Taking Be Proud! Be Responsible! to the Suburbs: A Replication Study

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CONTEXT: *An important phase of HIV prevention research is replicating successful interventions with different groups and in different settings.*

METHODS: *Be Proud! Be Responsible!, a successful intervention originally targeting black urban males and carried out in nonschool settings, was presented in health classes at urban and suburban schools with diverse student bodies. A group-randomized intervention study, which included 1,357 ninth and 10th graders from 10 paired schools in a Midwestern metropolitan area, was conducted in 2000–2002. Half the schools received the intervention, and half received a general health promotion program. Students' reports of their sexual behavior and selected cognitive mediators were analyzed immediately following the programs and four and 12 months later.*

RESULTS: *Compared with students who received the control curriculum, students exposed to the intervention reported significantly greater knowledge of HIV, other STDs and condoms; greater confidence in their ability to control sexual impulses, to use condoms and to negotiate the use of condoms; and stronger intentions to use condoms. Stratified analyses revealed that the strongest intervention impacts were on knowledge and efficacy among males and students attending suburban schools. The intervention had no impact on sexual initiation, frequency of intercourse or condom use.*

CONCLUSIONS: *Schools are a logical and viable setting for the dissemination and acquisition of information about HIV, including prevention strategies. However, the behavioral impact of an intervention may not be easily transferable when the program is taught outside a carefully controlled, nonschool setting.*

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Because minority adolescents and those living in impoverished areas have an increased risk of contracting HIV and other STDs,[1] prevention programs directed at urban, at-risk youth have received considerable attention.[2] As a result, many such interventions have been developed, the most successful ones being well controlled, theoretically derived, community-based and culturally sensitive.[2–5] However, the generalizability of these successful interventions to other settings (e.g., school classrooms) and populations (e.g., white adolescents and black suburban adolescents) has not been established.[6]

One successful intervention with the above prescribed characteristics is Be Proud! Be Responsible! (BPBR), developed by Jemmott et al.[7] Originally designed for inner-city, black males,[8] the six-session ethnocentric curriculum has been found to significantly reduce levels of risky sexual behaviors (for up to at least 12 months) in this intended audience, as well as influence the cognitive mechanisms (e.g., knowledge, efficacy) that are theoretically linked to behavioral changes.[8–12] The program has been replicated among other minority youth and females, and in international settings, with continued success.[7] However, published evaluations of BPBR have been largely limited to its use with young adolescents (average age, 11–13) and with urban, minority youth receiving the intervention in nonschool environments (e.g., Saturday programming) and in small groups (6–8).[8–12] The intervention has not been tested within school settings, taught by teachers or other school personnel, and little information exists on its effectiveness when extended beyond the urban environment. Its effectiveness in diverse settings, where program fidelity may be variable and the delivery less controllable, and where participants include young people who may be unlikely to volunteer for a weekend program, is important to assess.

This article presents the results of a school-based, group-randomized replication of BPBR with enrolled students from five pairs of large urban and suburban high schools in the Midwest. Schools were paired by socioeconomic status and racial composition; one school of each pair implemented the BPBR curriculum, while its matching school implemented a health promotion curriculum focused on good nutrition, physical activity and stress reduction, developed by the Cleveland Health Museum. The primary aim of this study was to determine if BPBR would be effective when taught within a high school health curriculum by school personnel (e.g., health teachers and school nurses). The secondary aim was to determine whether the curriculum would be effective among white youth, as well as among black suburban youth. On

the basis of the original intent and focus of the curriculum, we hypothesized that the program would be more effective among urban, black, male adolescents than among suburban, female or white adolescents.

THE CURRICULUM

The BPBR curriculum consists of six 50-minute modules that include a variety of developmentally appropriate teaching methods, such as group discussions, role model stories depicted in videos, interactive exercises and role-playing.[7] Drawing on social cognitive theory[13,14] and the theories of reasoned action[15] and planned behavior,[9,16,17] the curriculum is intended to influence a set of principles (i.e., perceived risk, knowledge, beliefs, efficacy, control) that are related to health behavior change. Its three core themes are the role of sexual responsibility and accountability, the importance of having a sense of community and the role of pride in making safer sexual choices.[7] While the focus is clearly on safer-sex decision making and practices, the curriculum is taught with an abstinence-first philosophy; that is, the main message promotes abstinence as the most effective way for adolescents to protect themselves from pregnancy and STDs. Activities promote the understanding of vulnerability to HIV infection and building negotiation and refusal skills. However, should adolescents decide to be sexually active, the curriculum also provides them with information and appropriate skill building about safer-sex practices (e.g., condom use).

METHODS

Participants

The study population comprised 1,576 ninth- and 10th-grade students enrolled between 2000 and 2002 in mandatory health education classes in 10 high schools in a midsize, metropolitan area in the Midwest. The urban school district expressed concern that nonparticipating students needed a separate place to go while the program was being conducted, but that they could provide this only for students whose parents refused consent, and not for students whose parents did not return the consent form or could not be reached. Thus, we obtained a waiver of consent from the National Institutes of Health. However, to ensure that parents were well informed about the study, parental or guardian consent was still actively sought. Introduction letters from school principals and the research team were mailed to students' homes informing parents of the survey and instructing them to indicate their consent by any of five methods (delivering, mailing or faxing a consent form to school, or e-mailing or phoning their consent). Those who used the last two methods received a confirmation letter. Two reminder letters were mailed to nonresponding parents, and up to five phone calls were made before a passive consent process was enacted. In addition, parent information meetings took place in the evenings at each participating school, parents were encouraged to contact the principal investigator with any questions or concerns, and a 24-hour telephone number was available. The written assent of students was also obtained. Ninety-three parents and 26 students refused to participate (6% and 2%, respectively), and 100 students (6%) were unable to complete the pretest that was administered 7–14 days prior to the start of the curriculum (because they had transferred or been expelled, were no longer attending school or had inconsistent attendance). Hence, the baseline sample consisted of 1,357 students.

Procedures

Five pairs of high schools were recruited; pairs were selected on the basis of the schools' location (inner city, inner-ring suburb or outer-ring suburb*) and similarity regarding community socioeconomic status (proportion of neighborhood households at or below the federal poverty line) and racial composition of the student body. Two pairs were from an urban school district in an area of low socioeconomic status; one pair had predominantly black student bodies, and the other had mixed student bodies (no racial group accounted for more than 40% of the study population). Two pairs of schools were from inner-ring suburbs; one pair was in an area of low socioeconomic status and had predominantly white student bodies, and the other was in an area of moderate socioeconomic status and had racially mixed populations. The last pair of schools were from outer-ring suburbs; both schools were in areas of high socioeconomic status and had predominantly white populations.

For schools to be included, officials had to agree to be randomly assigned to the intervention or control curriculum and to recruit all teachers responsible for teaching health to be trained in their respective curriculum. We used a two-stage, double-blinded randomization procedure[18] to randomize each pair. In this procedure, we flipped a coin, and the side that landed face-up represented the intervention condition. School representatives then chose between two sealed envelopes—one containing the word "heads" and the other "tails." Assignments were based on which card matched our coin flip. The curricula were taught in health classes facilitated predominantly by health education teachers. However, in three pairs of schools, approximately a quarter of the classes were taught by school nurses, who were randomly assigned to the health classes at that school.

Data were collected from students via confidential, self-administered questionnaires at four time points: prior to the intervention (baseline), immediately following the intervention, and four and 12 months later. All participants received a study-branded T-shirt and a small gift (e.g., pencil, CD case, hat, movie pass) each time they completed a survey. The study was approved by the institutional review board of Case Western Reserve University.

*An inner-ring suburb is a community that shares a border with the major city; an outer-ring suburb does not share a border with the city.

Curriculum Adaptations and Facilitator Training

Because this was a replication study, fidelity to the original BPBR curriculum was crucial. However, a few small but important adaptations to the curriculum were deemed necessary. First, because of objections from several urban as well as suburban schools, one 10-minute activity (How to Make Condoms Fun and Pleasurable) in the condom-use skills session was dropped; all other condom-related activities were retained in all schools. Second, the ethnocentric and urban focus of the curriculum was retained across all schools, except that the term "inner-city" was replaced with "community." Third, both intervention and control groups received a message-specific booster session between four and 12 months after the initial programs. Students in the intervention arm attended an assembly featuring a young HIV-positive woman, while students in the control arm attended an assembly in which a speaker discussed healthy eating and exercise. Otherwise, the control curriculum was designed to match the BPBR curriculum in structure and nature of the activities (i.e., interactive exercises, role-playing, lecture).

The teacher and nurse facilitators for both curricula attended separate two-day training sessions (12 hours in total). The two individuals responsible for training the BPBR facilitators had previously attended a training session offered by the curriculum authors and had three years of experience teaching the curriculum in middle schools. Training was conducted on consecutive Saturdays, and facilitators were reimbursed for their time, as well as travel and parking expenses. They were instructed on how to complete a detailed checklist for each session, including rating their command of the materials, their rapport with the students, the orderliness of the classroom and the extent to which the material for each session was covered, while documenting any deviations from the original curriculum. In addition, each facilitator was observed at least once during the six curriculum sessions to assess his or her comfort level with the material and fidelity to the curriculum. A majority of the 27 facilitators were female (74%) and white (59%) and had a postgraduate education (78%); their average age was 44 (range, 25–62), and they had been teaching within their school systems for more than 15 years, on average (range, 1–30). The facilitators for the intervention and control groups possessed similar characteristics.

TABLE 1. Percentage of students enrolled in school-based replication of Be Proud! Be Responsible!, by selected demographic and behavioral characteristics at baseline

Characteristic	Total (N=1,357)	Intervention (N=631)	Control (N=726)
DEMOGRAPHIC			
Female	51.8*	55.5	48.6
Grade			
9	45.8	45.0	46.4
10	54.2	55.0	53.6
Ethnicity			
White	49.7***	48.5	50.8
Black	35.8	32.3	38.8
Hispanic	11.9	17.4	7.0
Other	2.6	1.8	3.3
Lives with two parents	60.8	59.1	62.3
≥1 parent has some postsecondary education	59.8	58.3	61.0
Average % of neighborhood households ≤poverty	14.6**	15.7	13.6
Session attendance	86.9*	88.5	85.8
BEHAVIORAL‡			
All			
Ever had intercourse	38.1	39.1	37.2
Talked to professional about sex-related issue in past year	26.8	27.8	25.8
Carried condoms or had quick access to them	39.6	39.5	39.6
Sexually experienced at baseline			
Had sex in past 3 mos.	66.9	68.1	65.6
Avoided sex in past 3 mos. because had no condom	33.8	30.7	36.9
Sexually active in past 3 mos.			
Always used condom in this period	60.0	63.7	56.3
Ever used alcohol/drugs before sex in this period	30.5	31.5	29.6
Avoided sex in this period because had no condom	30.1	38.0	34.0

*p<.05. **p<.01. ***p<.001. ‡Proportions were adjusted for age, gender, ethnicity and neighborhood socioeconomic status.

Measures

The measures were largely guided by the constructs included in the theoretical framework underlying the BPBR curriculum and tested in the primary evaluation of BPBR.[9] This framework posits that the intervention will influence sex-related behaviors both directly and indirectly through cognitive processes that are assumed to mediate behavioral change. Five categories of sex-related cognitive mediators were included in the study: knowledge, efficacy, participants' beliefs, perceived peer beliefs and behavioral intentions.

•*Knowledge.* Three domains of knowledge were assessed, with questions that had possible responses of true, false and don't know. Knowledge of condoms was measured by five questions (e.g., "A condom should be completely unrolled before it is placed on the penis"). Knowledge of HIV and other STDs was measured by seven questions (e.g., "There's a good chance you'll get AIDS if you share a sink, shower or toilet seat with a person who has AIDS"). Health promotion knowledge was measured by nine questions that focused on nutrition, fitness and stress (e.g., "Restaurants typically serve 2–3 times the normal portion size"). Health knowledge was included as an indicator of the success of the control program (i.e., only the control students would be expected to show improvement). The number of correctly answered items for each domain was summed, resulting in scores of 0–5 for condom knowledge, 0–7 for HIV and other STD knowledge, and 0–9 for health promotion knowledge. The higher the score, the higher the participant's level of knowledge in each area.

•*Efficacy.* Three types of self-efficacy were measured, using a five-point Likert scale (from strongly disagree to strongly agree). The scores of the items for each construct were summed and averaged. Impulse control was measured using two items (e.g., "How sure are you that you could keep from having sex until you feel ready?"); higher scores indicated students' greater confidence in

their ability to resist unwanted sexual advances (alphas, 0.81–0.87 across study time points). Condom negotiation skills were measured using three items (e.g., "I can get my partner to use a condom even if he/she does not want to"); higher scores indicated students' greater confidence in their ability to get a partner to agree to use a condom (alphas, 0.60–0.64). Condom technical skills were measured by three items (e.g., "How sure are you that you could use a condom correctly or explain to your partner how to use a condom correctly"); higher scores showed students' greater confidence in their ability to correctly use a condom (alphas, 0.67–0.72).

•*Beliefs.* Beliefs about three aspects of condom use were assessed, as well as adolescents' commitment to sexual abstinence while in high school; five-point Likert scales (from strongly disagree to strongly agree) were used for all measures, and the items for each construct were summed and averaged. The condom use belief scale comprised three items measuring students' perspective of the value and importance of using condoms (e.g., "I believe condoms should always be used if a person my age has sex, even if the girl uses birth control"); higher scores indicated greater belief in the importance of condom use (alphas, 0.86–0.89). The condom use hedonistic scale consisted of three items measuring perceptions of whether condoms interfered with sexual enjoyment (e.g., "Sex feels unnatural when a condom is used"); higher scores indicated a belief that condoms interfere (alphas, 0.55–0.61). The two items of the condom use prevention scale measured the belief that condoms prevent HIV and other STDs (e.g., "As long as I use a condom during sex, I know I will be safe from disease"); higher scores indicated greater belief in the protective quality of condoms (alphas, 0.42–0.64). Finally, the abstinence belief scale used four items to assess students' beliefs about the importance or value of abstinence (e.g., "I believe that sex before marriage is wrong"); higher scores represented an increased belief in the value of abstinence (alphas, 0.78–0.80).

•*Perceived peer beliefs.* Students' perceptions of peer beliefs were measured using five-point Likert scales (from strongly disagree to strongly agree), and the items for each construct were summed and averaged. Three items measured peer beliefs of the acceptability of sexual activity (e.g., "Most of my friends believe it's okay for people my age to have sex with a steady boyfriend or girlfriend"); higher scores indicated increased acceptability (alphas, 0.64–0.72). Perception of peers' beliefs regarding condom use was also measured by three items (e.g., "Most of my friends believe condoms should always be used if a person my age has sex, even if the girl uses birth control"); higher scores indicated stronger perceptions that peers believed in the importance of condom use (alphas, 0.85–0.87).

•*Intentions.* Intention to have sexual intercourse was measured by three items using a five-point scale (from not at all likely to definitely likely); two items assessed the expectation of having sex in the next three months and in the next year, and the third assessed the expectation of not having sex (being abstinent) until after high school (reverse-coded). These items were summed and averaged; higher scores indicated a higher intention of engaging in sex (alphas, 0.90–0.94). Participants' intention to use a condom should they have sex was measured by a single item; higher scores indicated a greater intention of using a condom.

•*Sexual behavior.* The measures of sex-related behavior included in this study were guided by the measures used in the original study. Binary measures asked all students at baseline whether they had ever had sexual intercourse; whether they had talked to a nurse, doctor or other health professional about a sex-related issue in the past year; and whether they carried condoms or had quick access to them. Also at baseline, sexually experienced students were asked whether they had had intercourse within the past three months and if they had ever avoided sex in that same period because they did not have a condom. Students who had been sexually active in the previous three months were asked how often they had drunk alcohol or used drugs before having sex during this period (coded as never vs. sometimes, a few times, most times or always), and how often they had used condoms when they had had sex in this period. This last measure is referred to as the summary measure of consistent condom use, and is analyzed as both a binary measure (coded as never, sometimes, often or almost every time vs. every time) and a continuous measure.

At the four- and 12-month postintervention surveys, students answered questions about their sexual behavior

TABLE 2. Adjusted mean scores on cognitive outcomes at immediate posttest and at four- and 12-month follow-up, by group

Outcome	Immediate posttest		Four months		12 months	
	Intervention	Control	Intervention	Control	Intervention	Control
Knowledge						
Condoms	4.06	2.83***	4.14	3.44***	4.18	3.64***
STDs	5.24	4.81***	5.07	4.88**	5.13	4.96*
Efficacy						
Impulse control	3.95	3.84**	3.90	3.80	3.99	3.87*
Condom negotiation skills	4.13	3.98**	4.05	3.93**	4.14	4.07
Condom technical skills	4.30	3.99***	4.23	4.06**	4.24	4.18
Beliefs						
Condom use	4.72	4.70	4.68	4.59*	4.58	4.58
Condom use hedonistic	2.24	2.26	2.27	2.26	2.23	2.24
Condom use prevention	3.42	3.16**	3.30	3.23	3.24	3.22
Abstinence	3.13	3.13	2.99	2.95	2.88	2.86
Perceived peer beliefs						
Sexual activity	u	u	2.86	2.93†	2.97	3.11*
Condom use	u	u	4.35	4.29	4.28	4.23
Intentions						
To have sex	3.05	3.08	3.08	3.20*	3.29	3.35
To use a condom	4.62	4.51*	4.48	4.36	4.46	4.31

*p<.05. **p<.01. ***p<.001. †p<.10. *Notes:* Scale ranges were 0–7 for knowledge of STDs and 0–5 for all other outcomes. Immediate posttest models were adjusted for age, gender, ethnicity, sexual experience, neighborhood socioeconomic status and baseline scale value. Follow-up models were adjusted for the same factors plus session attendance. Significance levels for all models reflect adjustment of all standard errors for intragroup correlation (e.g., possible clustering at the school level). u=unavailable.

since the last survey, using a calendar as a memory cue. They were asked if they had had sexual intercourse, if they carried condoms or had quick access to them, and if they had talked to a health professional about a sex-related issue. Students reporting intercourse in the given period were asked if they had ever avoided sex because they did not have a condom, and if they had used alcohol or drugs before sex.

Continuous measures of sexual activity were conceptualized to coincide with treatment in the Jemmott et al. study.[9] These measures were asked only at the follow-up surveys and included frequency of intercourse since the last survey among sexually active students ("Since the last survey, how many times did you have sex?") and frequency of protected intercourse ("Since the last survey, when you had sex, how many times did you use a condom?"). The difference between these two frequencies yielded the frequency of unprotected intercourse and the proportion of unprotected episodes (proportional measure).

•*Demographic.* Age, gender, ethnicity (white, black, Hispanic, other), living arrangement (with two parents vs. other) and parents' education (at least one parent having had some postsecondary education vs. other) were assessed at baseline. An estimation of students' neighborhood socioeconomic status was generated by using the proportion of households in their neighborhood that were at or below the federal poverty line, based on the 2000 U.S. census (range, 1– 70%); this was done by linking the student's address to data for that specific census tract. The proportion of curriculum sessions attended was measured by the facilitators.

•*Curriculum fidelity, facilitator performance and student assessment.* Facilitators completed a checklist after each of the six class sessions. In addition to attendance, they recorded their command of the session materials (10-point scale, ranging from low to high), their perceived rapport with students (on the same scale) and how closely they followed the original curriculum as outlined in the training manual (four-point scale, ranging from not at all close to exactly). They also recorded whether they completed each of the specific activities (25 in all) within the designated sessions (and if not, why), and if they were unable to complete an activity, whether they completed it at a later session. Finally, at the immediate posttest (within a week of the last session), students responded to a number of items (using four-point scales): how well their facilitators presented the material and how comfortable they were in doing so (ranging from not at all to extremely); how much the curriculum challenged how students thought about their health (ranging from not at all to a lot); how comfortable students were with the activities and with potentially discussing a personal concern with their facilitator (ranging from not at all to extremely); the general classroom environment (ranging from chaotic to orderly); and how seriously their peers regarded the curriculum (ranging from not at all seriously to very seriously).

TABLE 3. Behavioral outcomes among intervention and control students at four and 12 months postintervention, for the period since the last survey, by sexual experience at baseline

Outcome	Four months		12 months	
	Intervention	Control	Intervention	Control
SEXUALLY INEXPERIENCED AT BASELINE				
Sexual intercourse				
Mean frequency of intercourse‡	3.7	5.4	11.0	8.6
% ever had intercourse§	11.3	8.7	21.4	19.4
Unprotected intercourse				
Mean frequency of unprotected intercourse‡	0.7	1.5	3.0	4.0
% of all episodes unprotected‡	15.1	18.5	23.6	23.3
% had any unprotected intercourse‡				
Proportional measure	20.3	32.2	49.3	34.0
Summary measure††	24.6	35.8	56.1	45.4
Other behavior				
% ever avoided sex because had no condom‡	25.7	40.1	42.6	39.8
% ever used alcohol/drugs before sex‡	19.9	30.4	30.3	37.2
% carried condoms or had quick access to them§	25.6	26.2	29.9	28.6
% talked to professional about sex-related issue§	17.1	10.1**	18.9	16.7
SEXUALLY EXPERIENCED AT BASELINE				
Sexual intercourse				
Mean frequency of intercourse‡	6.8	7.1	12.5	11.5
% ever had intercourse§	68.3	74.2	83.7	83.9
Unprotected intercourse				
Mean frequency of unprotected intercourse‡	2.5	2.1	5.3	4.4
% of all episodes unprotected‡	25.0	23.4	31.5	25.0
% had any unprotected intercourse‡				
Proportional measure	37.3	36.6	51.7	46.2
Summary measure††	47.4	48.2	57.9	51.6
Other behavior				
% ever avoided sex because had no condom‡	39.2	37.7	35.6	39.9
% ever used alcohol/drugs before sex‡	31.6	35.8	41.1	44.7
% carried condoms or had quick access to them§	66.0	69.9	67.8	67.0
% talked to professional about sex-related issue§	26.4	29.7	33.7	36.1

**p<.01. ‡Among students reporting intercourse since the last survey at each follow-up. §Among all students since the last survey at each follow-up. ††The summary measure indicates how often condoms were used during intercourse (responses ranged from never to every time); responses were classified as inconsistent use (never to usually) vs. consistent use (every time). *Notes:* Follow-up models were adjusted for age, gender, ethnicity, neighborhood socioeconomic status, session attendance and baseline scale value. Significance level reflects adjustment of all standard errors for intragroup correlation (e.g., possible clustering at the school level).

Analyses

Univariate statistics were used to assess whether student characteristics differed between the intervention and control groups at baseline. Continuous independent variables were compared using t tests, and chi-square tests were used to compare categorical variables. Preliminary analyses revealed small but significant differences between the intervention and control groups in gender, ethnicity, neighborhood socioeconomic status and session attendance. Therefore, to control for possible confounding, these variables as well as age were included as covariates in subsequent analyses.

To test the impact of the curriculum on the change in outcomes, we used general linear model analyses, with group membership (intervention=1, controls=0) as the fixed effect and covariates (those mentioned above plus sexual experience at baseline and baseline measure of

the outcome variable) included; this approach produced adjusted group means or proportions for comparison. Intervention effects, when found, indicate that the mean of the postintervention variable (e.g., knowledge of HIV and other STDs) differs significantly between the intervention and control groups, assuming equivalent values at baseline. Because the baseline measure is included as a covariate, the adjusted postintervention mean reflects the residualized change in the outcome; that is, when an effect is significant, the intervention group reports a significant change (increase or decrease) in the outcome variable when compared with controls.

This method was chosen so that results could be compared with the published results of the original BPBR study, using the same statistical method.[9] However, because of the randomization at the school level, possible intragroup (school) correlation needed to be considered. Thus, all analyses were also conducted using the cluster option in STATA, which adjusts the standard errors of estimates for intragroup correlations, but does not affect the estimates themselves.[19] Owing to the intuitive presentation of the adjusted means and proportions of the general linear model, these estimates are presented, yet the statistical significance of differences between the intervention and control groups is based on the adjusted results from STATA.

Finally, we conducted stratified analyses to explore the intervention effects by gender, location and race.

RESULTS

A total of 1,357 ninth and 10th graders were enrolled in the study and completed the baseline questionnaire. Of these, 99% completed the immediate posttest, 97% completed the four-month follow-up and 92% completed the 12-month follow-up. Rates of follow-up did not differ between the intervention and control groups. However, compared with students who completed every questionnaire, students lost to follow-up were older (15.7 vs. 15.1, p<.001) and more likely to be male (62% vs. 47%, p=.003) and nonwhite (67% vs. 50%, p<.001). They also were less likely to live with two parents (40% vs. 63%, p<.001), attended fewer sessions (70% vs. 89%, p<.001) and lived in neighborhoods with a higher average proportion of households at or below the poverty level (21% vs. 14%, p<.001).

Baseline Characteristics

Students in the intervention and control groups were nearly the same age (15.2 and 15.1, respectively). Proportions of students in the ninth and 10th grades (average, 46% and 54%, respectively) were similar in each group, as were the proportions living with two parents (61%) and having at least one parent with some postsecondary education (60%—Table 1, page 14). However, females represented a larger proportion of the intervention group than of the control group (56% vs. 49%), and intervention students lived in neighborhoods with a higher average proportion of households at or below the poverty line (16% vs. 14%).

TABLE 4. Adjusted mean comparisons of cognitive mediators between intervention and control groups at immediate posttest and at four- and 12-month follow-up, by gender

Outcome	Males						Females					
	Immediate posttest		Four months		12 months		Immediate posttest		Four months		12 months	
	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control
Knowledge												
Condoms	4.06	2.86***	4.15	3.52**	4.25	3.69**	4.06	2.82***	4.12	3.38**	4.11	3.61**
STDs	5.13	4.69***	5.05	4.85	5.12	4.95	5.33	4.92***	5.11	4.92*	5.15	4.95*
Efficacy												
Impulse control	3.44	3.22**	3.30	3.14	3.39	3.20	4.42	4.41	4.44	4.43	4.53	4.47
Condom negotiation skills	3.98	3.76***	3.93	3.72**	4.02	3.78**	4.25	4.19	4.17	4.12	4.25	4.32
Condom technical skills	4.32	4.07**	4.24	4.10	4.31	4.22	4.29	3.91***	4.23	4.02**	4.19	4.16
Beliefs												
Condom use	4.63	4.56	4.58	4.41	4.50	4.46	4.84	4.82	4.77	4.75	4.65	4.69
Condom use hedonistic	2.37	2.41	2.40	2.40	2.32	2.41	2.12	2.12	2.15	2.14	2.13	2.08
Condom use prevention	3.45	3.27**	3.40	3.29	3.34	3.33	3.38	3.05***	3.21	3.17	3.16	3.11
Abstinence	2.83	2.83	2.68	2.63	2.58	2.59	3.40	3.41	3.26	3.25	3.14	3.08
Perceived peer beliefs												
Sexual activity	u	u	3.20	3.29	3.33	3.44	u	u	2.55	2.62	2.65	2.82*
Condom use	u	u	4.25	4.12	4.22	4.11	u	u	4.55	4.45	4.33	4.34
Intentions												
To have sex	3.42	3.43	3.44	3.53	3.62	3.58	2.71	2.77*	2.76	2.90*	3.01	3.15
To use a condom	4.51	4.40	4.43	4.22	4.48	4.32	4.71	4.62	4.53	4.49	4.45	4.54

*p<.05. **p<.01. ***p<.001. *Notes:* Scale ranges were 0–7 for knowledge of STDs and 0–5 for all other outcomes. Immediate posttest models were adjusted for age, ethnicity, sexual experience, neighborhood socioeconomic status and baseline scale value. Follow-up models were adjusted for the same factors plus session attendance. Significance levels for all models reflect adjustment of all standard errors for intragroup correlation (e.g., possible clustering at the school level). u=unavailable.

A higher proportion of students in the intervention group than in the control group were Hispanic (17% vs. 7%), and a somewhat lower proportion were black (32% vs. 39%). In addition, students in the intervention arm attended a higher proportion of sessions than did those in the control group (89% vs. 86%).

Thirty-eight percent of all participants had had sexual intercourse by baseline. Sixty-seven percent of sexually experienced students had had sex in the three months preceding the study, and 60% of this group had always used a condom in this period. Forty percent of all students said they carried condoms or had quick access to them, and 27% had talked to a health professional about a sex-related issue in the past year. The intervention and control groups did not differ on these factors at baseline.

The two groups had similar scores for the cognitive mediators (not shown). The only difference between groups was that individuals in the control group initially reported higher condom negotiation skills than intervention students (mean, 4.0 vs. 3.9, p=.04).

Overall Outcomes

The curriculum's largest and most consistent effects on cognitive outcomes were found within the domains of knowledge (Table 2, page 15). Students exposed to BPBR reported significantly greater knowledge about STDs and condoms immediately following the intervention than controls, and these differences were sustained for one year after the intervention. (Similarly, throughout the follow-up period, students in the control group reported significantly higher scores in their general health knowledge than the intervention group, providing evidence of a control intervention effect—not shown.) Significant differences were also seen in efficacy, beliefs, perceived peer beliefs and intentions. While a few of these were sustained through four months (e.g., condom negotiation skills, condom technical skills, condom use beliefs), most were no longer evident by 12 months. The intervention had a more erratic impact on impulse control, peer belief regarding sexual activity, and intentions to have sex and to use a condom in the future.

BPBR had a significant effect on only one behavioral outcome (Table 3, page 16). At the four-month follow-up, among students who had been sexually inexperienced at baseline, a higher proportion of intervention students than of control students reported having talked to a health professional about a sex-related matter since the immediate posttest survey. While the two groups appeared to be different on a number of other behaviors, none of the differences reached statistical significance.

Stratified Analyses

The second aim of the study was to examine whether BPBR would resonate with adolescents for whom the intervention was not originally intended, such as female, white and suburban (regardless of race) adolescents. Because we

TABLE 5. Adjusted mean comparisons of cognitive mediators between intervention and control groups at immediate posttest and at four- and 12-month follow-up, by residence

Outcome	Urban						Suburban					
	Immediate posttest		Four months		12 months		Immediate posttest		Four months		12 months	
	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control
Knowledge												
Condoms	3.73	2.87***	3.63	3.45	3.63	3.59	4.19	2.84***	4.35	3.45***	4.39	3.69***
STDs	4.90	4.51**	4.67	4.62	4.86	4.73	5.38	4.97***	5.25	5.02**	5.24	5.07*
Efficacy												
Impulse control	3.99	3.90*	3.86	3.84	4.10	4.05	3.92	3.82†	3.90	3.82	3.94	3.81†
Condom negotiation skills	4.12	3.97*	4.02	4.01	4.11	4.14	4.12	3.98†	4.05	3.90**	4.14	4.04
Condom technical skills	4.28	4.15	4.24	4.27	4.29	4.39*	4.31	3.91***	4.22	3.96***	4.21	4.10†
Beliefs												
Condom use	4.69	4.69	4.64	4.61	4.51	4.63**	4.76	4.71	4.70	4.58*	4.61	4.56
Condom use hedonistic	2.23	2.19	2.29	2.15*	2.21	2.11*	2.25	2.29	2.27	2.31	2.24	2.29
Condom use prevention	3.42	3.25*	3.31	3.35	3.27	3.35†	3.41	3.11*	3.30	3.16	3.23	3.16
Abstinence	3.23	3.16	3.06	2.98†	2.91	2.91	3.08	3.12	2.96	2.94	2.87	2.83
Perceived peer beliefs												
Sexual activity	u	u	2.97	3.03	3.01	3.22†	u	u	2.81	2.89	2.94	3.07
Condom use	u	u	4.28	4.28	4.27	4.28	u	u	4.38	4.30	4.28	4.22
Intentions												
To have sex	3.26	3.32	3.30	3.49†	3.62	3.64	2.94	2.98	2.97	3.07	3.15	3.23
To use a condom	4.51	4.40	4.30	4.30	4.33	4.36	4.67	4.56	4.55	4.39	4.51	4.47

*p<.05. **p<.01. ***p<.001. †p<.10. *Notes:* Scale ranges were 0–7 for knowledge of STDs and 0–5 for all other outcomes. Immediate posttest models were adjusted for age, gender, ethnicity, sexual experience, neighborhood socioeconomic status and baseline scale value. Follow-up models were adjusted for the same factors plus session attendance. Significance levels for all models reflect adjustment of all standard errors for intragroup correlation (e.g., possible clustering at the school level). u=unavailable.

found only one significant behavioral outcome, the stratified analyses were limited to the cognitive mediators.

•*Effects by gender.* In general, the impact of the BPBR intervention on knowledge was strong, consistent and sustainable for both genders (Table 4, page 17). The largest gender differences were found in the area of self-efficacy. It appears that initially, the intervention had a strong impact on male students: Immediately postintervention, males in the BPBR group had significantly higher scores on impulse control, condom negotiation and condom technical skills than their control peers. Moreover, they reported significantly greater confidence in getting a partner to use a condom (i.e., condom negotiation efficacy) throughout the 12 months following the intervention. In contrast, females in the intervention group were no more confident than their control peers that they could get their partners to use a condom at any time. However, females exposed to the intervention reported significantly greater confidence than controls that they could obtain and correctly use a condom (i.e., condom technical skills), and the difference was sustained for four months, whereas the impact among males disappeared early. Finally, although the intervention did not appear to affect behavior intentions among male students, female intervention students reported significantly lower intentions to have sex than their control peers.

•*Effects by geographic location.* The curriculum's effects among urban-dwelling students were erratic at best (Table 5). Initially, knowledge scores, as well as two efficacy scores, were significantly higher among intervention than among control students, but the differences disappeared in subsequent surveys. Other erratic results included stronger attitudes about condoms (hedonistic beliefs) and an unexpected lower score on condom use beliefs among urban intervention students than among controls at 12 months. In contrast, among suburban youth, the intervention had a strong, significant and sustainable impact on STD and condom knowledge (for one year), and on confidence to not only use a condom correctly but convince a partner to use one (for four months).

•*Effects by ethnicity.* BPBR had a strong and sustainable impact on condom knowledge among white students and on STD knowledge among black students (Table 6). In addition, white students exposed to the intervention had higher scores on condom negotiation and condom technical skills at four months than did white controls, while black students showed no significant differences on these measures; however, this may reflect the higher starting point of black students.

Facilitator Performance

In general, facilitators gave high ratings to their comfort with the materials, rapport with students and fidelity to the published curriculum, and we observed no differences between intervention and control group facilitators (Table 7, page 20). Facilitators' reports on program activities in each session were aggregated across all classrooms,

TABLE 6. Adjusted mean comparisons of cognitive mediators between intervention and control groups at immediate posttest and at four- and 12-month follow-up, by race

Outcome	White						Black					
	Immediate posttest		Four months		12 months		Immediate posttest		Four months		12 months	
	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control
Knowledge												
Condoms	4.24	2.84***	4.28	3.56**	4.36	3.75**	3.82	2.94***	4.01	3.44*	4.00	3.62
STDs	5.40	5.12**	5.24	5.14	5.30	5.25	5.08	4.48***	5.01	4.61***	4.96	4.62**
Efficacy												
Impulse control	3.70	3.81	3.85	3.74	3.87	3.81	4.06	3.84**	3.95	3.90	4.14	3.96
Condom negotiation skills	4.09	3.97*	4.03	3.86*	4.06	4.00	4.20	4.04†	4.12	4.02	4.27	4.14
Condom technical skills	4.30	3.92***	4.19	4.00**	4.14	4.12	4.35	4.12†	4.37	4.15†	4.47	4.29
Beliefs												
Condom use	4.70	4.67	4.66	4.54†	4.55	4.51	4.78	4.75	4.70	4.67	4.60	4.68
Condom use hedonistic	2.33	2.32	2.32	2.38	2.33	2.31	2.10	2.14	2.19	2.08	2.10	2.09
Condom use prevention	3.39	3.09**	3.28	3.15†	3.20	3.16	3.45	3.30	3.38	3.38	3.36	3.31
Abstinence	3.03	3.00	2.90	2.80	2.75	2.65	3.16	3.19	3.03	3.06	2.85	2.97
Perceived peer beliefs												
Sexual activity	u	u	2.79	2.90	2.93	3.09	u	u	2.92	2.98	3.11	3.14
Condom use	u	u	4.29	4.22	4.25	4.14	u	u	4.48	4.43	4.30	4.36
Intentions												
To have sex	2.95	2.99	3.01	3.15	3.17	3.32	3.35	3.37	3.33	3.39	3.62	3.54
To use a condom	4.60	4.49	4.53	4.34	4.48	4.46	4.71	4.55	4.56	4.46	4.46	4.46

*p<.05. **p<.01. ***p<.001. †p<.10. *Notes:* Scale ranges were 0–7 for knowledge of STDs and 0–5 for all other outcomes. Immediate posttest models were adjusted for age, gender, sexual experience, neighborhood socioeconomic status and baseline scale value. Follow-up models were adjusted for the same factors plus session attendance. Significance levels for all models reflect adjustment of all standard errors for intragroup correlation (e.g., possible clustering at the school level). u=unavailable.

TABLE 7. Selected measures of facilitator performance and students' perceptions of the intervention and control curricula, according to facilitator and student reports

Measure	Intervention	Control
Facilitator self-reports		
Command of materials (range, 1–10)	8.7	8.6
Rapport with students (range, 1–10)	8.7	8.1
Fidelity to published curriculum (range, 1–4)	3.2	3.2
% of total activities completed	70.2	70.3
Student reports (range, 1–4)		
Instructor's presentation of the materials	3.3	3.0***
Instructor's comfort with the materials	3.5	3.3***
Curriculum's challenge to the way you think about your health	3.1	2.7***
Your comfort with the activities in the curriculum	3.1	3.1
Your potential comfort discussing a personal concern with this instructor	2.5	2.3*
How seriously students took the materials presented	3.5	2.9***
General classroom environment	3.8	3.4***

*p<.05. ***p<.001. *Notes:* Based on facilitator self-reports across the six sessions for 43 intervention and 45 control classrooms, and on student reports from 624 intervention and 715 control participants. Unless otherwise noted, data are mean scores. For all scaled measures, a higher score signifies a more positive rating.

and BPBR students in the 43 classrooms were exposed to an average of 70% of all prescribed activities. However, two activities were routinely truncated or deleted because of time constraints, greatly reducing the overall proportion of completed activities. One was a role-play that followed a lengthy video (both intended to be completed in a single session), and the other was the final activity of the last session, which reviewed previous material. The control group of 45 classrooms also completed 70% of activities.

While facilitators' characteristics and reports of performance did not differ by intervention group, many differences emerged in students' reports of facilitators' performance. On average, students receiving the BPBR curriculum gave higher ratings to their facilitators than did their control peers; they also gave a higher score to the extent to which the curriculum made them think about their health. Finally, when compared with the control group, BPBR students reported that their fellow classmates took the materials more seriously and that the classroom was more orderly.

DISCUSSION

It is essential that all adolescents learn behaviors that can help them lower the risk of acquiring or transmitting HIV and other STDs. Schools are a logical setting for the dissemination of knowledge about HIV prevention and strategies targeted at the reduction of risky sexual behaviors.[20,21] Integrating information about HIV and STD prevention into comprehensive school-based health education programs has led to significant gains in knowledge and has delayed the onset of sexual activity or decreased high-risk behaviors among adolescents.[5,22]

Our results revealed that when delivered in a school-based program, a curriculum whose effectiveness has been demonstrated in nonschool settings was successful in teaching students the fundamental aspects of HIV prevention. Students who attended the BPBR program learned significantly more about HIV, other STDs and condom use than did their peers in the control group, and they retained the information for a year. Most likely because of this increased knowledge and the role-playing activities within the curriculum, they also felt more confident in their ability to use a condom correctly and to negotiate with their partner to use a condom. These results confirm those reported in the original efficacy studies by the curriculum authors.[8,9,23]

Yet despite these apparent successes, the increased knowledge and efficacy did not translate into self-reported behavioral differences, with the exception of one significant finding (regarding students' having discussed a sex-related matter with a health professional). While we did not anticipate finding group differences in sexual initiation, we did hypothesize, on the basis of previous studies, that students exposed to the curriculum would report less frequent sexual intercourse and more condom use than would control students. For the most part, however, students who received the BPBR curriculum were just as likely as controls to have sexual intercourse (including initiation) and were no more likely to carry condoms or to use a condom when asked four and 12 months after the completion of the curriculum. Thus, this study did not replicate the findings of the curriculum's authors.[8,9,23] Moreover, a substantial proportion of adolescents in our study were not protecting themselves against HIV and other STDs by using condoms. For example, at the 12-month follow-up, more than half of the students who were sexually experienced at baseline and who reported having intercourse since the last survey had had unprotected intercourse—accounting for nearly three in 10 episodes—even though two-thirds of all students said they carried condoms or had quick access to them.

We were also interested in determining whether adolescents of different backgrounds and settings from the curriculum's original intended audience would be positively affected by the curriculum. As expected, given the original focus on urban black males, BPBR appeared to resonate differently with males and females, and had a longer term impact (at least regarding cognitive factors) on black teenagers than on white or Hispanic teenagers. However, the most interesting finding was the impact of the curriculum on suburban adolescents. We hypothesized that the curriculum would not resonate with suburban teenagers as much as with their urban counterparts, owing to its urban and ethnocentric focus. It is clear from our results that this was not true.

One possible explanation for the differences we observed among suburban youth may be the amount of prior exposure to information on STDs and on protective behavior. Our results appear to support findings from the Centers for Disease Control and Prevention's School Health Education Profiles Project[24] and other studies[25,26] showing that even though HIV and AIDS information is taught in Ohio high schools, the content varies significantly across communities and, as a result, no uniform prevention message is reaching all adolescents. For example, at the

time of our study, HIV education was offered in 95% of Ohio high schools; however, only 80% of these schools presented information about condom protection, and only 54% discussed the correct use of condoms.[24] Although our replication study concluded in 2002, it is the only analysis of the BPBR curriculum conducted in schools and taught by school personnel—as well as the only one that compares urban and suburban students—and its results are especially relevant given that the proportion of high schools teaching condom knowledge and skills declined significantly between 2000 and 2006.[27]

Interpretations

So, why was BPBR not as effective when implemented in schools as it had been in the original efficacy and subsequent effectiveness studies? A few important differences distinguish the current study from those reported by the original authors. First, the adolescents in our study were significantly older than those in the original studies. Most studies of HIV prevention curricula are conducted with middle school students, but owing to the content of the curriculum and other restrictions, we could not conduct this study in suburban middle schools. Suburban schools, particularly those farther from the city limits (outer-ring suburbs), felt that the only acceptable place for the BPBR curriculum was in the high school.

Second, the program evaluated in previous studies was typically taught in groups of 6–8 adolescents, by trained facilitators committed to the project and the message. Moreover, while the adolescents were sometimes recruited from schools, the curriculum was usually taught on Saturdays, away from the school environment, and significant monetary incentives were provided.[9] It is fair to assume that volunteer participants attending a Saturday program were more engaged than high school students who participated in our study as part of their required school day. In addition, we recruited all students enrolled in high school health classes; thus, our sample was more heterogeneous and perhaps more generalizable than those recruited for the original studies.

Third, while considerable effort was made to maintain high fidelity to the original BPBR curriculum, we dropped one 10-minute activity that is intended to reduce beliefs that condoms interfere with sexual pleasure, and curriculum fidelity was not 100%. In spite of the published time estimates[7] and our belief that the curriculum could be completed within the six days, in 50-minute sessions, on average only 70% of the original 25 activities were completed. However, two particular activities were omitted by all but a quarter of the BPBR classes, and this largely explains the shortfall.

While the fidelity to the curriculum was less than optimal, the class activity completion rate did not differ between the intervention and control groups. This suggests that a curriculum may require more time to complete in the school environment than in smaller groups outside the school, where distractions are fewer. Thus, if a school is limited to six 50-minute class periods, we recommend that the curriculum be adapted and, in particular, that a session include either one video or one role-play activity, but not both.

This study has several strengths, including the heterogeneous sample of urban and suburban adolescents, the randomized study design, the one-year follow-up period and an excellent follow-up rate (92% at one year), especially for a nonvolunteer program conducted in a school population in which nearly a third of urban students moved during the study. In addition, despite calls for independent, third-party evaluations of established interventions,[21] this is among the few that have been conducted of a school-based curriculum focused on teenage pregnancy or HIV prevention.

The results of this study support the role of schools as a viable setting for the dissemination and acquisition of information about HIV, including strategies for prevention. However, they call into question whether the behavioral impact found for the original Be Proud! Be Responsible! intervention is easily transferable when the program is taught within the classroom, by teachers who may not be as effective as a carefully selected outside facilitator in a controlled research study. This is not the first study to reveal that school-based prevention studies often affect knowledge and attitudes more than behavior.[5,21] Systematic reviews of research focused on cardiovascular health promotion and risk reduction in the school environment are consistent with these observations.[28–30] This may be explained, in part, by the reduction in experimental control, but it also may reflect that the moderate effect sizes found in the initial efficacy trials are difficult to sustain once the confounding impact of the school environment is introduced.

Because schools remain the most logical and cost-effective venues for prevention programming, we should continue to examine ways to optimize the school environment for delivering effective prevention messages by emphasizing program fidelity, message control and teacher training.

REFERENCES

1. Centers for Disease Control and Prevention (CDC), *HIV/AIDS Surveillance Report: Cases of HIV Infection and AIDS in the United States and Dependent Areas, 2005,* Atlanta: CDC, 2007.

2. Robin L et al., Behavioral interventions to reduce the incidence of HIV, STD, and pregnancy among adolescents: a decade in review, *Journal of Adolescent Health,* 2004, 34(1):3–26.

3. Holtgrave DR et al., An overview of the effectiveness and efficiency of HIV prevention programs, *Public Health Reports,* 1995, 110(2): 134–146.

4. Kirby D, Laris BA and Rolleri L, *Sex and HIV Education Programs for Youth: Their Impact and Important Characteristics*, Research Triangle Park, NC: Family Health International, 2006.

5. Bennett SE and Nassim PA, School-based teenage pregnancy prevention programs: a systematic review of randomized controlled trials, *Journal of Adolescent Health,* 2005, 36(1):72–81.

6. Bell SG et al., Challenges in replicating interventions, *Journal of Adolescent Health,* 2007, 40(6):514–520.

7. Jemmott LS, Jemmott JB III and McCaffree KA, *Be Proud! Be Responsible! Strategies to Empower Youth to Reduce Their Risk for AIDS, Curriculum Manual,* New York: Select Media, 1996.

8. Jemmott JB III, Jemmott LS and Fong GT, Reductions in HIV risk-associated sexual behaviors among black male adolescents: effects of an AIDS prevention intervention, *American Journal of Public Health,* 1992, 82(3):372–377.

9. Jemmott JB III, Jemmott LS and Fong GT, Abstinence and safer sex HIV risk-reduction interventions for African-American adolescents: a randomized controlled trial, *Journal of the American Medical Association,* 1998, 279(19):1529–1536.

10. Jemmott LS and Jemmott JB III, Increasing condom-use intentions among sexually active inner-city adolescent women: effects of an AIDS prevention program, *Nursing Research,* 1992, 41(5):273–278.

11. Jemmott JB III and Jemmott LS, Interventions for adolescents in community settings, in: DiClemente RJ and Peterson JL, eds., *Preventing AIDS: Theories and Methods of Behavioral Interventions,* New York: Plenum Press, 1994, pp. 141–171.

12. Jemmott JB III et al., Self-efficacy, hedonistic expectancies, and condom-use intentions among inner-city black adolescent women: a social cognitive approach to AIDS risk behavior, *Journal of Adolescent Health,* 1992, 13(6):512–519.

13. Bandura A, Self-efficacy: toward a unifying theory of behavioral change, *Psychological Review,* 1977, 84(2):191–215.

14. Bandura A, A social cognitive approach to the exercise of control over AIDS infection, in: DiClemente RJ, ed., *Adolescents and AIDS: A Generation in Jeopardy,* Newbury Park, CA: Sage Publications, 1992, pp. 89–116.

15. Fishbein M and Ajzen I, *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research,* Reading, MA: Addison-Wesley, 1975.

16. Ajzen I, *Attitudes, Personality, and Behavior,* Chicago: Dorsey Press, 1988.

17. Ajzen I, Theory of planned behavior, *Organizational and Behavioral Human Decision Processes,* 1991, 50(2):179–211.

18. Green SB et al., Interplay between design and analysis for behavioral intervention trials with community as the unit of randomization, *American Journal of Epidemiology,* 1995, 142(6):587–593.

19. Rogers WH, Regression standard errors in clustered samples, *Stata Technical Bulletin*, 1994, 3(13):19–23.

20. Walter HJ and Vaughan RD, AIDS risk reduction among a multiethnic sample of urban high school students, *Journal of the American Medical Association,* 1993, 270(6):725–730.

21. Kirby D, School-based prevention programs: design, evaluation, and effectiveness, in: DiClemente RJ, ed., *Adolescents and AIDS: A Generation in Jeopardy,* Newbury Park, CA: Sage Publications, 1992, pp. 159–180.

22. Kirby D et al., School-based programs to reduce sexual risk behaviors: a review of effectiveness, *Public Health Reports,* 1994, 109(3):339–360.

23. Jemmott JB III et al., HIV/STD risk reduction interventions for African American and Latino adolescent girls at an adolescent medicine clinic: a randomized controlled trial, *Archives of Pediatrics & Adolescent Medicine,* 2005, 159(5):440–449.

24. CDC, Characteristics of health education among secondary schools—School Health Education Profiles, 1996, *Morbidity and Mortality Weekly Report,* 1998, Vol. 47, No. SS-4.

25. Darroch JE, Landry DJ and Singh S, Changing emphasis in sexuality education in U.S. public secondary schools, 1988–1999, *Family Planning Perspectives,* 2000, 32(5):204–211 & 265.

26. Landry DJ, Kaeser L and Richards CL, Abstinence promotion and the provision of information about contraception in public school district sexuality education policies, *Family Planning Perspectives,* 1999, 31(6):280–286.

27. CDC, School Health Policies and Programs Study 2006: HIV Prevention, <http://www.cdc.gov/HealthyYouth/shpps/2006/factsheets/pdf/FS_HIVPrevention_SHPPS2006.pdf>, accessed Feb. 10, 2008.

28. Resnicow K and Robinson TN, School-based cardiovascular disease prevention studies: review and synthesis, *Annals of Epidemiology,* 1997, 7(7, Suppl.):S14–S31.

29. Meininger JC, School-based interventions for primary prevention of cardiovascular disease: evidence of effects for minority populations, *Annual Reviews of Nursing Research,* 2000, 18:219–244.

30. Hayman LL et al., Cardiovascular health promotion in the schools: a statement for health and education professionals and child health advocates from the Committee on Atherosclerosis, Hypertension, and Obesity in Youth (AHOY) of the Council on Cardiovascular Disease in the Young, American Heart Association, *Circulation,* 2004, 110(15):2266–2275.

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