------------|------------------|
|                                                   |                      |                      |
|                                                   | Continuing Studentsa | High-Risk Studentsb |
|                                                   | (Valid n = 4104)     | (Valid n = 829)     |
|                                                   | AOR | 95% CI       | AOR | 95% CI       |
| Age                                               | 0.8535** | 0.80, 0.91 | 0.8800* | 0.78, 0.99 |
| Sex                                               | 0.4650** | 0.39, 0.54 | 0.3254** | 0.21, 0.50 |
| Race/ethnicity                                    |                      |                      |
| Black                                             | 1.4823** | 1.23, 1.79 | 1.2456 | 0.78, 2.00 |
| Hispanic/Latin                                    | 0.8918 | 0.72, 1.10 | 0.7027 | 0.40, 1.24 |
| Asian                                             | 1.0461 | 0.69, 1.58 | 1.6900 | 0.52, 5.48 |
| Other                                             | 1.1849 | 0.83, 1.70 | 0.8068 | 0.36, 1.79 |
| Perception of risk to peers                       | 0.9524* | 0.91, 0.99 | 0.9227 | 0.85, 1.01 |
| Self-efficacy                                     | 1.3338** | 1.26, 1.41 | 1.3363** | 1.18, 1.51 |
| Locus of control                                  | 0.9618* | 0.93, 0.99 | 0.9163* | 0.85, 0.99 |
| Depression                                        | 0.9660* | 0.93, 0.99 | 0.9860 | 0.92, 1.06 |
| Salience                                          | 1.0310 | 0.89, 1.20 | 1.0027 | 0.71, 1.42 |
| Age at first intercourse                          | 1.0714** | 1.02, 1.12 | 1.1285* | 1.01, 1.25 |
| No. partners in last 6 months                     | 1.1640** | 1.08, 1.26 | 1.1618 | 0.82, 1.64 |
| Sexual intercourse, no. times in last 6 months    | 0.5842* | 0.54, 0.64 | 0.7129* | 0.53, 0.96 |
| School system (NYC: Chicago)                      | 1.3604** | 1.18, 1.56 | 1.8538** | 1.33, 2.58 |

*Note. Valid n includes all students who responded to the dependent variable question. Missing data on an independent variable, however, resulted in inclusion of the sample mean. AOR = adjusted odds ratio; CI = confidence interval; NYC = New York City.

aStudents enrolled in their school system for 1 year or more.

bStudents with three or more sexual partners within the last 6 months.

\(P < .05\); \(**P < .01\).
condom availability program persisted (OR = 1.24, P < .01, for continuing students and OR = 1.56, P < .05, for high-risk students) even when the two potential explanatory variables, use of the condom availability program and exposure to HIV/AIDS lessons, were controlled for in the logistic model.

Discussion

We used a variety of analytic strategies to examine the relationship between condom availability and sexual behavior. Clearly, making condoms available at school does not lead to increases in sexual activity. New students (the proxy baseline measure for this study) in New York City had the same sexual activity rates as new students in Chicago. In both cities the rate of increase of sexual activity associated with age was the same. A similar study of Latino adolescents in a community-based condom availability program in Boston also found no effect of condom availability on sexual behavior. Thus, the fear that making condoms available will increase sexual activity, a primary political obstacle to making condoms available to high school students, appears to be unfounded.

Additionally, these results suggest that making condoms available in high schools increases condom use. Notably, the impact of exposure to the program on condom use was significantly greater for those students who reported having had three or more partners in the past 6 months (the higher-risk group).

A range of psychosocial, behavioral, and demographic variables also influence condom use at last intercourse, including depression, self-efficacy, age at first intercourse, and gender. For example, although the NYC program is made available to both male and female students, the multiple determinants of condom use vary between males and females. Thus, logistic models, such as those presented in the Results section, were examined separately for males and females and for higher-risk males and higher-risk females. Exposure to the program continued to make an independent, significant contribution to condom use at last intercourse in each of these subgroups, although the relationships between other explanatory variables and condom use differed between males and females.

The major methodological limitation of this study is that there was no baseline measurement of condom use among NYC public high school students prior to the implementation of the condom availability program. Because the program was systemwide, there could be no random assignment to intervention or comparison groups. Thus the comparison group, by definition, had to be another school system. This raised the question of whether some unexplained differences between NYC and Chicago, rather than the condom availability program itself, might account for any observed differences in condom use. A variety of analytic strategies were used to account for these limitations. No single method or analytic strategy could overcome all the limitations, but as others have suggested, these methodologies used together build a case for the overall results.

Conclusions

Other studies have suggested that HIV education alone appears to have little impact on behavior and that most adolescents do not perceive themselves to be at risk for HIV infection, despite the fact that they are engaging in unprotected sex. Classroom-based programs alone have had limited success in delaying the onset of sexual activity, increasing
the use of contraceptives and condoms, and decreasing rates of pregnancy and sexually transmitted disease, while programs that include additional enabling or service provisions have been somewhat more successful. The data presented in this paper suggest that making condoms available does not encourage students who have never had sex to become sexually active. In addition, adding condom availability to an HIV/AIDS education program has a significant though modest relationship with condom use, particularly among students with multiple partners, whether through direct use of the program or through other, indirect, means.

School may not be the place to reach adolescents at highest risk for HIV infection, yet the school population does include a substantial proportion of students at high risk; nearly 1 in 10 (8.7%) of all NYC public high school students reported that they had had three or more sexual partners in the past 6 months. In fact, while less than one fifth of sexually active NYC students reported actually getting a condom from school, higher-risk students reported getting a condom from school in significantly higher proportions than lower-risk students. Our findings suggest that school-based condom availability, a low-cost, harmless addition to classroom HIV/AIDS prevention education efforts, merits policy consideration because it can lower the risk of HIV infection and other sexually transmitted diseases for urban teens in the United States.

Acknowledgments
This research was supported by a grant from The Robert Wood Johnson Foundation, with additional funding from the Aaron Diamond Foundation, the New York Community Trust, and the William T. Grant Foundation.

We would like to thank Jodi Beckwith, MA, and Lisa Weinberg, MA, for their help in the preparation of this manuscript.

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