

# Using Mass Media to Prevent Cigarette Smoking Among Adolescent Girls

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This article describes the development of a mass media smoking prevention intervention targeted primarily toward adolescent girls at increased risk for smoking and assesses its outcomes. A cohort of 5,458 students was surveyed at baseline in Grades 4-6 and annually for 4 years. Through diagnostic and formative research, media messages were created to appeal especially to girls. Students beginning in Grades 5-7 received the 4-year media intervention and a school program in two communities, while students in two matched communities received the school program alone. Media targeting techniques resulted in high levels of message appeal and exposure consistent with effects on mediating variables and 40% lower weekly smoking at Grades 8-10 for girls receiving the media and school interventions compared to school alone. Smoking behavior effects were maintained at Grades 10-12. These results indicate that mass media interventions targeting specific audience segments can reduce substance use behavior for those segments.

## INTRODUCTION

Increased cigarette smoking among women during the past half century has been reflected in large increases in smoking-related morbidity and mortality.<sup>1-5</sup> Nearly all recruitment of new smokers among females and males occurs during adolescence. Adolescent smoking rates have not decreased substantially in the past decade, foreshadowing continued high rates of smoking-related diseases for women as well as for men and putting new urgency behind efforts to develop more effective smoking prevention strategies.<sup>6</sup>

School-based cigarette smoking prevention programs that are focused on students in Grades 6-8 consistently have achieved reductions in smoking initiation that persist into

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the early high school grades,<sup>7,8,9</sup> but these effects usually eroded by the end of high school.<sup>10-13</sup> More promising long-term results have been obtained when school smoking prevention programs were combined with other channels of influence on young people.<sup>14,15</sup>

Smoking prevention program effects seldom are reported by gender,<sup>13</sup> and gender issues rarely are considered explicitly in program design or development, nor are they well understood.<sup>16-19</sup> A central feature of this cigarette smoking prevention study was an intensive program development process<sup>20</sup> that enabled us to target subgroups by gender, developmental level, and risk for smoking adoption during both program design and implementation. This article describes the emphasis placed in the design process on addressing the needs of adolescent girls at increased risk for cigarette smoking and reports the impact of interventions on this group.

## METHODS

The major goal of this study was to test the ability of a targeted mass media intervention to enhance the effectiveness of a school smoking prevention program.<sup>20,21</sup> The study design included two treatment groups: Students received either a mass media intervention combined with a school program or a school program only over a 4-year period. Each treatment condition was implemented in two small metropolitan areas. Annual classroom surveys of students in the study cohort were conducted over a 5-year period in each community to assess changes in smoking behavior and mediating variables, exposure to the interventions, and mass media use preferences; an additional school survey was conducted 2 years after the program was completed to assess long-term impact on smoking behavior.<sup>22</sup> Two matched pairs of Standard Metropolitan Statistical Areas (SMSAs) were selected using U.S. Census data; one pair was located in the northeastern United States, and one pair in Montana. Within each matched pair, one community received the media-school intervention while the other received the school-only intervention. Community selection was based on demographic and media market characteristics. Study samples were matched further with selection of specific school districts and feeder school units within these four SMSAs having lower adult educational attainment. An initial cohort of 5,458 students from the four SMSAs was established in Grades 4, 5, and 6 in Spring 1985.

### Mass Media and School Programs

Common educational objectives for the school and mass media programs were based on social learning theory and related behavior change theories.<sup>23-29</sup> Four primary educational objectives were established that encouraged young people to (a) have a positive view of nonsmoking, (b) have a negative view of smoking, (c) have skills for refusing cigarettes, and (d) have the perception that most people their own age do not smoke. Additional objectives concerned with cessation skills and awareness of tobacco marketing to youth were added later.

The mass media program consisted of television and radio messages or "spots" produced for the study; each spot was either 30 or 60 seconds in length. The spots were designed to address the educational objectives and to appeal to the interests of the target

audience as determined by diagnostic and formative research conducted with students in the study communities.<sup>20</sup> Spots were placed as local paid advertising in the broadcast television programs, cable TV channels, and radio stations used most often by our target population. To ensure variety in production style, we commissioned six different media producers over 4 years to create 36 television spots and 17 radio spots in formats appealing to the target groups: situation comedy, rock video, cartoon, testimonial, and drama. The mix of spots was changed over time to keep pace with the maturing tastes of the target groups. An average of 190 broadcast TV, 350 cable TV, and 350 radio exposures were purchased in each of the 4 program years in each of the two targeted media markets. These were supplemented by time donated by media outlets increasing the total number of spot broadcasts by about 50% in each market.

The school smoking prevention program for all four communities covered Grades 5-10 and included grade-specific curricular materials, annual teacher training, and monitoring of program implementation. It was delivered by regular classroom teachers and required either three or four class periods per year over 4 years.<sup>7</sup> The three-grade study cohort was exposed to either the school program only or the combined mass media and school programs in Grades 5-8, Grades 6-9, or Grades 7-10.

Although the school program and media intervention shared common educational objectives, they were otherwise independent. This strategy assumed that the interventions would be more effective if presented to the adolescent audiences as coming from multiple, independent sources conveying similar ideas about smoking.

### Mass Media Program Development

The intervention programs were planned to extend over the period of highest risk for adoption of cigarette smoking by the target group. This is also the period of transition through puberty into adolescence. To account for rapidly changing needs and interests of the target group during this time, we designed the mass media campaign to be sensitive to program content, styles, and delivery channels that would reach higher-risk girls and boys most effectively as they matured from prepuberty (Grades 5 and 6) to puberty (Grades 7 and 8) to adolescence (Grades 9 and 10). The six major audience segments were identified as higher-risk girls and boys at each of these three developmental levels.

The ages of most rapid pubertal change is about 12 years for girls and about 14 years for boys, suggesting that girls would be more mature during the earlier stages of the campaign and therefore have an increased predisposition toward smoking in the initial campaign period. National data at that time indicated that by the end of high school more girls than boys were smoking cigarettes.<sup>6</sup> These considerations provided a rationale for orienting the larger part of the media campaign to appeal to the interests of higher-risk girls.

*Diagnostic Phase.* The diagnostic phase consisted of data collection visits with higher-risk students in the study communities to gather information about cigarette smoking experiences, perceptions and attitudes, favorite leisure activities, persons they admire, wishes, styles, media habits, and television viewing patterns. Students who had a history of smoking or reported two or more smoking influences in their immediate environment were considered to be at higher risk. These data were collected first in small-scale surveys with classroom groups of higher-risk students, then were discussed in focus groups with these students. Data were analyzed according to gender and risk of smoking initiation.

The initial diagnostic research targeted Grades 5-8, representing the first and second stages of adolescent development. A second round of diagnostic research occurred midway through our program and targeted Grades 7-10, representing the second and third stages of adolescent development. For each diagnostic visit, one classroom judged by school administrators to contain a substantial number of higher-risk students was surveyed in each of the four targeted grades in each of two communities. Results, transcripts, and interpretations from these surveys and from the subsequent focus groups of students were summarized by gender in large loose-leaf binders called Writers' Notebooks, which were used as source material in the creation of spot concepts and scripts.

*Formative Phase.* Writers' Notebooks and statements of overall educational objectives were provided to media producers to guide them in creating appropriate script concepts. Producers returned a variety of concepts for review by the research team, and those that were educationally appropriate and potentially attractive were selected for development as preliminary TV or radio spots. These were produced in the form of loosely edited videos, sketched storyboard simulations, or audio messages. Preliminary spots were pretested in study communities with representative classroom groups of higher-risk students. Students rated each spot for coverage of major objectives, overall liking, and liking of specific elements; these data were used, in combination with expert opinion, to select spots that would be produced in finished form for broadcast.

*Implementation Phase.* The main task of the implementation phase was to deliver an optimal mix of the educational messages to each audience segment at an adequate level of intensity. Formulating an optimal mix of spots for each of the six audience segments required selection of spots that were found to appeal to the specific segment in spot pretests and that represented a balanced coverage of the educational objectives as judged by students in the pretests.

The mix of selected spots was placed in television programs and on radio stations that were highly preferred by an audience segment. Media preferences for each audience segment were ascertained through diagnostic and formative research conducted with small groups and through annual population-wide school surveys. Using this information, spots appealing to higher-risk girls in our formative research were assigned to slots in broadcast TV programs and on cable TV channels that these girls reported watching most often, usually in afternoon soap operas or situation comedies. Radio spots were placed on one radio station in each market that was clearly preferred by higher-risk students above all other stations.

The annual school surveys also provided information on student exposure to and preferences for individual spots that had been aired in the previous year, so that spots no longer preferred were replaced by newly produced, more age-appropriate spots in the following year. Thus the mass media intervention was modified during each of the 4 years of the campaign to match the rapidly changing tastes and needs of each gender and age group.

### **Measurement and Data Analysis**

Smoking behavior was assessed by determining the number of cigarettes the respondent had smoked in the past week. Those who reported smoking one or more cigarettes in the past week were classified as "weekly smokers." Collection of saliva samples at the

time that self-reports of cigarette smoking are provided has been shown to increase the accuracy of self-reports among adolescents when the ability to detect cigarette use through analysis of saliva samples is explained to the survey participants.<sup>30</sup> Saliva samples were collected using these procedures from students in all six classroom surveys conducted for this study to enhance the accuracy of cigarette smoking self-reports.

Most of the major mediating constructs defined by the educational objectives were measured with multiple item scales that had good internal consistency reliability. These mediators included "advantages of smoking" (seven items, range of scores 0-7, Cronbach's alpha = .75), "attitude toward smoking" (three items, range 0-3, alpha = .84), "perceived peer smoking" (three items, range 3-15, alpha = .70), and a single item measure of smoking intentions. All scales were coded so that higher values were associated with higher risk for cigarette smoking.

Media exposure and message appeal were evaluated using chi-square tests. Comparisons between treatment groups on mediating and outcome measures were performed using analyses of variance that considered communities, not individual students, as the units of allocation to treatment. *F* tests were used to test whether the two treatment groups showed parallel changes over time. For these tests, community within treatment by time was used as the error term.<sup>31</sup> The sums of squares corresponding to the overall time by treatment interaction was further partitioned using orthogonal polynomials into its quantitative components (i.e., linear, quadratic, cubic). The *F* test presented for each dependent measure corresponds to the contrast representing the linear component of this change, as it specifically tests whether the rate of increase is equal for the two treatment groups.

## RESULTS

These results present diagnostic and formative research data that guided the development of the media intervention and evidence for impact on targeted psychosocial mediating variables and smoking behavior measures.

### Diagnostic Research Results

Classroom surveys and focus groups were conducted with 191 students in Grades 5-8 in two study communities for the first round of diagnostic research in 1985; 206 students in Grades 7-10 from two other study communities participated in the second round in 1987. A review of information collected on leisure activity preferences in these two diagnostic rounds indicated that younger students tended to prefer more athletic and physical activities and the older students tended to prefer more social activities. Television program preferences showed, in a consistent pattern across developmental levels, that girls generally preferred programs focused on social relationships while boys preferred action-oriented programs.

Diagnostic data from the first round, combined with findings from adolescent development literature,<sup>32</sup> were interpreted by the research team and summarized as guidelines for implementing the overall educational objectives within each developmental level and gender. For the prepuberty grouping (Grades 5-6), these guidelines emphasized a need to provide information supporting decisions to become a nonsmoker, model ways to refuse

cigarettes, model coping with social pressures without smoking, and model feeling mature and independent without smoking. The guidelines for the Grade 7 and 8 grouping emphasized that girls in this age group wanted to look older and more attractive to older boys, and they wanted to feel like they were on their own, coping successfully with social stressors. These guidelines suggested message concepts highlighting social influences and featuring positive female role models.

The results of the second round of diagnostic activities generally affirmed the findings of the earlier round for those at the Grade 7 and 8 level, while showing few differences between that level and the Grade 9 and 10 level. A notable exception was the mention of time spent in cars, which became prominent for girls only at the Grade 9 and 10 level; in further discussion with focus groups, it was evident that this increased mobility translated into less time spent watching television, particularly on weekends. This information suggested a reduction of weekend spot placements on television for students in these grades and an increase in placements on radio.

### Formative Research Results

Twenty-three message concepts were selected for production in pilot versions in the initial program year and were pretested with classroom groups who provided comparative ratings of each preliminary spot, endorsements of educational objectives, and comments on how to improve spots. Examples of these pretest data are shown in Table 1 for spots used throughout the campaign. Spots with higher ratings that clearly addressed at least one objective were considered for further production. Pretest data were reviewed with producers, and 16 of the higher rated spots that most closely matched guidelines and objectives were selected to be produced as finished products suitable for broadcast. These formative research steps were followed in each of the three subsequent program years, producing an average of nine new television spots and four new radio spots per year.

Ratings of the appeal of both TV and radio spots after broadcast to the entire target population were obtained through four annual school surveys. These data were used to determine which spots were of sufficiently high appeal to be retained in the next year of intervention. Gender preferences for individual spots seen in surveys of the entire target population reflected gender preferences observed in the small-scale pretests conducted prior to broadcast. Five of the 10 highly rated TV spots listed in Table 1 were found to appeal to a significantly higher proportion of girls than boys, and none appealed to a significantly higher proportion of boys. Fourteen of the 36 TV spots rated by the entire target population throughout the campaign appealed to a significantly higher proportion of girls, compared to only two spots for boys. Girls showed particularly high interest in situation comedy, drama, rock video, and testimonial formats, such as the "Older Girl" spot shown in script form in Figure 1.

For radio, school survey data indicated that 6 of the 17 spots appealed to significantly greater proportions of girls than to boys; the remaining 11 spots appealed similarly to both genders. The average appeal across all radio spots was somewhat below that of the television spots, with 34% of both genders saying they liked the radio spots "a lot," compared to 40% for the TV spots. The radio message format in 5 of the 6 spots preferred especially by girls was testimonial, a simple statement by a young voice of indeterminate gender, confiding a thought or conviction about smoking. An example was a girl saying that she "took a chance" when someone offered her a cigarette and said "no thanks;" then

Table 1. Summary of 10 Highly Rated Television Spots With Pretest Appeal Ratings and Broadcast Appeal Ratings for Females and Males

Spot Name	Format/Length	Description	Pretest Endorsement of Educational Objectives <sup>a</sup>			Pretest Appeal (%) <sup>b</sup>		Broadcast Appeal (%) <sup>c</sup>		
			POS	NEG	REF	NORM	Female	Male	Female	Male
Ex-Smoker	Testimonial 30 seconds	Three kids who used to smoke say that they're glad they quit.	X	X		X	97	89	62*	50
Breakaway	Rock Video 60 seconds	A band sings "Breakaway" as an unpopular girl quits smoking and finds new friends.	X	X		X	95	83	58*	51
Shy Girl	Comedy 30 seconds	A talking cigarette pack tries to get a shy girl to smoke, but she smashes it.			X		89	90	53	54
Billy	Comedy 60 seconds	A boy offers cigarettes to all his friends, but they turn him down; even his dog leaves him.	X	X	X	X	78	95	52	54
Nicoflame	Cartoon 30 seconds	An impish character, "Nicoflame," shows how he harms smokers in a fast-paced rap cartoon.		X			98	98	51	50
Mindy	Drama 60 seconds	A girl going to a party worries about refusing to smoke, but all goes well when she does refuse.		X	X		98	97	57*	42
Nonsmoker	Testimonial 30 seconds	Several kids talk about reasons why they don't smoke.	X	X		X	97	89	52*	45
Track	Testimonial 30 seconds	Kids on a track team say that smoking is bad for athletes.	X	X			81	90	51	47
Answering Machine	Comedy 30 seconds	A phone message from a guy tells a girl she's "cool" for refusing a cigarette; but . . . wrong girl!	X		X		90	82	54*	42
Profile of a Smoker	Comedy 30 seconds	Two girls are disgusted with a girl who drops cigarette ashes in their hamburgers.	X	X		X	90	84	50	45

a. Objectives: POS = positive view of non-smoking; NEG = negative view of smoking; REF = demonstrates refusal skills; NORM = shows norm that most kids don't smoke. Endorsement (X) indicates that at least 50% of pretest respondents judged that the spot addressed the educational objective.

b. Pretest appeal = percentage of pretest respondents rating spots 3, 4, or 5 on liking scale (1 = *don't like it at all*; 5 = *like it a lot*); significance tests not conducted.

c. Broadcast appeal = percentage of school survey respondents who said they liked the spot "a lot" the first year it appeared on TV (other choices: "not at all" or "a little").

§ \*  $p < 0.05$  using chi-square; annual school survey sample sizes ranged from 1,223 to 2,408.

**Older Girl**

*Girl about 18 rolls through a park on roller skates, passing two kids smoking cigarettes.*

**Skating's terrific! It's a lot better than sitting around smoking.**

*She's at her job in a classy clothing shop.*

**I used to smoke... for a laugh. Some laugh!  
Bad breath, burns on my clothes. I felt rotten.**

*She hops on a motorcycle; a cute guy hops on behind her.*

**I have a lot better way to spend my money, and a lot better way to spend my time!**

*She drives off down a tree-lined street..*

**Figure 1.** Script for 30-second testimonial television spot "Older Girl."

she says "it was no big deal—my friends like me because I do what I *want* to do." Situation comedy was another highly rated radio format for girls.

### Media Use and Television Program Preferences

Exposure data gathered in school surveys showed the relative effectiveness of mass media for reaching both girls and boys at higher risk for smoking initiation and guided the selection of television programs in which to place spots. During the height of our media campaign, 57% of the higher-risk girls in Grades 7-9 reported listening to radio 3 or more hours per day compared to 40% of the lower-risk girls ( $p < 0.01$  chi-square test); 40% of higher-risk boys in these grades reported listening to radio 3 or more hours per day compared to 30% of the lower-risk boys ( $p = 0.01$ ). Similarly, 32% of the higher-risk girls and 35% of the higher-risk boys reported watching the MTV rock music cable channel 3 or more hours per day, compared to 17% of the lower-risk girls and 23% of the lower-risk boys ( $p < 0.01$  for both comparisons within gender). Program preference data for the major target audience segments indicated that girls preferred the afternoon soap operas *Guiding Light* and *Days of Our Lives* and situation comedies such as *Kate and Allie* and *Who's the Boss?* Both genders preferred other comedies such as *Diff'rent*



*Strokes and Family Ties*; about 60% of students in Grades 5 and 6 said that they "almost always" watched these shows, compared to 20-40% of students in Grades 7-10.

### Impact on the Target Population

The initial study cohort consisted of 5,458 students surveyed in the Grades 4-6 classrooms of 50 elementary and middle schools during Spring 1985; this group represented over 99% of the enrollment of targeted grades. Forty-seven percent of these students (2,540) participated in five annual classroom surveys conducted through Grades 8-10. This group was presumed to be fully exposed to the 4-year interventions and formed the primary study sample.

Within the study sample, baseline characteristics of students from the media-school and school-only communities were compared to assess the initial equivalence of treatment groups. The media-school group included more females (51.8% vs. 47.0%,  $p = 0.02$ ), was slightly younger (10.7 vs. 10.8 years,  $p < 0.01$ ), and included students who were more likely to have an older sibling who smoked (15.8% vs. 11.3%,  $p = 0.06$ ). There were no other significant differences between treatment groups for other reports of family smoking, for seven measures of psychosocial risk factors for smoking, for own smoking, or for other substance use behaviors.<sup>21</sup> Results were similar for separate analyses of the 1,266 girls and 1,274 boys.

The additional impact among girls of the media interventions on beliefs in the advantages of smoking cigarettes is shown in Figure 2. A significant difference in change over time was found between girls in the two treatment groups ( $F(1, 2) = 9.79$ ,  $p = 0.01$ ), with scores increasing less among girls in the media-school communities. Similar findings were observed with a lower increase among girls in the media-school communities in positive attitudes toward smoking ( $F(1, 2) = 8.24$ ,  $p = 0.02$ ; Figure 3), in perceived peer smoking ( $F(1, 2) = 31.62$ ,  $p < 0.01$ ; Figure 4), and in intentions to smoke cigarettes ( $F(1, 2) = 10.66$ ,  $p = 0.01$ ; Figure 5).

Assessments of weekly smoking for girls (Figure 6) showed a pattern similar to that seen in psychosocial mediators of program effects. Weekly smoking increased less over time among girls in media-school communities than among girls in school-only communities ( $F(1, 2) = 12.97$ ,  $p < 0.01$ ). When they were in Grades 8-10, 12.7% of girls from media-school communities and 21.1% of girls from school-only communities reported smoking weekly; the reduction in weekly smoking for girls in media-school communities relative to those in school-only communities at Grades 8-10 was 40%. The follow-up survey conducted 2 years later<sup>22</sup> showed that 16.5% of girls from media-school communities and 29.4% of girls from school-only communities reported smoking weekly ( $F(1, 2) = 44.97$ ,  $p < 0.01$ ); the reduction in weekly smoking for girls in media-school communities relative to those in school-only communities at Grades 10-12 was 44%.

Among boys in this sample, differences between treatment groups in psychosocial mediators followed the same pattern as for girls. Similarly, changes in weekly smoking followed the same pattern as for girls, but the difference was not statistically significant ( $F(1, 2) = 2.42$ ,  $p = 0.16$ ). At the time they were in Grades 8-10, 9.8% of boys from media-school communities and 14.4% from school-only communities reported weekly smoking. The follow-up survey conducted 2 years later at Grades 10-12<sup>22</sup> showed that 13.0% of boys from the media-school communities and 17.1% from the school-only communities were weekly smokers ( $F(1, 2) = 1.65$ ,  $p = 0.23$ ). When girls and boys were considered together, the increase in weekly smoking was significantly less among the

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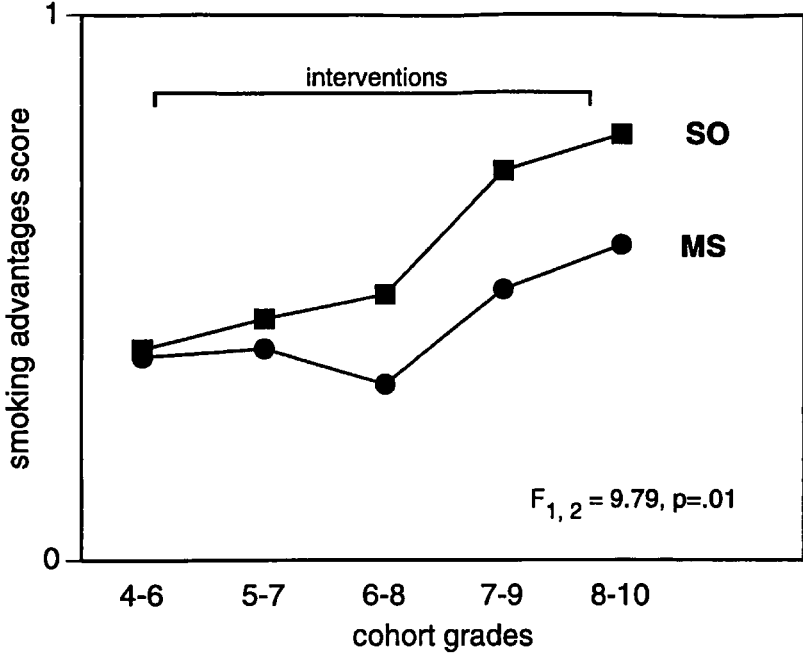


Figure 2. Smoking advantages score for girls among those in school-only communities (SO) and those in media-school communities (MS) over 5 years. A higher score indicates greater perceived advantages to smoking.

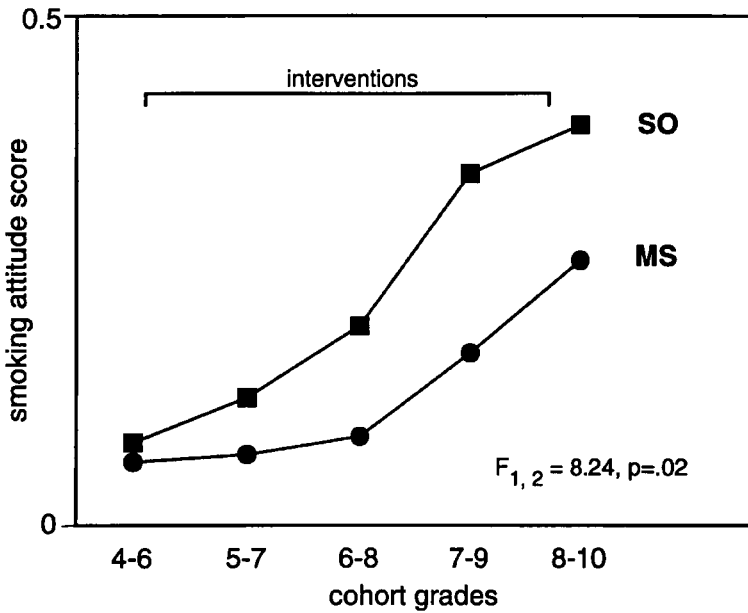
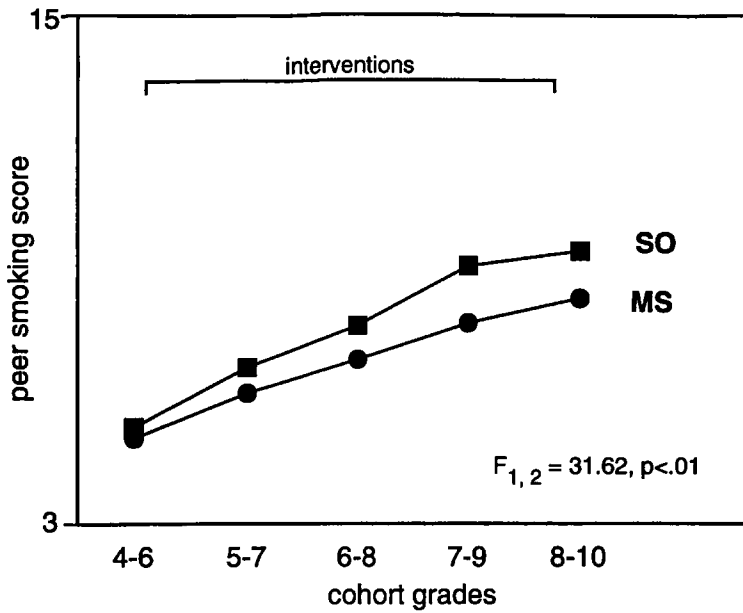
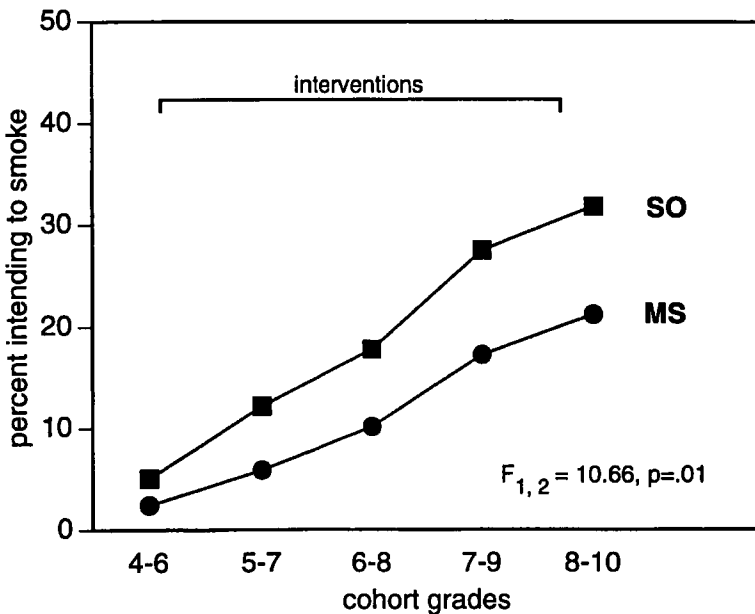


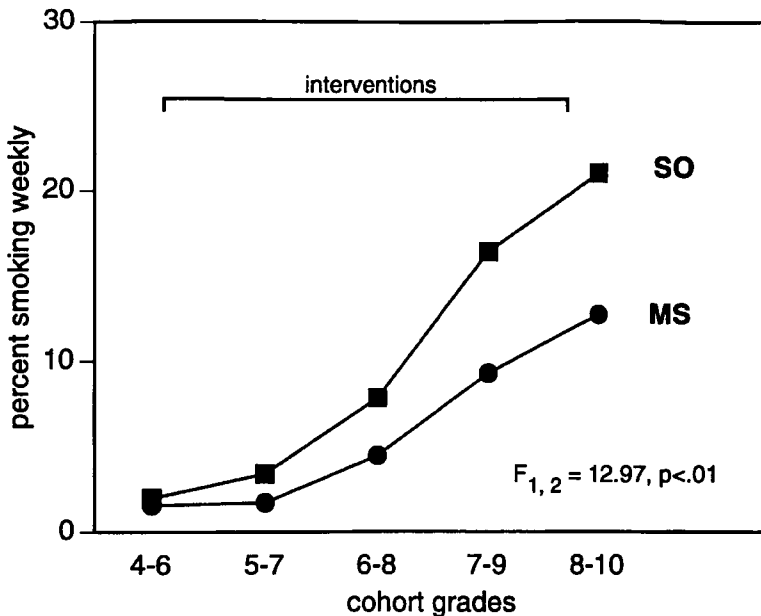
Figure 3. Smoking attitude score for girls among those in the school-only communities (SO) and those in the media-school communities (MS) over 5 years. A higher score indicates a more positive attitude toward smoking.



**Figure 4.** Peer smoking scores for girls among those in the school-only communities (SO) and those in the media-school communities (MS) over 5 years. A higher score indicates a greater perception of peers smoking.



**Figure 5.** Proportion of girls reporting that they intended to smoke cigarettes among those in the school-only communities (SO) and those in the media-school communities (MS) over 5 years.



**Figure 6.** Proportion of girls reporting that they smoked any cigarettes in the past week among those in the school-only communities (SO) and those in the media-school communities (MS) over 5 years.

media-school group through Grades 8-10 ( $F(1, 2) = 7.46, p = 0.03$ ) and through Grades 10-12 ( $F(1, 2) = 14.51, p = 0.003$ ).

## DISCUSSION

In an earlier article, we presented our plans for development and evaluation of a targeted mass media smoking prevention program.<sup>20</sup> That article described the combination of diagnostic and formative research we would use to optimize the fit between the educational needs of our target groups and the content and exposure plan for the media campaign. In this article, we have shown how these plans were carried out and have presented evidence for the effectiveness of this approach at major stages in the process of program development and implementation.

The educational objectives of the study were to achieve changes in beliefs, attitudes, skills, and perceived norms about cigarette smoking and, through these changes, to reduce rates of smoking initiation. Formative research data showed that we developed media messages that were appropriate to these objectives and appealing to specifically targeted audience segments. Feedback from target population surveys confirmed the targeting of message content and placement. Figures 2-5 showed that these messages had a favorable impact among girls on mediators of smoking initiation targeted by the intervention. Figure 6 shows that weekly smoking among girls in the media-school group increased at a significantly lower rate than for girls in the school-only group. These results provide strong, internally consistent evidence for the effectiveness of this mass media strategy for smoking prevention.

### **Gender-Specific Intervention Effects**

Although this media campaign was intended to result in lower cigarette smoking levels throughout an entire target population, it clearly had a greater impact on girls than on boys. Several interpretations may explain this result. First, it could be seen in a simple dose-response framework. More spots were targeted toward girls' interests and more spots were broadcast in programs more often viewed by girls than by boys.

A second potential explanation focuses on the specific utility of message content for girls. The emphasis in the diagnostic and formative stages on developing messages that addressed girls' needs may have resulted in the creation of concepts that had especially compelling meanings for adolescent girls. For example, a theme of managing social relationships successfully without becoming a smoker emerged from our developmental research as especially important to higher-risk girls and characterized several successful spots.

Thirdly, the greater impact on girls may be interpreted as a matter of timing. It is possible that these interventions had larger and more lasting effects on girls than on boys because they occurred over a more crucial period of adolescent development for girls. Since boys mature somewhat later than girls, they may have benefited more from similar interventions starting at later ages.

### **Developing Messages Appealing to Girls**

Our overall goal in planning the mass media campaign was to identify youngsters at higher risk for smoking, especially girls, and to target the campaign to their interests.<sup>33,34</sup> Our diagnostic surveys and focus groups confirmed at every developmental level that the leisure and media interests of girls tended to focus on social relationships. Thus the interests of girls at these ages were compatible with the social learning theories underlying the educational objectives. Subsequent research has tended to indicate that interventions focused on social skills, influences, and norms may be more successful with adolescent girls than with adolescent boys.<sup>35,36</sup>

Media producers were encouraged to create message ideas featuring credible girls and boys modeling cigarette refusal skills and endorsing nonsmoking in a variety of social situations. Many of the spots successfully targeted toward girls either managed social situations involving cigarettes in humorous ways (as in situation comedies), or they presented positive role models giving credible messages in straightforward testimonials, teenage dramas, or rock videos. Producers also were encouraged to ensure that a nonsmoking norm was conveyed consistently throughout the spots so that anyone smoking in the spots was portrayed in the obvious minority, with nonsmokers highlighted as the more prominent and more attractive majority. These spots thus contained positive social themes that were especially appealing to girls.

### **Targeting Media to Reach Girls**

We used school surveys of the entire target population to select media that brought messages most effectively to higher risk girls. Working with program preference data gathered each year from about 1,500 students in each community receiving the campaign, we were able to pinpoint programs watched by female students who also reported that

they were at higher risk of becoming cigarette smokers. A second tool that was helpful in targeting a specific audience segment was the ability to purchase broadcast time. Even with a limited budget,<sup>21</sup> we were able to reach higher-risk girls by purchasing time efficiently. This was accomplished by purchasing time slots in and around programs watched frequently by higher-risk girls in the late afternoon when rates are down, rather than purchasing time in the evening when the rates are high because the rest of the household is also using television. Radio is a low-cost medium<sup>37</sup> that also was used heavily by higher-risk girls.

### **Public Health Education and Mass Media Planning**

The major product of this research was the approach used in developing and implementing a targeted media intervention. This approach relies on teamwork among persons with experience in disciplines related to both public health and mass media. For our program, these disciplines included health education, mass communication, and behavioral psychology. Public health agencies wishing to use media should bring people with such backgrounds into the process, either on staff or as consultants.<sup>38</sup> This team should maintain control over the entire creative process: design of diagnostic research, including choice of items and participants for surveys and focus groups; development of guidelines for producers; pretesting messages in preliminary form, interpreting results, and selecting final spots to be produced; and placement of messages in appropriate media to reach the target audiences.

### **Conclusions**

This study has demonstrated smoking prevention effects by achieving 40% lower girls' smoking at Grades 8-10, with effects persisting at Grades 10-12, implying that wider application of similar interventions could have a significant impact on future smoking prevalence among girls and women. It also has demonstrated a highly generalizable approach for reaching clearly defined groups on a broad scale through channels that are particularly well suited to influence young people at risk for smoking and other harmful behaviors. While these media maintain such influence on this impressionable group, we should make every effort to use them for the public good.

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