

Effectiveness of a High School Smoking Cessation Program

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ABSTRACT. *Objective.* To evaluate the impact of a school-based smoking cessation program targeting adolescents interested in quitting.

Design. Randomized clinical trial over one school year.

Setting. Large public high school.

Participants. Students interested in quitting smoking.

Intervention. Seventy-four students were randomized to receive either: 1) a 6-week, 8-session, classroom-based, smoking cessation curriculum designed for adolescents ($n = 35$) or 2) an informational pamphlet on how to quit smoking with promise of the classroom curriculum in 3 months ($n = 39$).

Outcome Measures. Change in smoking behavior measured by: 1) self-reported smoking cessation and exhaled carbon monoxide <6 parts per million (smoke-free); 2) self-reported quit attempts; and 3) change in cigarettes per day (cpd) at the end of the 6-week curriculum and then 4, 10, and 20 weeks later. Saliva cotinine was also measured at these points to validate these outcome measures.

Analysis. Intention-to-treat.

Results. Participants in the classroom group attended an average of 4.4 sessions. At the end of the curriculum, the classroom group was significantly more likely to be smoke-free (59% vs 17%), to have tried to quit smoking (82% vs 54%), and to reduce mean cpd (7.0 vs 1.0). Four weeks later, these differences persisted: smoke-free (52% vs 20%), quit attempt (85% vs 60%), and reduction in mean cpd (6.6 vs 1.6). Changes in saliva cotinine were consistent with reported outcome measures; those who were smoke-free had a significant reduction in saliva cotinine at the end of the intervention, and at 4 weeks. At 10 and 20 weeks after the curriculum, 41% and 31%, respectively, of the classroom group remained smoke-free. Once participants in the pamphlet group underwent the classroom intervention (average attendance of 2.2 sessions) their cessation rates were similar to the initial group: 31% at the end of the curriculum and 27% 10 weeks later.

Conclusion. A school-based curriculum for adolescent smoking cessation is more effective than an informational pamphlet alone and reduces cigarette use by adolescents. More research is needed to test the reproducibility, sustainability, and generalizability of this curriculum to offer more smoking cessation options to

teenagers. *Pediatrics* 2001;107(4). URL: <http://www.pediatrics.org/cgi/content/full/107/4/e50>; adolescent, smoking, cessation, high school, randomized clinical trial.

ABBREVIATION. cpd, cigarettes per day.

More than one third of high school students in the United States smoke cigarettes.¹ Seventy percent of 12- to 17-year-old smokers regret smoking,² and 3 of 4 young smokers have tried to quit at least once in adolescence and failed.³ The need for effective youth tobacco cessation programs has been recognized by many organizations, including the Centers for Disease Control and Prevention,⁴ the American Medical Association,⁵ the Institute of Medicine,⁶ the office of the Surgeon General of the United States,⁷ the Public Health Service,⁸ and the US Department of Education.⁹ In marked contrast to the number of effective adult smoking cessation interventions that have been developed and tested,¹⁰⁻¹⁵ few interventions to assist adolescents with smoking cessation have been developed or evaluated.¹⁶⁻²⁶ Most cessation studies among adolescents have been nonrandomized, uncontrolled, or single-group studies, with varying endpoints and inconsistent use of biochemical validation of self-report.²⁷ To our knowledge, no rigorous controlled trials have been published that evaluated the effectiveness of an organized approach to adolescent smoking cessation.²⁸

The purpose of this study was to determine the impact of a high school-based smoking cessation program targeting smokers interested in quitting. We were interested in answering the following questions: 1) In the short-term, is a school-based, multiple-session smoking cessation program more effective than a pamphlet on how to quit smoking among teenagers who express interest in quitting?; and 2) Over the course of one school year, how effective is a school-based program for achieving smoking cessation, cessation attempts, and overall smoking reduction?

METHODS

Setting

Students at a large public high school in Baltimore City, who smoked cigarettes and who were interested in quitting, were invited to participate through flyers posted at the school, public address announcements, and word of mouth from the school's health center.

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Participants

Seventy-four students expressed interest and enrolled in the study during the 2-week enrollment period in October 1998. No individuals who requested information about the program declined participation. Enrollment occurred on a rolling basis at the school health center and was available to any student enrolled in the school who expressed interest in the program. Signed informed consent was obtained from all participants. After completing a baseline assessment, which included completion of a questionnaire, measurement of exhaled carbon monoxide, and provision of saliva samples for cotinine levels, students were randomized to 1 of 2 groups. Students in group 1 received the smoking cessation curriculum immediately after the enrollment period; those in group 2 received an educational pamphlet on how to quit smoking,²⁹ were told, "we encourage you to quit smoking on your own," and were offered participation in the curriculum in 3 months. Follow-up with a 1 page questionnaire and measurement of exhaled carbon monoxide and saliva cotinine occurred at the same 4 points in time for both groups: at the end of the intervention for group 1 and then 4, 10, and 20 weeks later. These times correspond to 8 and 12 weeks after pamphlet distribution for group 2, at the end of the classroom intervention for group 2, and 10 weeks postintervention for group 2 (Figs 1 and 2). The same individual taught the curriculum for all participants.

Randomization

Randomization was performed using a random numbers table. A blocked randomization scheme was used with block sizes randomly ranging from 2 to 8. The randomization sequence was generated at a site distant from the intervention, by a research assistant who was not involved in determination of student eligibility or enrollment in the study. Assignment was determined using 80 sequentially numbered, sealed opaque envelopes containing group designation. The sealed envelopes were kept at the academic offices of the investigators, away from the intervention site. After enrollment of each participant, the principal investigator (W.P.A.) called the academic office, where a secretary opened the next study envelope and reported the group assignment. Study enrollment and group assignment logs were maintained at

the academic office and at the intervention site. After the enrollment period, an audit of the logs revealed that there were no discrepancies in group assignment. Masking of the curriculum leader and the students was not possible because assignment consisted of classroom-based intervention or pamphlet.

Intervention

Preliminary studies in Baltimore in 1997 and 1998 allowed us to formulate a high school smoking cessation curriculum that consisted of eight 50-minute sessions administered over a period of 6 weeks (W. P. Adelman, unpublished data). Curriculum development was guided by information gathered in preliminary focus groups, directed interviews, and current teen³⁰ and adult smoking cessation programs.³¹

The program took place in an auxiliary classroom during the school day. Session 1 consisted of introductions and team-building skills. Session 2 consisted of self-identification of personal smoking habits and perceived barriers to quitting. Session 3 was devoted to individual and group problem solving to develop strategies for quitting. Sessions 4 and 5 were devoted to practicing these solutions. Session 6 focused on mental and physical preparedness to quit smoking and was highlighted with a quit ceremony. Sessions 7 and 8 were devoted to prevention of relapse and dealing with withdrawal symptoms. Each session was planned to be independently useful to the participant, with review and implementation of concepts introduced in previous sessions.

Baseline Data Collection

At baseline, each participant completed a questionnaire that included basic demographic information and a smoking history (age of first cigarette, years of regular smoking, daily smoking habits, previous 30-day smoking history, previous quit attempts, preferred brand, and smoking status of friends, household members, and relatives). Nicotine dependence was assessed using a modified Fagerstrom Tolerance Questionnaire, an instrument previously validated for adolescents.³² This 7-item scale is scored from 0 to 9; a score of 6 or above is considered to represent a high level of nicotine dependence. Each participant was asked to identify his or her thoughts about quitting on first hearing of the

Study Week		0	6	10	16	26			
Month		<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>
Students Interested	Group 1	O _b	X-----X	O ₁	O ₂		O ₃		O ₄
Quitting Smoking	Group 2	O _b	Pamphlet	O ₁	O ₂	X-----X	O ₃		O ₄

Where R = Randomization

X = Classroom based Smoking Cessation Program

O = Measurement of smoking behavior

O_b = baseline measurements

O₁- O₄ = follow up measurements

Fig 1. Study timeline.

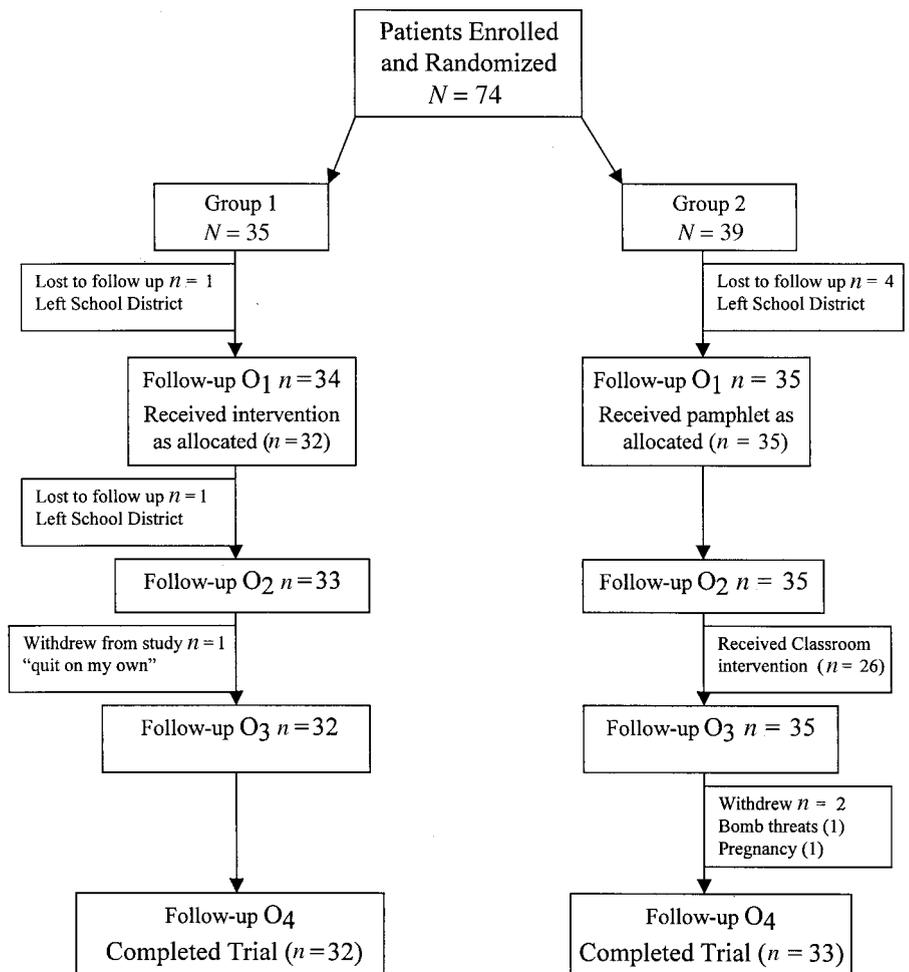


Fig 2. Study flow.

program and was then assigned 1 of 5 stages of change^{33,34}: precontemplation, contemplation, preparation, action, and maintenance. Self-efficacy regarding ability to quit smoking was measured by 7 questions: "How confident are you that you will be able to quit smoking?" and "How confident are you that you will be able to resist smoking in the following situations: at home?, at a friend's house?, at a party?, at school?, when bored?, and when stressed out?" Responses were scored on a 6-point scale ranging from "I am completely sure I will NOT quit [resist] smoking" (score = 1) to "I am completely sure I will quit [resist] smoking" (score = 6). The questions were weighted equally, and an average score was computed as a measure of baseline self-efficacy. Data entry was performed by the principal investigator and checked by the research assistant for accuracy.

Two biochemical measures were collected at baseline: saliva cotinine and exhaled carbon monoxide. Saliva cotinine was obtained by having each participant spit 2 mL of saliva into a 15-mL polypropylene test tube. Samples were then placed in a cryofreezer at -80°C and shipped in bulk at the end of the study. Saliva cotinine analysis was performed by an outside laboratory (Labstat Inc, Kitchener, Ontario, Canada), which received saliva samples marked only with the participants' unique study identification numbers. Exhaled carbon monoxide was measured with the BreathCO (Vitalograph, Lenexa, KS) carbon monoxide monitor as per manufacturer's instructions, to validate claims of current smoking status.

Outcome Variables

Our primary outcome variable was whether the participant quit smoking. Students were considered to have quit smoking if they met all of the following 4 criteria: 1) self-identification as a nonsmoker; 2) individual report of being smoke-free from an identifiable quit date; 3) smoke-free status for at least 5 days before the observation point; and 4) an exhaled carbon monoxide level

≤ 5 parts per million. Other outcome variables were: 1) whether the participant tried to quit smoking (independent of quit status), as measured by self-report via questionnaire; 2) reduction in cigarettes smoked per day as measured by the difference between baseline and follow-up cigarettes smoked per day; 3) changes in thoughts toward quitting as measured by baseline to follow-up differences in stage of change and mean self-efficacy score; and 4) difference in saliva cotinine.

Sample Size

Our initial target sample was 60 students. Using assumptions from the adult and adolescent smoking cessation literature, we expected 5% of motivated teenagers to quit smoking on their own. Based on preliminary data from pilot studies of our curriculum, we anticipated 60% of students to be smoke-free at the end of the program. Conservatively estimating a 40% quit rate in the intervention group, we calculated the need for at least 27 students per group to detect an absolute difference in quit rates of 35% (40%–5%) with power = 0.8, $\alpha = 0.05$ (*Stata, Release 5 Statistical Program*, Stata, College Station, TX). Our budget allowed us to enroll up to 80 students. We planned to end enrollment after a preset period of 2 weeks, assuming we had enrolled a minimum of 60 students. At the end of the enrollment period, 74 students had enrolled.

Data Analysis

Dichotomous outcomes were analyzed with χ^2 test and Fisher's exact test for differences in proportions. Continuous outcomes were analyzed with the Student's *t* test. To compare results between group 1 and group 2, we used an intention-to-treat analysis. Statistical analysis was performed with the statistical package *SPSS, Version 8.0* (SPSS, Chicago, IL).

Ethical Review

The institutional review boards of the Johns Hopkins University School of Medicine and the City of Baltimore Health Department approved the study.

RESULTS

Groups 1 and 2 were similar at baseline in most respects (Table 1). There were trends toward group 1 participants being older and having smoked longer than the group 2 participants.

At the end of the intervention, group 1 participants were significantly more likely to have quit smoking (Table 2). Fifty-nine percent of group 1 compared with 17% of group 2 were smoke-free immediately after the intervention for group 1 ($P < .001$). This difference persisted at 4 weeks after the end of the intervention, when 52% of group 1 versus 20% of group 2 were smoke-free ($P = .03$). Once group 2 received its school-based curriculum, there was no longer a difference between the groups. (See observation points 3 and 4 in Table 2.) Saliva cotinine levels for individual quitters dropped dramatically, and there is a significant difference in mean cotinine levels when quitters are compared with nonquitters (Fig 3).

This pattern holds true for secondary outcome variables as well: quit attempts and mean reduction in cigarettes smoked per day. Immediately after the intervention for group 1, 82% of group 1 versus 54% of group 2 had attempted to quit smoking ($P = .02$). This difference persisted 4 weeks after the intervention, with 85% of group 1 compared with 60% of

group 2 reporting that they had attempted to quit ($P = .03$). Similarly, at the end of the intervention for group 1, group 1 reduced daily smoking by an average of 7 cigarettes per day (cpd) compared with an average reduction of just 1 cpd in group 2 ($P < .001$). This too persisted 4 weeks after the intervention for group 1 (6.5 cpd vs 1.5 cpd; $P < .001$). After the school-based curriculum for group 2, no significant difference was apparent in quit attempts or mean cpd reduction.

Sixty-two of the original 74 students answered the stage of change follow-up question. Although only 3 of them (4%) considered themselves to be postpreparation stage at baseline, 33 (44%) identified themselves as either in the action or maintenance phase of smoking cessation at the end of the school year (Table 3).

Mean self-efficacy scores significantly improved after the intervention. The mean self-efficacy score was significantly higher for each group at the end of the school year compared with baseline. Those who were smoke-free at the end of the school year had higher baseline self-efficacy scores than did those who were not successful in quitting. Those who were successful in quitting smoking showed significant improvements in mean self-efficacy, whereas those who did not quit failed to improve their self-efficacy scores (Table 4).

Through the course of the school year, 23% of the 74 study participants left school. These were evenly divided between group 1 ($n = 9$) and group 2 ($n = 8$).

TABLE 1. Baseline Characteristics by Study Group*

	Group 1 <i>n</i> = 35	Group 2 <i>n</i> = 39	<i>P</i> Value
Male	40%	31%	.47
Age	16.2 ± 1.4	15.6 ± 1.2	.07
Grade			
9th	26%	33%	.28
10th	23%	31%	
11th	28%	18%	
12th	23%	18%	
White	51%	56%	.79
Age at first whole cigarette	12.3 ± 2.6	12.6 ± 1.6	.55
Years smoked	3.8 ± 2.4	3.0 ± 1.61	.07
Previous quit attempts	1.74 ± 1.6	1.82 ± 2.0	.86
No previous quit attempts	29%	36%	.28
Mean mFTQ score	4.46 ± 2.2	4.0 ± 1.8	.33
mFTQ ≥6	37%	26%	.32
Mean cpd at max smoking	13.4 ± 10.5	13.1 ± 11.4	.92
Days smoked past 30 d	24.6 ± 9.0	24.9 ± 8.8	.96
Days smoked in past 7 d	5.9 ± 2.0	6.1 ± 1.7	.72
Mean cpd at start of program	10.0 ± 7.7	8.5 ± 6.1	.37
Mean saliva cotinine (ng/mL)	158.0 ± 144	156.4 ± 126	.96
Stage of change			
Precontemplation	31%	46%	.18
Contemplation	11%	10%	
Preparation	54%	38%	
Action	3%	5%	
Self-efficacy score	3.6 ± 1.2	3.4 ± 1.1	.49
Smoke menthol cigarettes	86%	92%	.47
Smoke Newport	86%	85%	.89
Parent knows you smoke	66%	64%	1.00
Number of other smokers at home	1.9 ± 1.4	2.0 ± 1.7	.58
Best friend smokes now	66%	72%	.62

mFTQ indicates modified Fagerstrom Tolerance Questionnaire.

* Mean values displayed as mean ± standard deviation.

TABLE 2. Outcome Variables

Outcome Variable	Ob	Intervention	O1	O2	Intervention	O3	O4
Quit smoking							
Group 1	0	Curriculum	59%	52%		44%	34%
Group 2	0	Pamphlet	17%	20%	Curriculum	31%	27%
<i>P</i> value	—		<.001	.01		.32	.60
Tried to quit smoking							
Group 1	0	Curriculum	82%	85%		100%	100%
Group 2	0	Pamphlet	54%	60%	Curriculum	94%	100%
<i>P</i> value	—		.02	.03		.49	—
Mean cpd*							
Group 1	10.0	Curriculum	2.8 ± 5.7	3.4 ± 6.2		3.2 ± 5.4	3.8 ± 5.5
Group 2	8.5	Pamphlet	7.4 ± 7.4	6.8 ± 6.4	Curriculum	4.9 ± 5.5	5.2 ± 5.9
<i>P</i> value	.37		<.01	.03		.22	.30

Ob indicates baseline measurements of smoking behavior; O1–O4, follow-up measurements of smoking behavior.

* Mean values displayed as mean ± standard deviation.

Smoking cessation program attendance varied considerably between the groups. On average, group 1 attended over one half of the sessions (4.4), whereas group 2 attended only slightly more than one quarter (2.2). Seventy-eight percent of participants attended at least 1 session, 42% attended 4 or more, and 27% attended 6 or more sessions. Group 1 participants who attended at least 5 sessions were significantly more likely to quit compared with those who attended 1 to 4 sessions at observation points 1 (79% vs 38%; *P* < .01) and 2 (74% vs 25%; *P* < .01). The 3 participants who attended all 8 sessions remained smoke-free through the entire school year. In group 2, attendance did not significantly impact quit rates.

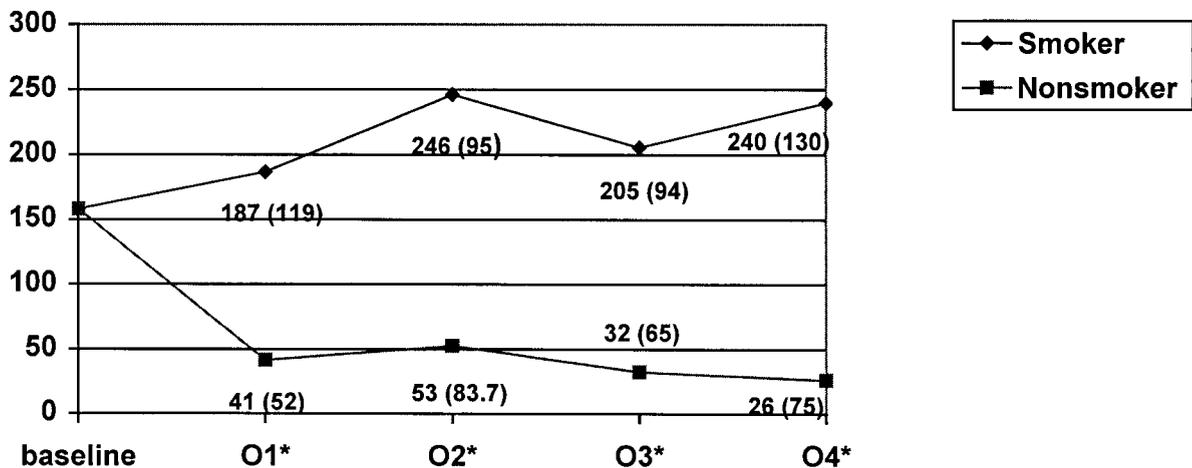
DISCUSSION

The effect of our intervention was robust. Naturally occurring adolescent smoking cessation rates over a 6-month period range from 0% to 11%.^{35,36} In a recent review of 12 adolescent smoking cessation programs, the mean quit rates immediately postintervention ranged from 0% to 36% with a mean of 20.7%. These numbers dropped to 13% at follow-up periods of 1 to 6 months.²⁷ In our intervention, group 1 had a postintervention quit rate of 59% and group

2 (after receiving the classroom intervention) had a quit rate of 31%. Overall, at the end of the school year, 30 weeks after initial study enrollment, 27% of our original sample members were smoke-free.

A strength of our study is our randomization and use of a control group. Of interest is that our control group had a postintervention quit rate of 17%, with 54% stating that they tried to quit smoking. Although the classroom intervention had a significantly greater impact on smoking cessation and attempts, the impressive rates of cessation and attempted cessation for those given only educational smoking cessation materials is encouraging and underscores the need for including a control group in adolescent smoking cessation research.

Our definition of smoke-free consisted of psychological and biochemical dimensions, and we required criteria to be met in both areas for an individual to be considered to have quit smoking. In this study, some individuals who considered themselves smokers but reduced smoking or inhaled infrequently had biochemical markers suggesting that they were smoke-free (eg, saliva cotinine <14 ng/mL or exhaled CO <6 ppm). Had we not included self-identification as a criterion, biochemical verification



* Differences between smoker and nonsmoker significant at *P* < .001.

Fig 3. Mean cotinine in ng/mL (standard deviation) at baseline and for smokers and nonsmokers at observation points 1 through 4.

TABLE 3. Stage of Change of Participants at Observation Point Four

	Group 1 (<i>n</i> = 30)	Group 2 (<i>n</i> = 32)
Precontemplation	17%	12%
Contemplation	10%	25%
Preparation	13%	16%
Action	23%	19%
Maintenance	37%	28%

with recent smoking history alone would have misclassified 16 of the original 74 smokers as nonsmokers (21%) on at least 1 follow-up observation point. Previous studies^{18,22–26} that failed to include self-identification as a nonsmoker as a criterion for cessation may be overestimating the effect of their intervention.

We required self-report of continuous abstinence from an identifiable quit date for students to be considered smoke-free. Our goal was to identify individuals who stopped smoking and did not relapse. However, we did not wish to penalize individuals who required >1 cessation attempt to achieve successful abstinence. We chose 5 days as a minimum period from most recent quit attempt because students identified persistence to 5 days as necessary to overcome the withdrawal symptoms that most commonly cause relapse. Our high cessation rates, considering our strict definition of cessation, further support the value of this school-based curriculum.

The use of biochemical validation with adolescents is controversial.^{16,37,38} Among adults, this issue has been well evaluated and biochemical verification has been demonstrated to be valid.^{39–41} The adult model is based on adult smoking patterns, which are characterized by addiction and need for maintenance of a physiologic steady-state of nicotine.⁴² These assumptions have not been validated in an adolescent population. In fact, research comparing adolescents and adults who smoke the same number of cpd reveals significantly lower measures of addiction scores and cotinine levels in adolescents.^{19,32}

We chose a carbon monoxide cutoff point of ≤ 5 parts per million to acutely differentiate smokers from nonsmokers. In an adolescent population where smokers inhale inconsistently or smoke only intermittently, a higher cutoff would misclassify too many smokers as nonsmokers. A similarly low cutoff point of 6 ppm has been used previously in an adolescent sample.¹⁸ In our study, all individuals with exhaled CO >5 ppm confessed to having smoked within the previous 24 hours.

Individually, saliva cotinine levels supported self-report and cessation observations made with exhaled CO validation. We observed that saliva cotinine levels drop significantly in self-reported quitters and that there is a significant difference in mean saliva cotinine between self-reported smokers and quitters. However, wide variability of cotinine levels with overlap between smokers and quitters was also noted. Additional research is needed in the areas of smoking topography and the role of biochemical verification in smoking cessation programs for adolescents.

TABLE 4. Changes in Self-Efficacy by Study Group and Quit Status*

	Baseline	Observation 4	<i>P</i> Value
Group 1	3.6 \pm 1.2	4.1 \pm 1.4	.02
Group 2	3.4 \pm 1.1	3.9 \pm 1.4	.02
<i>P</i> value	.49	.61	
Quit smoking	4.0 \pm 1.3	5.5 \pm 0.6	<.01
Smoker	3.2 \pm 1.0	3.3 \pm 1.0	.20
<i>P</i> value	.01	<.001	

* Mean values displayed as mean \pm standard deviation.

Previous research in adolescents has shown a positive association between number of quit attempts and quit rates.^{43,44} Thirty-two percent of those in this study had never tried to quit smoking before enrollment. At the end of the school year, our entire sample reported making a new, serious cessation attempt, which suggests that our intervention promotes quit attempts. Among those still smoking, the significant reductions in tobacco use that we observed are similar to results previously reported.^{16,19,24,45}

Intention to smoke in the future is inversely related to quitting.⁴⁶ Our intervention decreases intention to smoke in the future, as measured by participant's stage of change and mean self-efficacy score at enrollment and at the final observation point. Previous research suggests that individuals benefit most from an action-oriented smoking cessation program once they have reached the preparation stage.⁴⁷ Many advocate a need for interventions for individuals in stages that precede preparation to maximize chances of later cessation.^{28,48,49} Participants in our intervention underwent a marked progression in stage of change. This suggests that a school-based smoking cessation intervention may attract participants in stages before preparation and move individuals along the stages of change.

Our self-efficacy measure was created based on preliminary studies that identified domains where teenagers believed that being smoke-free was most difficult. The inherent value of such a score is supported by the observation that those who succeeded in quitting smoking had higher mean self-efficacy scores at baseline than did those who failed. Both group 1 and group 2 had significant increases in mean self-efficacy at the end of the school year, which may suggest that specific cessation skills increase self-efficacy. Stage of change and self-efficacy measures may be important intermediate outcomes in cessation trials and deserve additional study.

The discrepancy in attendance between the groups is best explained by the time of year when the interventions occurred. Two of the 9 school withdrawals from group 1 occurred before the intervention, whereas all 8 of the school withdrawals from group 2 occurred before their intervention. Although participants who withdrew from school could not receive the intervention, they were not excluded from the intention-to-treat analysis and most also were available for follow-up (Fig 2). It is also possible that smokers motivated to quit are more likely to succeed when they receive the intervention immediately after

enrollment instead of waiting. The intervention may have reached more students if it had occurred early in the school year for all participants. Therefore, we believe that a school-based intervention is most likely to be successful when offered early in the school year.

This study has several limitations. First, outcome variables such as cigarettes smoked per day relied on self-report. Although reports were consistent with biochemical measures, accuracy of self-report among teenagers in a smoking cessation study requires additional research.

Second, although group 2 members were encouraged to quit on their own, they were promised the curriculum later in the school year if desired. It is possible that group 2 students did not attempt to quit initially, anticipating quitting with the curriculum later in the year. This seems unlikely considering the high cessation rate among group 2 members before the intervention.

Third, it is possible that the students in the intervention group quit smoking as a result of the increased attention received as part of the study and not because of the content of the curriculum per se. Our curriculum included measures of saliva cotinine and exhaled CO and the independent effects of these items within the intervention are difficult to measure. Reproduction of the curriculum without these elements may produce different results. Finally, this study was performed in one high school in one city, based on a curriculum formulated from preliminary studies conducted in the same city; it may not be generalizable to other populations.

We conclude that a school-based curriculum for adolescent smoking cessation has a measurable impact on the smoking habits of participants and is more effective than educational brochures alone for achieving smoking cessation, promoting quit attempts, reducing cigarettes smoked per day, and diminishing intention to smoke in the future. The school-based model shows promise for promoting smoking cessation among teenagers. Additional research is warranted to study the reproducibility, sustainability, and generalizability of this intervention to provide more options for adolescent smoking cessation.

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