Other variations in intervention approaches have used media supplements and involved students' parents. Flay et al. (1987), for example, used a five-day smoking-prevention curriculum in junior high school classrooms and coordinated it with five different five-minute video segments aired on a local television station. The focus of these television segments was smoking prevention, and they were followed the next week by five more segments dealing with smoking cessation (Flay et al. 1987).

Pentz et al. have trained health, science, and social studies teachers to deliver a social influences program that was reinforced by 10 homework activity sessions involving parents and other family members in role playing and other forms of behavioral rehearsal (Pentz, Dwyer, et al. 1989). In a related project, this group has developed a component that asks parents to attend organizational meetings, support school activities, and participate in an educational workshop (Pentz, MacKinnon, Flay, et al. 1989). The results of these studies are discussed later in this chapter, along with other community programs.

Biglan, Glasgow, et al. (1987), have also designed a component that tries to enlist direct parental support of their standard classroom curriculum. The component relies on a set of four mailed messages for parents of participating students. These messages reinforce classroom activities, encourage family discussions of smoking in general, and urge parents to establish family policies regarding smoking.

Walter, Vaughan, and Wynder (1989) embedded smoking education in a comprehensive school health education program, the Know Your Body Program, with fourth- through eighth-grade students in New York. This more comprehensive program had a significant impact on multiple risk-related behaviors, including cigarette smoking.

Finally, Cain, Dudley, and Wilkerson's (1992) "Tar Wars" program has used health professionals to deliver antitobacco messages with the help of fourth-, fifth-, and sixth-grade children. The students participate in a poster contest to counter the messages of tobacco advertising, and a communitywide media campaign complements the school program. Originating in 1977, this program is based on the DOC program Superhealth 2000, which similarly emphasized counteradvertising skills among 7th- through 10th-grade students (Blum 1980).

A number of recent reviews have closely examined issues related to program design and content (Botvin and Wills 1985; Flay 1985; Glasgow and McCaul 1985; Hansen 1992). Rather than replicate these efforts here, the next section will provide examples of the range of programs that can teach adolescents the skills needed to resist social influences to smoke.

Exemplary Programs for Resisting Social Influences

Social Inoculation

In the mid-1970s, Evans et al. developed the first prevention program that instilled adolescent skills to resist social influences to smoke. The program, described as "social inoculation," taught students methods for recognizing and coping with pressures to smoke from peers, family, and the media (McGuire 1964). The program's hypothesis was that if young adolescents received classroom "inoculations" of "peer pressure," for example, and learned how to deal with it, they would be more prepared to resist actual social pressure from peers. Additional emphasis was placed on the immediate physiological impairments that smoking produces, rather than on long-term consequences (Evans et al. 1979). The program used videotapes of nonsmoking peers to impart information and to teach skills needed to resist social influences. In the pilot study involving 750 seventh-grade students, the proportion of nonsmokers in the experimental group who 10 weeks earlier had reported smoking at least one cigarette was approximately half that of those in the control group.

This research group introduced a notable procedure for enhancing the validity of self-reported smoking behavior among study subjects. Students were shown a film indicating that their smoking status could be verified biochemically by analyzing a sample of their saliva. The perception that the samples could be examined led to more truthful reporting by students and thereby decreased misclassification bias due to inaccurate self-reports (see "Validity of Measures of Smoking," Appendix 2, in Chapter 3).

Although interpretations of results from this early work were complicated by a variety of methodological flaws (Flay 1985), Evans' work provided the foundation for much of the smoking-prevention research that followed over the next decade.

Project CLASP

Later in the 1970s, McAlister et al. (1980) developed an intervention called Counseling Leadership About Smoking Pressure (CLASP), during which peer leaders from high school were trained to help junior high school students develop the skills needed to resist social pressures to smoke. The students learned to identify social pressures and then rehearsed and modeled strategies for coping with them (McAlister et al. 1980).

Besides this use of older students as peer leaders, the use of behavioral rehearsal methods and strategies to enhance commitment to nonsmoking was an innovation

that has been incorporated into many of the prevention programs developed later. The intervention consisted of three sessions delivered on consecutive days, followed by four booster sessions delivered over the remainder of the seventh-grade school year. Nine months after pretest, 5.6 percent of the treatment group and 9.9 percent of the control group reported smoking during the previous week—a statistically significant 56 percent difference between the groups. These reductions in smoking prevalence were observed up to the 10th grade.

Life Skills Training

Botvin (1986) has developed another variation of the social influences approach that includes resistance skills, behavioral rehearsal, role playing, self-control, decision making, problem solving, and self-reward, as well as components devoted to increasing self-esteem, self-confidence, autonomy, and assertiveness. The program, called Life Skills Training, includes various aspects of cognitive-behavioral psychological training. The program consists of 15 to 20 sessions for seventh-grade students; booster sessions are given in the eighth and ninth grades. The specific objectives of the program are to teach skills that help students resist direct pressures to smoke; to enhance students' self-esteem, self-mastery, and self-confidence in order to decrease their susceptibility to indirect social pressures to smoke; to prepare students to cope with anxiety induced by social situations; to enhance students' knowledge of the actual prevalence of smoking among adolescents and adults; and to promote attitudes and beliefs consistent with nonsmoking.

This program has been evaluated extensively in progressively larger studies over the past decade; the encouraging results have ranged from 40 to 80 percent reductions in smoking prevalence, and long-term effects have lasted up to four years (Botvin and Dusenbury 1989). In the most comprehensive evaluation of the Life Skills Training program to date, 56 schools in three different geographic regions were randomly assigned to three study conditions: Life Skills plus one-day teacher training, Life Skills plus video training for teachers, and a control condition. Significant positive effects were reported for cigarette use (see Table 5) and for smoking-related knowledge, attitudes, and normative expectations. In most cases, the two treatment conditions had similar results; students in both groups demonstrated more positive effects than students in the control group (Botvin et al. 1990). The effects of the Life Skills Training program have been demonstrated when the program has been delivered by project staff, older peers, or regular classroom teachers. These effects have also been demonstrated on inner-city

Table 5. Outcomes of the Life Skills Training (LST) program: adjusted third-year follow-up mean for smoking-related knowledge, expectations, personality measures, and behavior

	Adjusted mean scores*		
Smoking variable	LST (with teacher training)	LST (with video training)	Control
Knowledge			
Smoking prevalence	1.10$^{\Delta}$	1.16†	.93
Smoking consequences	4.80$^{\Delta}$	4.60$^{\Delta}$	4.13
Smoking acceptability	1.49§	1.52$^{\Delta}$	1.37
Normative expectations			
Adult smoking	3.92†	3.95†	4.22
Peer smoking	3.80†	3.77†	3.92
Personality measures			
Self-esteem	34.25†	34.07	33.65
Self-efficacy	19.27	19.20	19.26
Social anxiety	28.71‡	29.36	29.92
Smoking behavior	1.46§	1.50‡	1.63

Source: Botvin et al. (1990).
*Means for LST groups differ from control group at $^{\dagger}p < .05$, $^{\ddagger}p < .01$, $^{\S}p < .001$, and $^{\Delta}p < .0001$.

populations of predominantly Hispanic (Botvin et al. 1992) and black (Botvin et al. 1989; Botvin and Cardwell 1992) adolescents.

The SODAS Model

Several researchers have developed a variation of the social skills training approach that adds to the basic components of resistance skills, behavioral rehearsal, and role playing. The additional components focus on self-control, decision making, problem solving, and self-reward. Using a problem-solving approach called Stop, Options, Decide, Act, and Self-Praise (SODAS), students are taught self-control skills for smoking prevention coupled with self-reward for personal successes (Schinke et al. 1986; Gilchrist et al. 1986).

This research group has conducted a variety of studies evaluating this intervention model in different settings and using varied delivery modalities. The results of these studies have consistently demonstrated that treatment students reduce their smoking prevalence more than control students and that treatment students have greater positive changes in smoking-related knowledge and attitudinal factors (Schinke and Gilchrist 1984, 1985, 1986).

The Waterloo Smoking-Prevention Program

Investigators at the University of Waterloo (Ontario, Canada) have carried out a series of large-scale, longitudinal studies evaluating the efficacy of an intervention that teaches sixth-grade students the skills they need to resist social influences to smoke. This intervention is based on an integrative model of attitude and behavior changes surrounding health issues that suggests that if information is attended to, comprehended, and accepted, it may lead to changes in beliefs. Beliefs, however, will not necessarily lead to changes in attitudes, and attitudes will not necessarily lead to changes in intentions unless values, expectancies, and social influences are considered. Lastly, intentions will not necessarily lead to changes in behavior unless the individual has the requisite control and coping skills (Flay 1986).

The intervention program has three main components that are delivered to sixth graders in six one-hour weekly sessions. The first component provides information on the consequences of smoking and the reasons that adolescents smoke. The second component examines social influences—including family, friends, other peers, and the media—that promote smoking; students then learn specific skills to resist these pressures. In the third component, the students are asked to integrate information learned in all previous sessions in order to make a decision about their future smoking behavior and to publicly commit to nonsmoking, if that is their decision.

In the first large-scale randomized trial of this program, 22 schools were randomly assigned to treatment and control conditions. Sixth-grade students in the 11 treatment schools received the curriculum plus booster sessions in seventh and eighth grade. Initial evaluation results indicated that although the intervention did not reduce levels of regular smoking or significantly increase the probability of remaining a nonsmoker, it prevented the onset of experimental smoking through the end of the eighth grade. The results were particularly encouraging for students who were at highest risk of becoming regular smokers because they had tried smoking in grade six or because their parents, siblings, or friends were smokers (Best et al. 1988).

The University of Waterloo research group has reported six-year follow-up data for the same cohort of students studied earlier through the eighth grade. Ninety percent of the students were located for this follow-up study, and data were obtained from over 80 percent of them. These students had not received any additional intervention after the eighth grade. The significant intervention effects observed in this cohort after the eighth grade had begun to disappear by the fifth year after the intervention; by the sixth year, there was no longer a significant difference between treatment and control students (Flay et al. 1989). These results (see Figure 2) suggest that the initial positive impacts of such interventions may dissipate over time (Kozlowski et al. 1989), particularly if intervention activities and booster sessions do not extend throughout middle school, junior high, and high school (Botvin and Botvin 1992). School-based programs may also be strengthened by supplementary intervention activities that extend beyond the school context into the community (Perry, Klepp, Shultz 1988; Perry et al. 1992).

The Minnesota Smoking-Prevention Program

The Minnesota Heart Health Program is a community-based cardiovascular disease prevention program that has been carried out in selected Minnesota study communities during the past decade (Blackburn et al. 1984). As a part of this program, the Minnesota Smoking-Prevention Program (MSPP) has addressed the prevention of tobacco use by influencing the social and psychological factors known to promote the onset of smoking.

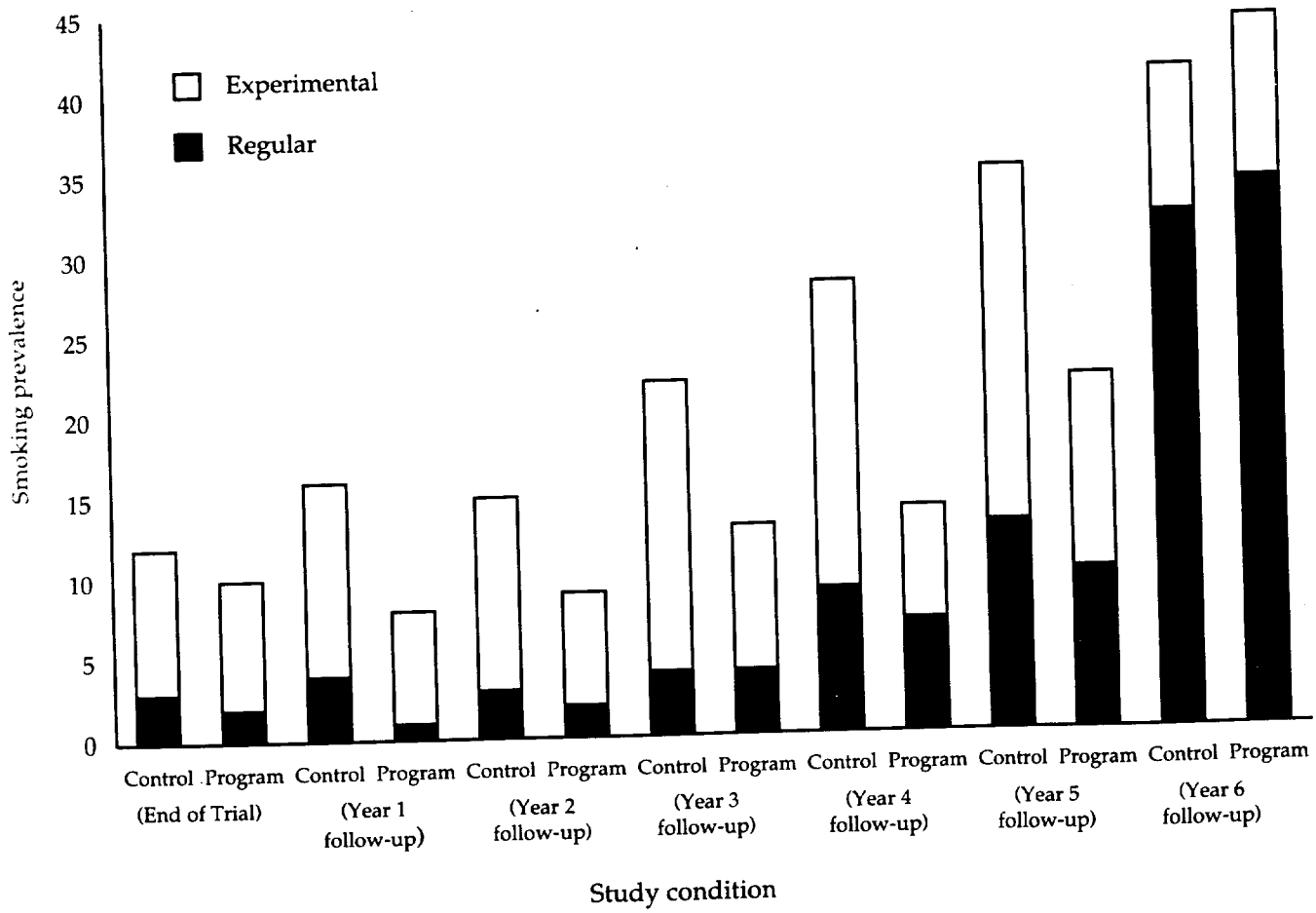
The activities in MSPP are often led by peer (same-age) leaders who are trained to communicate the social and psychological messages embodied in the program. The students first form small groups to discuss the short-term, social consequences of smoking. By

examining actual data and discussing young people's tendency to overestimate smoking prevalence, students learn that smoking is not a normative behavior in our society. After exploring why adolescents smoke, students discuss positive alternatives to smoking. Students then learn how these misperceptions about smoking are established in our culture through advertising and role modeling by peers and adults. Students practice the skills to resist the social influences that promote smoking, including peer influences and advertising techniques. Near the end of the program, students state a goal to remain nonsmokers.

In evaluating the effects of the MSPP in eight junior high schools, Murray et al. (1988) reported that after four years, the peer-led social influences intervention reduced the incidence of daily and weekly smoking by 35 to 50 percent. In contrast, no reduction was observed in an adult-led group that was taught the health consequences of smoking or in a comparison group enrolled in an existing curriculum covering general health topics. These differences, however, were no longer statistically significant at the five- and six-year follow-ups (Murray et al. 1988).

As part of this overall research program, the Class of 1989 Study was established to test the efficacy of the MSPP approach when introduced as part of a broader, community-based health promotion effort (Perry et al. 1992). Researchers hypothesized that the school-based intervention program would have longer-lasting effects if it was introduced in communities where adults were involved in communitywide smoking-cessation programs, where antismoking ordinances in the schools and public community spaces were being considered, and where integrated school and community intervention

Figure 2. Six-year follow-up of the first Waterloo School Smoking Prevention Trial: proportion of subjects smoking regularly and experimentally at each wave of the study



Source: Flay et al. (1989).

activities were offered. Throughout junior and senior high school, smoking prevalence was significantly lower among students in the intervention community than among students in the control community. The results of this study are discussed later in this chapter, along with other communitywide programs.

International Research on Smoking-Prevention Programs

Intervention studies reported in the English-language literature outside the United States concentrate primarily on school-based interventions directed at secondary school students (persons aged 11 years or older). In many cases, these intervention programs have adopted some elements of U.S. school programs in order to reflect different local conditions. This section reviews several of the more rigorously evaluated programs and pays particular attention to programs that have been followed up for two or more years after intervention.

Western Australia

Armstrong et al. (1990) conducted a large randomized trial evaluating peer- and teacher-led social influence programs among 12- and 13-year-old students in Western Australia. The authors used the MSPP program (Arkin et al. 1981) and resurveyed the students one year and two years after the intervention. Although the effects of the program were not strong, at the two-year follow-up, the smoking prevalence in the control group was 6.6 percent higher than in the teacher-led intervention group and 8.1 percent higher than in the peer-led intervention group.

North Karelia Youth Project

The North Karelia Youth Project in Finland (part of the International Know Your Body study) was a two-year controlled trial that targeted schoolchildren in grade seven (12 and 13 years old) and included components on smoking prevention, physical activity, and reduction of dietary fat and alcohol consumption (Puska et al. 1981, 1982). The smoking intervention program was peer-led and involved three 45-minute sessions for grade seven; these students received seven shorter sessions the following year (a schedule similar to that of Project CLASP). The program included sessions on social pressures to smoke, ways to resist such pressures, ways to cope with social anxiety, the short- and long-term health effects of both active and passive smoking, and the impact tobacco growing has on the environment.

Health educators from the project team delivered a direct, intensive intervention (intervention A) in two schools (one urban and one rural). A less intensive, countywide intervention (intervention B) provided materials and training to local youth and temperance workers. The evaluation involved the two intervention A schools, two matched intervention B schools selected from the county, and two matched reference schools selected from another county that did not receive an organized intervention. Puska et al. (1982) found that among boys, the prevalence of occasional smoking (one or two times per month) had increased by 30 percent in the reference group, by 8 percent in the A group, and by 13 percent in the B group. Among girls, the prevalence of occasional smoking had increased by 20 percent in the reference group, by 18 percent in the A group, and by 9 percent in the B group. Vartiainen et al. (1990) reported the results of an eight-year follow-up and found that the prevalence of "any smoking" in the reference group was 10 percent higher than in the A group and 16 percent higher than in the B group.

United Kingdom

In the United Kingdom, Nutbeam et al. (1993) conducted a controlled trial of two school-based interventions. The Family Smoking Education Project was derived from a program first developed in Norway (Aarø et al. 1983). Directed toward 10- through 12-year-olds, the project consisted of five lessons on the immediate health effects of smoking and on the wider environmental impact of tobacco growing and use. A notable feature was a leaflet sent to parents to encourage their support for school-based smoking education. The Smoking and Me project was the United Kingdom adaptation of the MSPP. Directed toward 10- through 12-year-olds, the program consisted of six sessions highlighting a range of social influences and equipping students with skills to manage these social pressures. At the first-year and second-year follow-ups, no differences were observed between the intervention population and the control population for either smoking uptake or personal skills.

Overall, school-based smoking education programs that have been evaluated internationally have met with limited success in the past decade. In general, these programs were brief and were not continued through the high school years. Many countries are taking more comprehensive approaches to smoking control among young people; such approaches include community action, further restrictions on tobacco advertising and promotion, and substantially higher tobacco tax rates than are found in the United States.

Meta-Analyses of School-Based Smoking Prevention

Extensive discussions of the methodological issues inherent in research on smoking prevention have been thoroughly discussed elsewhere (Cook and Campbell 1979; Flay 1985; Biglan, Severson, et al. 1987; Murray and Hannan 1990). The primary issues have included questions of mixed units of analysis, attrition of the subject (student) population, integrity of implementation, and homogeneity of the subject population. These issues have been partly accounted for in four important meta-analytic studies published since 1980.

Tobler (1986) examined 143 studies of drug-use prevention programs for 6th- through 12th-grade students and found that these programs had an overall significant impact on behavior, skills, and knowledge. The study also found that peer-led programs and programs dealing with social influences were more effective than other modalities. Tobler (1992) later confirmed these findings with more rigorous analytic methods. The Rundall and Bruvold (1988) meta-analysis of 40 studies of school-based programs to prevent smoking examined knowledge, attitude, and behavioral outcomes of social influence programs versus traditional programs; the social influence programs were more likely to affect attitudes and behavior. Rooney (1992) examined 90 school-based tobacco-use prevention programs conducted from 1974 through 1989 that sought to develop skills to resist social influences. The meta-analysis took into account the clustering of students in schools and used the school as the unit of analysis. Results indicated that smoking prevalence was 4.5 percent lower among students in the social influence programs than among students in control conditions. The social influence programs that were most effective at one-year follow-up were those that were delivered to sixth-grade students, that used booster sessions, that concentrated the program in a short time period, and that used an untrained peer to present the program. Under these more optimal conditions, long-term smoking prevalence was reduced by about 25 percent.

Bruvold's meta-analysis (1993) included 94 separate interventions from the 1970s and 1980s. The intervention programs were categorized as rational (providing factual information), developmental (increasing self-esteem and decision-making skills), social-norms–oriented (providing alternatives and reducing alienation), and social-reinforcement–oriented (developing skills to deal with social pressures to smoke). The meta-analysis showed that the rational approach had very little impact on smoking behavior, that the developmental and social norms approaches had equivalent and intermediate impact on smoking behavior, and that the social reinforcement approach had the greatest impact on smoking behavior (Bruvold 1993).

Discussion

In retrospect, research on smoking prevention has by its very nature had to contend with various threats to validity posed by factors such as mixed units of analysis, differential attrition, and inconsistent implementation. To a large extent, the most recent research studies have been designed to deal with these methodological obstacles and have still found moderately strong prevention effects (Rooney 1992; Bruvold 1993). Therefore, most reviews of the smoking-prevention research literature consistently have come to the same conclusions, which can be summarized under three general findings.

First, a variety of individual research reports (Botvin and Dusenbury 1989; Flay et al. 1989), several comprehensive literature reviews (Flay 1985; Best et al. 1988), and four meta-analyses (Tobler 1986; Rundall and Bruvold 1988; Rooney 1992; Bruvold 1993) have all reported lower prevalences of smoking among students in social influence programs than among students in equivalent comparison groups or randomly assigned control groups. The difference between treatment and nontreatment groups ranges from 25 to 60 percent and persists from one to four years.

Second, as Best et al. (1988) have underscored, given the number of research studies, the variability in program format and scope, the various communities and cultures in which these studies were undertaken, and the potential threats to internal and external validity in school-based research, the consistency of overall findings and reductions in smoking prevalence across all these studies is rather remarkable.

Third, it has been observed repeatedly that the positive shorter-term intervention effects reported in adolescent smoking-prevention studies tend to dissipate over time (Murray et al. 1989; Pentz, MacKinnon, Dwyer, et al. 1989; Flay et al. 1989; Ellickson, Bell, McGuigan 1993). This general trend has been particularly evident among school-based intervention studies that included little or no emphasis on booster sessions, few (if any) communitywide activities, or few (if any) mass-media–based components (Botvin, Renick, Baker 1983; Perry, Klepp, Shultz 1988; Botvin and Botvin 1992). These interventions may be enhanced if they are embedded in a more comprehensive school health education program (Allensworth and Kolbe 1987; Walter, Vaughan, Wynder 1989). The comprehensive school health approach needs further evaluation but is promising as an effective prevention tool.

Only the social influence approaches have been scientifically demonstrated (through replicated research

studies) to reduce or delay adolescent smoking. Still, the effects of these programs have not been sustained without additional educational interventions or community components. This experience suggests that programs grounded in school-based skills training are indeed important for preventing smoking, although more sustained and comprehensive efforts may be needed for long-term success.

The concept of reciprocal determinism (Bandura 1986) would argue that these complementary components should target the elements of the dynamic person–environment interaction that school-based interventions may not be capable of reaching, much less influencing. These components would include the types of community, environmental, legislative, policy-based, and societal interventions described later in this chapter.

Preventing Smokeless Tobacco Use

Introduction

The 1986 publication of the Advisory Committee's Report to the Surgeon General (USDHHS 1986b) on the health consequences of using smokeless tobacco (chewing tobacco and snuff) and subsequent reports of widespread use of smokeless tobacco among children and adolescents (Boyd et al. 1987; USDHHS 1992b) have called forth a wide range of written and media materials (including films, pamphlets, and video programs) on the risks of using smokeless tobacco (Wilson and Wilson 1987; Laflin, Glover, McKenzie 1987). These materials, made available to school personnel and parents, have aimed at countering the perception that smokeless tobacco is a safe alternative to cigarettes. Materials have been produced by federal agencies (such as the NCI and the National Institute of Dental Research), voluntary nonprofit groups (such as the ACS), and professional organizations (such as the American Dental Association and the American Academy of Otolaryngology). These materials have been distributed widely, but the degree of their diffusion has not been evaluated, nor has their effect on young people's use of smokeless tobacco.

Evaluation of School-Based Efforts

Because the increased use of smokeless tobacco among youth is a relatively recent phenomenon, few programs for preventing adolescent use of these products have been evaluated for either short- or long-term efficacy. Those that have been evaluated have been but one component of a broad tobacco-prevention program.

In response to the emerging concern about the health risks of regular smokeless tobacco use, the National Institutes of Health has funded numerous research grants to develop interventions to prevent initiation or regular use and to promote or assist cessation for adolescent and young adult users. Nine research grants on smokeless tobacco use have been funded by the NCI since 1987; most are focused on adolescent populations (USDHHS 1990b), and results are pending. Although most of these projects have been school-based prevention activities, some programs have targeted youth in non-school settings (e.g., 4-H clubs, Little League baseball clubs, and Native American community centers).

The prevention programs that have been evaluated have targeted both smoking and smokeless tobacco use among middle and high school students. The primary focus has been on middle school (grades 6–8, ages 12–14). Smokeless tobacco prevention has also been included as part of more comprehensive curricula to prevent drug use, such as *Here's Looking at You, 2000* (Roberts, Fitzmahan & Associates, Inc., and Comprehensive Health Education Foundation 1986), or as part of community-based interventions to reduce drug use. Seldom have programs to prevent smokeless tobacco use been instituted independent of other substance-use prevention or of a more general tobacco-use prevention effort. Since smokeless tobacco products are used primarily by males, the overall prevalence of use is lower than that of smoking. There is also less concern about the health effects of smokeless tobacco than about those of illegal drugs and cigarettes. This logical inclusion, however, of smokeless tobacco prevention in the context of other prevention efforts makes the evaluation of the smokeless tobacco component problematic.

A factor that more directly obscures the importance of smokeless tobacco prevention is the widespread acceptance of use by both young people and parents. Youth generally perceive that smokeless tobacco use is a safe alternative to cigarette smoking. For example, in one study, 77 percent of school-aged children believed that cigarette smoking was very harmful to one's health, yet only 40 percent believed the same of smokeless tobacco use (Schaefer et al. 1985). Parents are also more likely to accept smokeless tobacco use than smoking among teens (Chassin, Presson, Sherman 1985; see "Parental Reaction to Smokeless Tobacco Use" in Chapter 4).

The Oregon Research Institute Program

In several studies, young adolescents have received a preventive curriculum that targeted both smoking and smokeless tobacco use. In one such study (Severson et al. 1991), a social influences program conducted by the Oregon Research Institute was delivered by regular classroom teachers and by same-age peer leaders to entire classrooms in randomly assigned schools. The brief seven-session program significantly reduced smokeless tobacco use among males in both seventh and (to a lesser

extent) ninth grades. Parallel analysis failed to show that the intervention had any positive effect on cigarette smoking. The results for smokeless tobacco use, however, were particularly encouraging, since only two of the seven class periods of the intervention were devoted to smokeless tobacco.

The intervention used in the Severson et al. (1991) study sought to make students sensitive to overt and covert pressures to use tobacco and taught effective ways to respond to these pressures. The students practiced how to refuse offers of tobacco. Besides using a structured curriculum with role-play activities, the teacher used videotapes to standardize instruction and maintain student interest. The program was taught by regular classroom teachers; same-age peer leaders assisted in role-playing activities for the seventh-grade students. A videotape titled *Big Dipper* (Oregon Research Institute 1986) was developed to highlight the physical and social consequences of smokeless tobacco. To involve parents, brief brochures were mailed to students' homes.

Toward No Tobacco Use

A study by Sussman et al. (1993) reports positive results in their Toward No Tobacco Use (TNT) project for reducing smokeless tobacco use. The study compared four different prevention curricula developed to counteract three types of factors related to the onset of tobacco use that are typically addressed within a comprehensive social-skills program. These include peer approval for using tobacco, incorrect social information provided about tobacco use, and lack of knowledge about physical consequences of tobacco use. The development of these curricula is detailed in previous reports (Sussman 1991).

Smokeless tobacco use was significantly less prevalent among students who had received the TNT intervention than among those who had not (Sussman et al. 1993). The results of the evaluation of this 10-lesson curriculum intervention suggest that learning about the physical consequences of smokeless tobacco use can be as successful as a social influences program and that a combination of both is probably best for deterring use of smokeless tobacco. The Sussman et al. (1993) study in southern California and the Severson et al. (1991) study in Oregon suggest that smokeless tobacco use can be reduced through school-based programs that try to prevent all types of tobacco use among seventh- and ninth-grade students.

Project SHOUT

Elder et al. (1993) developed Project SHOUT, a social influences program that has been evaluated in 22 junior high schools in San Diego County, California. Based on an operant conditioning model of tobacco use (Elder and Stern 1986), the intervention was delivered in randomly assigned schools to seventh-grade students. Intervention and assessment continued for three years (through seventh, eighth, and ninth grades). Because of multiple school changes at the end of the eighth grade, Project SHOUT used telephone calls and program newsletters for the ninth-grade intervention.

At the three-year follow-up, the intervention had a significant effect on cigarette use, smokeless tobacco use, and combined cigarette and smokeless tobacco use. The intervention effect was particularly strong during the ninth grade (Elder et al. 1993). The three-year intervention and follow-up is a strength of this study; previous studies have been limited to a single intervention year and one-year follow-up.

Programs for Native American Populations

Smokeless tobacco use by Native American youth on reservations is higher than that of other groups (Schinke et al. 1989). There is evidence of early, frequent, and heavy use of snuff and chewing tobacco by Native American children and Alaskan Natives (Schinke et al. 1987). Young people in these populations begin using smokeless tobacco at an early age, and girls use it at levels almost equal to boys (Schinke et al. 1987). Current reservation-based interventions aimed at reducing this pattern of smokeless tobacco use have not yet been evaluated. These ongoing programs are sensitive to the unique aspects of tobacco use by Native Americans, since tobacco has traditionally played a role in sacred rites. The programs make extant materials appropriate for Native American children by creating a specific curriculum for the tribal group and having Native Americans provide the intervention in schools or other settings on their reservation.

Smoking Cessation

Introduction

Few studies have examined adolescent smoking cessation. The four primary sources of information on adolescent cessation are national probability surveys on patterns of adolescent attempts to quit (see "Attempts to Quit Smoking" and "Self-Reported Indicators of Nicotine Addiction Among Smokers" in Chapter 3), convenience sample surveys of adolescents who have tried to quit on their own, reports from prevention projects on effects of treatment on youth who were smokers at baseline, and programs that explicitly try to recruit adolescent smokers into cessation programs. The relatively few intervention studies vary considerably in scientific quality; many are anecdotal or descriptive accounts of programs.

Convenience Samples of Adolescents Who Try to Quit Smoking

Although national surveys ask a great many respondents a few questions about quitting smoking, some smaller studies have more deeply probed the experience. The role of nicotine's pharmacologic effects has received increasing attention, culminating in the 1988 Surgeon General's report on nicotine addiction. The report demonstrated that cigarette smoking is characterized by the same addictive processes that have been observed with other drugs that are abused (USDHHS 1988). Recent observations of adolescents who have tried to quit smoking suggest that dependency or addiction has developed in many adolescent smokers and may play an important role in their attempts to quit. Data from both Great Britain (McNeill et al. 1986; McNeill 1991) and the United States (Hansen 1983; Hansen et al. 1985; Ershler et al. 1989) show that many adolescents who try to quit have withdrawal symptoms that parallel those reported by adult smokers (see "Nicotine Addiction in Adolescence" in Chapter 2).

In a survey of 116 British schoolgirls (aged 11 through 17) who had tried to quit smoking, 63 percent reported withdrawal effects. The degree of withdrawal effects was related positively to both self-report and biochemical measures of nicotine intake (McNeill et al. 1986). These findings were replicated, although without biochemical measures, in a study of American 6th- through 12th-graders of both sexes (Ershler et al. 1989). Over half of the smokers in both of these studies reported attempts to quit, and most were unsuccessful. These observations, along with other data summarized in Chapters 2, 3, and 4, strongly suggest that adolescent smoking is more than socially driven and that addictive processes in adolescents are similar to those that characterize adult smoking.

Effect of Smoking-Prevention Programs on Cessation

Smoking-prevention programs have typically, and appropriately, targeted younger adolescents. In these populations, prevalence rates tend to be low, and those who smoke are mostly doing so infrequently. These studies, reviewed earlier in this chapter, focus on preventing onset or on preventing the progression from experimentation to regular smoking. The impact of smoking-prevention programs on students who are experimental or regular smokers appears to be small and inconsistent (Best et al. 1984; Johnson et al. 1986; Biglan, Severson, et al. 1987). However, the small number of regular smokers (that is, those who smoke every week) tends to preclude meaningful analyses of cessation resulting from these programs (Best et al. 1984).

Cessation Interventions in the School

Young people who smoke have been a persistent concern of both educators and voluntary health agencies. A number of materials and programs for adolescent smoking cessation have been developed and implemented, but evaluation typically has been anecdotal or descriptive (Hulbert 1978; Patterson 1984; Brink et al. 1988). Many of the older programs are described by Thompson (1978), USDHEW (1979), and Seffrin and Bailey (1985). Cessation programs are sometimes led by peers, sometimes by teachers or volunteers. Participants are recruited through school channels such as newsletters, classes, and public address announcements. Evidence from these descriptive reports, as well as from some of the formal research programs described below, indicates that recruitment is difficult; adolescent smokers are hesitant to come forth. In some instances, the participants in the school cessation programs are referred by school authorities for infractions of school smoking policies and are thus not coming to these programs voluntarily.

These issues are illustrated by a program evaluation reported by the American Lung Association (unpublished data). The program, developed by a Minnesota affiliate of the American Lung Association, was evaluated in 22 schools in four states. A total of 241 students (mean age = 16 years old) participated in eight 50-minute sessions during school hours over a four-week period. Over half the students, however, were required to participate as a consequence of being caught smoking on school grounds. This inclusion of nonvoluntary participants may partly explain the program's low success rate: at the end of the sessions, only 30 students (14 percent) reported that they were abstinent (program dropouts were counted as smokers). Low cessation rates like these, coupled with recent legislation such as the Oregon law forcing school authorities to take action against students caught smoking on school grounds, signal the need for more effective cessation approaches for student smokers.

Lotecka and MacWhinney (1983) compared an intervention group focusing on cognitive behavioral skills (N = 53) with a group only receiving health information (N = 54). Less than 50 percent of the students in each group participated in the three-month follow-up. Of those assessed at that time, 78 percent of the students in the cognitive behavior group reported a decrease in smoking, and only 4 percent reported an increase; the comparable figures for the information-only group were 46 percent and 31 percent. No information was provided on complete abstinence. Given that reported rates of smoking are relatively unreliable and that the program

did not report cessation rates, this study cannot be considered conclusive.

Perry et al. (1980, 1983) conducted two school-based cessation interventions in California schools. In the first, 10th-grade classes in three high schools (N = 477) received a special program that focused on immediate physiological effects of smoking and on social cues that influence the adoption of smoking. Classes in two control schools (N = 394) received standard information on long-term health effects. The program consisted of four consecutive 45-minute sessions in regular health classes conducted in the fall. Posttest outcome data were obtained approximately five months later and included carbon monoxide measures of smoking. At the posttest, the experimental group, compared with the control group, had a significantly greater percentage of subjects who reported abstinence in the previous week (22 vs. 16 percent) and month (30 vs. 24 percent). Parallel significant differences were also found for carbon monoxide measures.

In their second study, the Perry group (1983) tried to sort out the specific efficacious components within the intervention program by analyzing three kinds of programs—those that discussed long-term health effects (the control group), those that discussed immediate and long-term physiological effects, and those that discussed social consequences—and comparing programs taught by either teachers or college students. Twenty health classes and four high schools were randomized by using a factorial design. The study obtained three-month follow-up data that included self-reports and carbon monoxide breath tests. Using entire 10th-grade health classes solved the recruitment problem but yielded a limited number of current smokers; the relatively small number of pretest smokers in this study (N = 82) precluded finding any significant difference between the groups. Overall, 23 percent of the pretest smokers reported not smoking at the three-month follow-up. Teachers tended to be more effective with the traditional curriculum covering long-term health effects, and college students seemed more effective with the social influences curriculum.

The largest and most systematic school-based adolescent cessation study has not yet been published. Burton et al. (unpublished data) worked with rural and suburban high schools in two states. Within each of the 16 treatment schools, students volunteering to participate in a cessation clinic were randomly assigned to a clinic or to a control group of students told they were on a waiting list. Clinic students were further randomly assigned either to a clinic designed to address addiction or to one designed around psychosocial dependency. Clinics consisted of five sessions spaced over one month. A follow-up session was held three months after the fifth session. The control participants were also invited to the follow-up session, where smoking status was assessed both by self-report and measurement of saliva cotinine.

At the three-month follow-up, 8.4 percent of clinic participants and 10.5 percent of controls were abstinent. When corrected for biochemical verification, these figures become 6.8 and 7.9 percent, respectively. There was considerable attrition; students lost to follow-up were assumed to be smokers. The negative results in the study are especially sobering because the investigators had previously conducted 31 focus groups with adolescents to help inform the intervention's recruitment strategies and content (Sussman et al. 1991).

Difficulty in recruiting adolescent smokers in school programs has been a pervasive problem for investigators. Adolescents may be concerned about parents or teachers learning that they smoke (since parental consent could be required for participation). Adolescents may also be less motivated than adults to quit, since long-term health consequences carry less weight with the young. A simpler explanation of low recruitment is that prevalence rates are low; schools do not provide large populations of smokers from which to recruit. Multisite trials that pool subjects may be needed before rigorous and meaningful evaluations can take place.

Cessation Interventions Based Outside the School

Hollis et al. (in press) tried an unusual approach to recruit young smokers. Adolescents between 14 and 17 years of age who were members of a large health maintenance organization (HMO) were mailed a screening questionnaire that asked about "health habits." Those who reported that they had smoked in the past week were asked if they would participate in a two-year study of adolescent health and were randomly assigned to either an intervention group that received help to quit smoking or a control group that received no such help.

The focus of the intervention was an office visit with a nurse practitioner at a conveniently located HMO clinic. Incentives were offered for attending these sessions, each of which lasted about 60 minutes. The participants reviewed their health history, watched and discussed a video on adolescent smoking cessation, were encouraged to set a quit date, and were given tips and strategies for successful quitting. Those who wanted to quit smoking received a follow-up call one week later; additional calls were also made, depending on the adolescent's continued interest in quitting. Participants who had quit smoking were eligible to participate in a lottery with chances to win $100.

All participants were followed up at one year, at which time both self-report and biochemical (saliva cotinine, carbon monoxide) data were obtained. The

intervention and control groups had similar self-report measures of smoking (i.e., measured in number of cigarettes in the last month, week, day) and similar biochemical indicators of smoking. No relationship was found between the number of contacts with the HMO interventionist and either quitting rates or the number of cigarettes smoked. Similar interventions in health care settings with adult smokers have usually yielded positive results (e.g., Hollis et al. 1991), but this was clearly not the case for adolescent smokers.

Discussion

The data reviewed indicate consistently that adolescent smokers frequently try to quit but are usually unsuccessful, often have withdrawal reactions much like adult smokers, are difficult to recruit and retain in formal cessation programs, and are not responsive to programs thus far developed. Further basic research and new directions for intervention are clearly needed. Data presented in Chapter 3 (see "Adult Implications of Adolescent Smoking") from the Monitoring the Future Project show that well over 80 percent of adolescents who smoked half a pack a day or more as seniors in high school (over 15 percent of the sample) were smoking five to six years later as young adults; over half of these were smoking a pack or more a day at follow-up. In the absence of intervention, adolescent smokers will most likely become adult smokers.

Smokeless Tobacco Cessation

Introduction

Of the estimated six million people who regularly use smokeless tobacco, half are under age 21 (USDHHS 1986b). Data from several national surveys show an increase in the prevalence of smokeless tobacco use, specifically in the use of moist snuff among young males (Boyd and Glover 1989; Marcus et al. 1989; Novotny et al. 1989; Rouse 1989; see "Current Use of Smokeless Tobacco" in Chapter 3). The high prevalence of smokeless tobacco use underscores the growing need to help young people quit.

To date, there are few published studies of smokeless tobacco cessation. The withdrawal symptoms for smokeless tobacco are the same as those for smoking—cravings for the substance, irritability, distractibility, and hunger (Hatsukami, Gust, Keenan 1987)—although these symptoms may be less intense and felt less frequently. Because of these similarities, most cessation programs for smokeless tobacco users are multicomponent treatments that use key elements from smoking-cessation programs that have been extensively evaluated in large-scale studies (Severson 1993).

Clinical Studies

Clinical studies of smokeless tobacco cessation have been done with both adolescents and adults. The first published study of smokeless tobacco cessation was reported by Glover (1986), who adapted the ACS' Fresh Start Adult Smoking Cessation Program for use with 41 adults who used smokeless tobacco. This pilot study resulted in a six-month self-reported abstinence rate of only 2 percent. However, these subjects had not voluntarily sought assistance in quitting; they had been required to attend the program for violating school rules at a college that prohibited the use of tobacco products. Low success rates are not surprising in a nonvoluntary cessation program.

Eakin, Severson, and Glasgow (1989) reported an intervention with adolescent male daily users, aged 14 through 18, who were recruited from high schools in Eugene, Oregon. The study recruited 25 students, five of whom also smoked cigarettes concurrently. The program consisted of three small group meetings with counselors, each lasting approximately one hour, during which the focus was on developing coping skills for cessation. Of the 21 subjects who completed treatment, two subjects had quit using smokeless tobacco by the end of treatment, and three subjects were abstinent at the six-month follow-up. Compared with the other students, however, these successful quitters had consumed a smaller amount of smokeless tobacco at baseline and were less addicted, as measured by an adapted Fagerström Tolerance Questionnaire (Fagerström 1978). They were also more involved in school athletics than those who did not succeed at quitting.

School-Based Efforts

Three recent studies of smokeless tobacco cessation are informative about school-based cessation and self-help approaches. Burton et al. (unpublished data) report results from a school-based cessation clinic model tested in 16 high schools in Illinois and California. Within each school, cigarette and smokeless tobacco users were recruited and either randomly (and voluntarily) assigned to a cessation clinic or told the clinics were filled. Clinics consisted of five sessions over a one-month period. A sixth session was held three months later to assess the intervention and control groups. The attrition rate for the clinic group was high: almost half the students did not complete the treatment. Of the 16 smokeless tobacco users who completed five sessions, seven reported quitting at the end of the treatment; none of the five students in the control group reported quitting. However, when the clinic dropouts were included as the denominator and the results corrected for biochemical verification, the quit rate for students in the smokeless tobacco clinic was 15 percent; none of the control

subjects had quit at the three-month follow-up. The study suggests that a school-based multisession clinic can achieve small cessation rates for adolescent subjects who volunteer, although the volunteer rates for the study were notably low.

Persons going through treatment for smokeless tobacco addiction often request an oral substitute to help them through withdrawal. Smokeless tobacco users report using cinnamon sticks, gum, sunflower seeds, finely ground mint leaves, or other chewed foodstuffs to lessen the effects of withdrawal (Severson 1992). To evaluate the use of nonnicotine substitutes as aids for smokeless tobacco cessation, a recent study compared the use of a ground-up mint product, chewing gum, and no substitute (Chakravorty 1992). Subjects were recruited from six high schools in rural Illinois. Two schools each were randomly assigned to either the treatment group (mint snuff substitute), gum group, or lecture-only control group. Within schools, smokeless tobacco users were invited to volunteer for a two-session school-based cessation program. Eighty-three males were recruited to participate. Of the 70 students who completed the treatment, 30 were in the mint group, 15 in the gum group, and 25 in the lecture-only group. At the end of the treatment period, all three groups had about the same quit rates. Eleven students reported quitting smokeless tobacco, but nine of these quitters also smoked cigarettes. The author reports that students using the mint snuff substitute significantly reduced their frequency and intensity of smokeless tobacco use, but the study had no biochemical verification of use. The results suggest that adolescent males who use smokeless tobacco can be recruited to attend sessions at school and that nontobacco oral substitutes may be a helpful adjunct to quitting.

Research with adults suggests that health care providers can motivate some adult users of smokeless tobacco to quit (Stevens et al., in press). The clinical opportunity to provide advice on quitting in the context of health care delivery has been referred to as a "teachable moment" (Vogt et al. 1989; Morosco 1986). The results are modest in terms of overall quit rates, but having dentists, hygienists, nurses, and physicians counsel their patients to quit using smokeless tobacco could have a significant effect on prevalence. The Stevens et al. (in press) study provided the first examination of a large-scale, low-cost intervention to encourage smokeless tobacco users to quit. This program, which was conducted in the context of regular hygiene visits, provided strong evidence of the effect of smokeless tobacco use on oral health: 73 percent of the adult users in this study had identifiable oral lesions (Little, Stevens, La Chance, et al. 1992). Parallel studies with youth or studies of programs using physicians or other health care providers have not been conducted.

Smokeless Tobacco and Cigarettes

Young people who use smokeless tobacco may also smoke cigarettes. Studies have reported that from 12 to 30 percent of all regular users of smokeless tobacco also use cigarettes (Eakin, Severson, Glasgow 1989; Williams 1992; Stevens et al., in press; see "Use of Smokeless Tobacco and Cigarettes" in Chapter 3). This relationship is critical, since cessation programs may motivate smokeless tobacco users to quit using snuff or chewing tobacco, yet not affect their use of cigarettes—and thus not affect their addiction to nicotine. Moreover, deprivation of one substance may lead to a direct increase in the use of the other (Biglan, La Chance, Benowitz, unpublished data). Cessation rates among men who use both tobacco products are significantly lower than those among men who use smokeless tobacco exclusively (Stevens et al., in press).

Research and Programmatic Challenges

Certain peculiar aspects of smokeless tobacco use may present problems to those who plan or study cessation programs. The lack of public data on the nicotine content of smokeless tobacco products is not only a research problem but a challenge to cessation efforts that might reduce the severity of nicotine withdrawal by gradually cutting back on nicotine ingestion. Such efforts are further hampered, as are studies or programs depending on self-monitoring of product consumption, by the nonuniform (bulk) packaging of most smokeless products and by the variation in the amount of product that constitutes a "pinch" (of chewing tobacco) or a "dip" (of moist snuff) (Severson et al. 1990.) External monitoring of use also has inherent limitations, since snuff (and to a lesser extent, chewing tobacco) can be used surreptitiously. On the other hand, the oral lesions frequently experienced by smokeless tobacco users readily indicate smokeless use—and provide direct physical evidence to the user that this behavior has detrimental health effects (Little, Stevens, Severson, et al. 1992).

The relationship between smokeless tobacco use and cigarette smoking also presents problems for research and intervention. Because many adolescents perceive smokeless tobacco use to be a safe alternative to smoking, motivation to quit using smokeless tobacco products may be low. On the other hand, because as many as one-third of all smokeless tobacco users also smoke cigarettes, the possibility exists (as was discussed previously) that persons trying to quit using smokeless tobacco may continue to smoke—or even increase their smoking—to minimize nicotine cravings.

Although the preliminary evidence is that cessation rates for smokeless tobacco are similar to those for smoking, the difficulty in recruitment, the small sample

sizes, the limited number of studies, the lack of control groups, and the lack of long-term follow-up necessitate cautious interpretation. Further research on cessation must consider the effects of usage frequency and intensity and must focus on relapse rates, use of nicotine replacement in cessation, self-help attempts at quitting, effects of advice by physicians and other health professionals, and effects of taxation and environmental restrictions.

Clinical Interventions to Prevent Tobacco Use

Introduction

Physicians, dentists, and other health care providers who take care of children are in a unique position to help their patients avoid the use of tobacco (Perry and Silvis 1987). Children perceive these professionals as credible health experts and thus may attend more to what they say than to what parents and other adults say. Health care providers can serve as powerful role models who can positively influence the health behavior of their young patients, especially where a long-term relationship has been formed with the child and the family. Lastly, health care providers should know when to provide specific health information at critical times in a child's development.

The medical office provides an important opportunity for physicians, dentists, and staff to communicate attitudes about smoking and smokeless tobacco use (Kottke et al. 1989; Richards 1992). By not smoking, health professionals can serve as positive role models, as the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP) have recommended. Smoking by physicians, other staff, adolescents, or parents should not be allowed in the physician's office or reception area (AAP 1987; AAFP 1992).

The AAP recommends that between birth and 21 years of age, a child should make a minimum of 20 visits to the physician (AAP 1988). These visits offer opportunities to prevent and deter tobacco use. To be successful at preventing tobacco use, physicians and other health professionals must know what the risk factors are, how to identify children who are most vulnerable, and how to intervene effectively.

Recommendations to Clinicians Who Care for Children and Adolescents

Education about tobacco should begin in childhood, when family standards and values are developing (AAP and Center for Advanced Health Studies 1988). The child's visit may also afford the opportunity for a health professional to advise young parents who smoke to stop (Perry, Griffin, Murray 1985). During infancy and early childhood, clinicians should emphasize to parents the relationship between environmental tobacco smoke and the infant's health, particularly the association between environmental tobacco smoke and children's pneumonia, bronchitis, asthma, middle ear disease, and sudden infant death syndrome (USDHHS 1986a, 1990a; U.S. Environmental Protection Agency [USEPA] 1992). Advice from a child's physician can reinforce advice that parents may have received from their own doctors. Clinicians thus need to learn skills to promote antismoking behavior and encourage parents to stop smoking.

The NCI and the AAP have developed recommendations for health professionals to prevent their preadult patients from trying smoking (Epps and Manley 1991b). These brief activities can be carried out during the periodic visits that the AAP recommends between birth and 21 years of age, as well as at other visits. Five steps that begin with the letter "a"—anticipate, ask, advise, assist, and arrange follow-up—are recommended:

- *Anticipate* the risks for tobacco use associated with the child's development stage. These risks include exposure to environmental tobacco smoke, experimentation with tobacco, and nicotine addiction (Kandel 1975; Hawkins, Lishner, Catalano 1985; Dent et al. 1987; AAP 1988). Children and adolescents are more likely to use tobacco if their siblings and friends use it and if tobacco use is perceived as normative or functional (USDHHS 1986a; see "Interpersonal Factors" and "Perceived Environmental Factors," both for smoking and for smokeless tobacco use, in Chapter 4). Adolescents are vulnerable to tobacco use—especially those with fewer coping skills (Doueck et al. 1988), those susceptible to cigarette advertising (Blum 1980), and adolescent females concerned about their body weight. (Gritz 1986).

- *Ask* at each visit, about tobacco exposures and tobacco use (Richards 1992). Ask about tobacco use by the patient and by the patient's friends and family. When seeing infants and young children, ask parents whether the patient has regular contact with anyone who smokes. Ask if tobacco use is being discussed among the child's friends or in school and, if so, in what classes. Ask about the child's school health education program. Ask the child about participation in sports and extracurricular activities that may be incompatible with smoking. In dental examinations, inspect the intraoral soft tissue. If changes are noted in the mucosa, ask about smokeless tobacco use.

- *Advise* tobacco users to stop. Advise women of the adverse effects of smoking during pregnancy. Inform smoking parents of the health consequences that environmental tobacco smoke can have on their children. Advise children and adolescents who are using (or

even trying) tobacco to stop. Advise smokers of the short-term adverse consequences of tobacco use, such as bad breath, other odors, and the cost of cigarettes. Advise smokeless tobacco users of the potential consequences of use, such as discoloration of teeth, destruction of soft tissue in the mouth, and potential early development of oral lesions and cancers.

- *Assist* tobacco users in stopping. Encourage parents who are trying to quit smoking and help them choose effective strategies to help them quit (Richards 1991, 1992). Assistance for parents or adolescents can include selecting a quit date, providing self-help materials, and in some cases counseling on the use of nicotine replacement (transdermal nicotine patch or nicotine gum) (Glynn and Manley 1989). Help children and adolescents take additional responsibility for their health behaviors. Encourage participation in programs that develop skills for solving problems, setting goals, making decisions, and countering peer pressure (Bingham, Edmondson, Stryker 1984a, b).
- *Arrange* follow-up visits as appropriate. Arrange more frequent follow-up visits for an adolescent who is experimenting with tobacco products. At the first follow-up visit, one to two weeks after a scheduled quit date, discuss progress and problems. Arrange a second visit in one to two months.

The five steps described above should be commonplace in the medical setting. Richards (1992) notes that "the words that a physician chooses to discuss smoking with a patient should be considered no less a therapeutic agent than the pharmacologic agent that the physician prescribes" (p. 687). Yet Frank et al. (1991) found that only 14 percent of smokers aged 12 through 17 years who had seen a physician in the previous year had been advised to quit smoking. In contrast, over 50 percent of smokers aged 25 years and older were advised to quit. Clearly, more consistent advice, concern, and counsel from the medical profession is warranted.

Role of Health Professionals in the School, in the Community, and in Policy Formation

Physicians and other health professionals are often considered leaders in their communities and have the opportunity to mobilize schools and communities to develop tobacco-use prevention, cessation, and policy change strategies. Health professionals who have examined their roles in this larger context should encourage their colleagues to act as advocates for such programs and, if possible, participate in their development or implementation (Shank 1985; AAP 1987; Blum 1992).

Health professionals play a powerful role as sources for nonsmoking advice and assistance, as role models of nonsmoking adults, as providers and supporters of a nonsmoking health care environment, and as agents who deliver nonsmoking programs in schools and communities (USDHHS 1991). Several medical organizations have adopted policies and developed programs to encourage member concern and involvement in preventing adolescent tobacco use. The AMA House of Delegates has adopted numerous policy resolutions that support local tobacco-control activities on behalf of children and others (AMA 1992b). The AAFP (1987) has also published policies and a manual on how to encourage patients of all ages to stop smoking. The AMA Guidelines for Adolescent Preventive Services recently recommended that physicians actively screen and counsel adolescent patients about tobacco use (AMA 1992a). The AAP, with the NCI, has drafted a set of age-specific recommendations for pediatric practice as part of their Tobacco Free Generation program to prevent adolescent tobacco use (Epps and Manley 1991a). The AAP also distributes Healthy Beginning kits developed by the American Lung Association for counseling parents on the harmful effects of smoking around children and distributes pamphlets for parents and adolescents regarding tobacco use (AAP 1988, 1990a, b). The American Academy of Otolaryngology—Head and Neck Surgery, Inc., launched a major public service campaign titled Through with Chew in response to the problem of smokeless tobacco use by youth. The campaign includes a video, a physician volunteer kit to encourage and assist members in community outreach, and a variety of educational aids designed to persuade young men, especially athletes, not to use smokeless tobacco (American Academy of Otolaryngology—Head and Neck Surgery 1992).

Community Programs to Discourage Tobacco Use

Introduction

Community-based strategies to prevent smoking are important adjuncts to school-based programs. Some studies have shown that classroom-based smoking-prevention programs, by themselves, have produced only short-term effects (Lichtenstein et al. 1990; Pentz, MacKinnon, Flay, et al. 1989; Best et al. 1988). These limited outcomes suggest the need to mobilize parents and elements of the community outside the schools to produce lasting behavior change.

Young people who have the highest rates of tobacco use are those least likely to be reached through school programs (Glynn, Anderson, Schwarz 1991). Messages concerning tobacco use will be more acceptable to high-risk adolescents if they are embedded in groups or programs to which these youth already

belong, rather than in tobacco-use prevention programs that stand conspicuously apart (Glynn, Anderson, Schwarz 1991). Community organizations and groups, on the other hand, are associated with particular social networks and social groupings of adolescents—potential avenues of program entry to the various social contexts of adolescents' lives.

Such contacts with and through these groups are important, since a strong correlation has been observed between smoking behavior and social group membership among youth (Novick et al. 1985; La Greca and Fisher 1992). The social environment of youth may include strong cues to use tobacco, such as adult role models who smoke or social groups where tobacco use is viewed positively. Community programs can effectively address these environmental elements and disperse messages against tobacco use (Becker et al. 1989; USDHHS 1991). Concerted use of multiple school and community channels for affecting adolescent tobacco-use behavior can produce a synergistic effect on the risk factors associated with adolescent tobacco use (USDHHS 1991).

Information about the programs described in the following sections was obtained through national and regional organizations and published literature. Many other locally initiated programs have been carried out in individual communities throughout the United States, but information on them was not readily available.

Communitywide Research Trials on Smoking Prevention

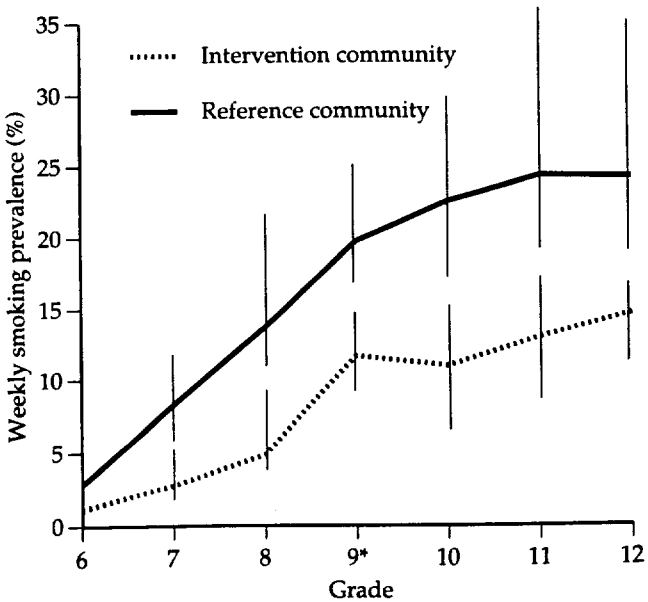
In the last 15 years, several major community-based prevention trials that target youth smoking have been undertaken. Three of these, the Stanford Heart Disease Prevention Program, the Pawtucket Heart Health Program, and the Minnesota Heart Health Program, addressed several cardiovascular risk factors for all age groups and used a variety of community strategies and channels, including school-based programs for youth (Farquhar et al. 1985; Mittelmark et al. 1986; Carleton et al. 1987). Young people therefore received these interventions directly—through school and home-based programs—and indirectly—through a communitywide attempt to structure the overall social and physical environment to support smoking cessation and to discourage young people from starting to smoke. In the Class of 1989 Study, which was part of the Minnesota Heart Health Program, all of the 2,400 students in the graduation class of 1989 in two of the state program's six communities took part in a longitudinal study of health behaviors from 1983 through 1989. In one community, the students also participated in five years of school-based health education, including a peer-led prevention program that addressed social influences to smoke (Perry, Klepp, Sillers 1989). At each of the annual follow-up surveys from 1984 through 1989, youth from the intervention communities had significantly lower smoking prevalences and smoking intensities than youth from the reference communities (Figure 3); at the end of 12th grade, the intervention group had reduced its smoking prevalence by 40 percent (Perry et al. 1992).

Similar results are anticipated from COMMIT, which is a comprehensive, community-based approach to smoking cessation. Though COMMIT's adolescent component is largely limited to the school-based efforts, the program is designed to change the community environment by making smoking a major public health issue and strengthening the social norms and values that support nonsmoking (Thompson et al. 1990–91).

The Richmond Quits Smoking Program tested the communitywide approach in a predominantly black community. Program components, including youth programs, were integrated into existing communication channels and social structures, and the smoking issue was presented in ways relevant to the black community (Hunkeler et al. 1990).

Trials that focus specifically on youth include the Midwestern Prevention Project (MPP), which tested the use of a home- and community-based program in addition to school curricula to prevent the onset of tobacco

Figure 3. Smoking prevalence of the cohort sample, Class of 1989 Study



Source: Perry et al. (1992).
*Smoking prevalence adjusted for false negatives in ninth grade.

use. The overall design of the MPP included all communities within metropolitan Kansas City (Kansas and Missouri) and Indianapolis (Indiana). Within each of these two areas, cohorts of adolescents were assigned by school to intervention or delayed intervention (control) conditions. The intervention programs initially targeted sixth- or seventh-grade students and consisted of a 10-session, school-based social skills curriculum; 10 homework assignments to be completed with parents or guardians; mass media coverage using television, radio, and print; community organization; and policy change. In the first two years of the project, 22,500 adolescents participated in the school and community intervention. Analyses from students in 42 schools (N = 5,008) indicated a lower prevalence of past-month cigarette, alcohol, and marijuana use at one-year follow-up for those exposed to the school intervention than for the control group (17 percent vs. 24 percent for cigarette smoking, 11 percent vs. 16 percent for alcohol use, and 7 percent vs. 10 percent for marijuana use) (Pentz, Dwyer, et al. 1989).

Similar results were observed after two years for a longitudinal panel of students from eight schools in Kansas City (N = 1,122) (Pentz, MacKinnon, Flay, et al. 1989) (Table 6). Third-year results demonstrated sustained impact only on tobacco and marijuana use, but reductions were equivalent for adolescents at lower or higher risk (Johnson et al. 1990). The MPP is particularly important because it demonstrates the feasibility of a large-scale, communitywide effort focused exclusively on youth. The program has also demonstrated impact on those at high risk, and it has considerable methodological strength. The MPP's long-term impact on tobacco is still to be determined.

The New England Research Institute has developed and tested a community program for smoking prevention among Hispanic (Puerto Rican) adolescents. The program includes a music video, buttons and T-shirts, a smoking cessation booklet, information booths and a traveling music show at area festivals, and a basketball tournament that includes a discussion about pressures to smoke (McGraw 1990). The preliminary results of the evaluation, however, indicate no differences between the intervention group (in Boston) and a comparison group (in Hartford) in reported smoking rates, attitudes toward smoking, or intentions to smoke.

Currently under way is Project SixTeen, a community trial being conducted by the Oregon Research Institute from 1990 to 1995. In this project, experimental communities receive a school program combined with community intervention that includes parental involvement, media campaigns, efforts by health care providers, and changes in policies and regulations (Ary and Biglan, unpublished data).

State and Federal Tobacco-Control Efforts at the Local Level

A number of states have adopted tobacco-control programs that include community-based adolescent components. The Association of State and Territorial Health Officials (ASTHO) has recommended the development of statewide tobacco-control plans that include both school and nonschool activities for youth (ASTHO 1989). At least 12 states have developed freestanding statewide tobacco-control plans, and another 22 states have incorporated them into plans for controlling chronic disease (CDC 1991b). All but 15 states have a specific budget devoted to tobacco-related activities. Examples of state-funded nonschool activities to prevent tobacco use include the K.I.D.S. Coalition, a Utah program that encourages youth to work with community leaders to

Table 6. Outcomes of the Midwestern Prevention Project: adjusted net differences in the percentage of smokers in program and control groups, from baseline to 6-month, 1-year, and 2-year follow-up

	Adjusted net difference*		
Smoking variable	**6 months**	**1 year**	**2 years**
Lifetime use	2.3	1.2	11.7†
Past-month use	-7.5‡	-10.2§	-16.0§
Past-week use	-6.4‡	-7.9‡	-11.7§

Source: Pentz, MacKinnon, Flay, et al. (1989).
*Analyses done with school as a unit of analysis, adjusted for race and grade.
†$p < .10$ (one-tailed test).
‡$p < .05$ (one-tailed test).
§$p < .01$ (one-tailed test).

create social change around the tobacco issue (Utah Department of Health 1991), and the Body Guards campaign, a program sponsored by the Minnesota Department of Health that trains minority youth (aged 12 through 14 years) to involve their families and others in the community in tobacco-free pledges and messages (ASTHO 1992).

The Federal Comprehensive Smokeless Tobacco Health Education Act of 1986 (Public Law 99-252), which included a mandate for health education programs and materials about risks of smokeless tobacco, coincided with an increase in state-funded community programs addressing smokeless tobacco. In Ohio, for example, the Department of Health has involved American Lung Association affiliates, Boys and Girls Clubs of America, Little League, the Cleveland Indians baseball team, 4-H Clubs, and juvenile detention centers in efforts to reach youth at high risk of using smokeless tobacco (Capwell 1990).

The most comprehensive state tobacco-control program operates in California. Administered by the state's Department of Health Services and Department of Education, the program has been funded since 1989 by a cigarette excise tax increase of 25 cents per pack (as a result of Proposition 99), one-fifth of which is dedicated to antitobacco education (Bal et al. 1990). Community-based prevention services are specifically directed to high-risk youth (i.e., those who have parents who smoke, those who have dropped out of school, or those who are economically disadvantaged) (Tobacco Education Oversight Committee 1991). During its first two years, this program created local tobacco-use prevention coalitions in all 61 local health jurisdictions, organized a youth summit called Kids Choose a Tobacco Free Future, held training workshops for county staff of the Child Health and Disability Prevention Program to introduce materials and techniques for counseling children and parents about tobacco use, and funded many projects targeting ethnic minority youth and their communities. California Smoke-Free Cities is a joint project sponsored by the California Healthy Cities Project and funded by Proposition 99. This program encourages cities to strengthen local tobacco-control efforts through various activities, many of which include youth (California Smoke-Free Cities 1992).

A community-based program that embraces multiple states and communities is the Planned Approach to Community Health (PATCH), a partnership of the CDC, state health departments, and local communities to plan, carry out, and evaluate programs to prevent chronic disease (USDHHS 1992a). Many of the 19 states and the more than 50 communities that have been involved in the PATCH program have carried out communitywide tobacco-use prevention efforts.

The Center for Substance Abuse Prevention, part of the Substance Abuse and Mental Health Services Administration (SAMHSA), sponsors a program of Community Partnership Grants, in which communities address local drug-use prevention issues. Public Law 102-321, the ADAMHA Reorganization Act, Section 114, provides that all projects funded as prevention, treatment, and rehabilitation model projects for high-risk youth are to include strategies for reducing both tobacco and alcohol use among minors.

The NCI has supported nearly 100 controlled intervention trials aimed at preventing young people from taking up tobacco and helping adult users quit. These trials have involved more than 10 million people in 33 states and over 200 communities in North America; 24 trials specifically targeted adolescents, and 6 addressed the prevention of adolescent use of smokeless tobacco (USDHHS 1990b).

The NCI's American Stop Smoking Intervention Study for Cancer Prevention (ASSIST) is the largest tobacco-control project attempted in the United States. ASSIST is designed to demonstrate that a comprehensive, coordinated intervention effort can significantly reduce smoking and tobacco use. The scientific rationale for this approach was clearly detailed in *Strategies to Control Tobacco Use in the United States: A Blueprint for Public Health Action in the 1990s* (USDHHS 1991).

ASSIST is predicated on a coalition model. During the planning phase, nearly 1,000 community health agencies, social service organizations, and voluntary health groups have joined state and local tobacco-control coalitions. This number will grow as the project enters its intervention phase, when these organizations are expected to begin carrying out interventions targeting youth and other high-risk populations served by these groups. A number of states, including Maine, Virginia, Michigan, Massachusetts, Colorado, and Minnesota, have supplemented their broader statewide coalitions with separate coalitions for controlling tobacco use among youth. Those ASSIST states that have high rates of smokeless tobacco use (West Virginia, Virginia, North Carolina, and South Carolina) specifically address such behavior among both adults and youth in their statewide comprehensive plans.

ASSIST has the potential to save more than 1.2 million lives, including over 400,000 deaths averted from lung cancer alone. The majority of these lives saved would be the direct results of ASSIST's primary prevention efforts among children, adolescent, and young adults.

Community Organizations for Preventing Tobacco Use

Many youth organizations include a programmatic focus on substance use. These program activities may or may not explicitly focus on tobacco separately

from other drugs. In most cases, little or no evaluation has been done to measure the effect these programs have on tobacco use.

Project California 4-Health focuses specifically on tobacco and is a joint effort of the University of California at Davis and the University of California Cooperative Extension 4-H programs. The program, which teaches older teens to present a tobacco-use prevention program to youth aged 9 through 12 in settings outside of school, is currently being evaluated (Project California 4-Health 1992).

Two programs are noteworthy because they have been designed to reach high-risk youth. Girls Inc. (formerly Girls Clubs of America) is a nationwide (120-city) network of over 200 centers serving young girls aged 6 through 18; over half of these girls belong to racial and ethnic minority groups. The organization's Friendly PEERsuasion program focuses on avoiding substance abuse (Girls Inc. 1991). Developed under a grant from the Office for Substance Abuse Prevention, Friendly PEERsuasion uses an older-to-younger peer leadership approach to encourage girls aged 11 through 14 to choose healthy alternatives to using illegal drugs, alcohol, and tobacco. The Boys and Girls Clubs of America, a nonprofit organization that provides programs in several areas, including health and physical education, has recently established clubs (built on the structures and supports of the Boys and Girls Clubs of America) in several housing developments around the country. Dubbed the SMART Moves (Self-Management and Resistance Training) program, these clubs aim to prevent substance abuse (including tobacco use) among high-risk youth by also targeting parents and the community (Schinke, Orlandi, Cole 1992).

To counter the association between baseball and smokeless tobacco use, Little League Baseball, Inc., with the support of the NCI and NIDA, has developed for young players two pamphlets that emphasize the negative social consequences of smokeless tobacco. A more extensive program for preventing smokeless tobacco use among youth who are baseball players is currently being evaluated among Little League and Senior League teams in Harris and Galveston counties in Texas (Evans, Raines, Getz 1992). This intervention targets players and their parents and involves professional baseball players.

In 1987, a program developed and implemented in 72 of the 4-H clubs in 24 California counties targeted reduction of smoking and smokeless tobacco use (D'Onofrio, Moskowitz, Braverman, unpublished data). Club members aged 10 through 14 years were involved in the study; 68 percent of the sample were retained at the two-year follow-up. The program included five tobacco-related outcome variables—knowledge, attitudes, perceived social influences, intentions, and behaviors—and involved five sessions of tobacco education provided at the monthly club meetings by volunteers (41 adults and 26 teens) trained to deliver the program. At the first follow-up (one year later), the program demonstrated a significant impact on participants' knowledge of the harmful effects of smokeless tobacco use and on participants' intentions to smoke, but the program had no effect on actual use of smokeless tobacco. The two-year follow-up showed no difference between members of clubs receiving treatment and members of control clubs. The authors concluded that providing a tobacco-prevention program through 4-H clubs was difficult to manage because of time constraints on club meetings, but the effort proved to be a useful complement to school-based programs to change social norms.

Other youth organizations that incorporate tobacco-use prevention as part of a general emphasis on preventing substance abuse include the YWCA (Condas 1992), Camp Fire Boys and Girls (Emerson 1992), the Boy Scouts of America (Grau 1992), and the Girl Scouts of the U.S.A. (Eubanks 1992).

The National Parent Teacher Association (PTA) has adopted a number of resolutions that recognize the hazards of tobacco use and support educational programs and community policies to discourage tobacco use (National PTA 1984). However, the organization's materials for parents about drugs do not discuss tobacco use.

"Just Say No" International is an organization founded in the late 1980s to promote local clubs for youth aged 7 through 14 years. These clubs give children information, skills, and support to help them resist drugs, including tobacco ("Just Say No" International 1992). The parent organization and the 11,000 local clubs are largely funded through private sources and are based in schools and community settings, including some public housing sites. Activities include education, recreation, outreach and peer-education, and community service. An evaluation of 12 local clubs that had been active for at least one year revealed that these clubs can offer young people a meaningful role in improving the community, strengthening community ties, helping community members commit to drug-use prevention, and coordinating other prevention efforts (Duper 1992).

Prevention Programs Initiated by the Tobacco Industry

Since 1984, the Tobacco Institute has distributed a series of publications intended to discourage children from smoking (National Association of State Boards of Education [NASBE] 1984, 1987; Tobacco Observer 1984). Although all of these publications emphasize decision-making skills, only the

most recent, *Tobacco: Helping Youth Say No*, actually focuses on tobacco use (Tobacco Institute 1990a, b). The program's cosponsor, The Family COURSE Consortium (Communication through Open minds, Understanding, Respect and Self Esteem) has approached schools and worked with school districts in four major cities to determine the content of their program (Blaunstein 1991). Although promotional materials include testimonials and endorsements, no data concerning the effect of these programs are available.

The first program sponsored by the Tobacco Institute was Helping Youth Decide (NASBE 1984). The program's focus is on parent–child communication skills and responsible decision making (NASBE 1984; Coulson 1985). The program acknowledges that young people should not smoke, but the program itself offers no specific advice on preventing tobacco use (NASBE 1984).

In 1987, Helping Youth Decide was supplanted by Helping Youth Say No (NASBE 1987). Both programs were published in conjunction with NASBE. Like its predecessor, Helping Youth Say No focuses on parent–child communication and on adolescents' decision-making skills. NASBE was criticized by a number of individuals and organizations for its involvement with the Tobacco Institute and eventually ended its association with the program.

The current version of Helping Youth Say No consists of a booklet entitled *Tobacco: Helping Youth Say No—A Parent's Guide to Helping Teenagers Cope with Peer Pressure.* Provided at no charge, these booklets are designed "to increase communication between parents and children and to raise levels of mutual trust and respect." The text discusses the role of peer pressure in young peoples' lives, helps parents talk with their child about not using tobacco, and includes practical exercises to increase parent–child communication. The booklet is likely to appeal to both smoking and nonsmoking parents, since smoking is described as an adult choice (DiFranza and McAfee 1992). This booklet would not likely affect adolescent behaviors because it is directed at parents, who rarely participate in such programs without an incentive (Perry et al. 1989). The materials also do not attempt to set new peer-group norms or encourage peer leadership. Although the program does not specify whether it is to be used as a school-based curriculum, it would not meet the recommended criteria established by the NCI in conjunction with a panel of smoking prevention experts (Glynn 1989; see Table 4).

Prevention Programs Sponsored by Health-Related Organizations

Most of the programs developed by voluntary organizations to prevent smoking among youth are offered as part of a school curriculum. An exception is the American Cancer Society's preschool smoking-prevention program Starting Free—Good Air for Me, which includes various home activity sheets and group activities for preschool settings (ACS 1987). This program was tested among 86 families in four primary care medical settings. Results indicated that children exposed to the program were almost three times as likely as others to report that they intended to protect themselves from adult cigarette smoke (Philips et al. 1990).

The American Lung Association disseminates the Unpuffables, a four-week, home-based program designed to help parents and children aged 9 through 12 years discuss the issue of preventing tobacco use. Pilot tests of the Unpuffables program in schools in Minnesota and Massachusetts and with Camp Fire and YWCA youth groups in Oklahoma showed that parents were aware of and approved of the program (Perry et al. 1990; American Lung Association of Green Country Oklahoma, unpublished data).

The American Lung Association has been active in the area of adolescent smoking cessation. In 1988, a technical advisory group on adolescent smoking cessation reported that demands in this area were unmet and research questions unanswered (Hitchcock 1991). Local affiliates of the American Lung Association have developed one of the few available programs for smoking cessation among adolescents—Tobacco Free Teens, which is used by schools and other organizations in 25 states and 84 local affiliates (Terwedo 1992). A recent, limited evaluation showed lower cessation rates and higher dropout rates than were observed in American Lung Association programs targeting smoking cessation among adults (American Lung Association 1991).

The American Cancer Society, American Heart Association, and American Lung Association joined together in 1988 to launch the Smoke-Free Class of 2000 program. The goal of this education effort is to help the cohort of young people who were first graders in 1988 remain tobacco-free when they graduate in the year 2000. The project reaches about 2 million students and 135,000 teachers nationwide. As students enter junior and senior high school, learning activities will shift from information to community advocacy, creating "youth ambassadors" for a smoke-free society.

Tobacco-Control Advocacy Organizations

DOC, the organization for health professionals that has more than 150 chapters in 23 countries, encourages physicians to counteract the promotion of tobacco to young people (Blum 1980; DOC 1992). Proactive and prohealth strategies in the classroom, clinic, and community use humor and ridicule of tobacco products and

tobacco industry messages to call attention to the marketing of tobacco to children. DOC chapters sponsor youth sports teams and leagues with an antitobacco message, support local minority organizations and events such as the Cincinnati Smoke-Free Jazz Festival, and make "housecalls" (protests) at youth-appealing events sponsored by tobacco companies. DOC has also established a program whereby medical students can teach in school-based smoking prevention efforts and become specialists in school and community health promotion (Shank 1985). DOC's leadership in innovative activities has been noted nationally and internationally, and these activities have been replicated or have been the basis for many communitywide programs.

Other tobacco-control advocacy organizations, such as Stop Teenage Addiction to Tobacco (STAT), SmokeFree Educational Services, Inc., and Americans for Nonsmokers' Rights, sponsor many other creative and effective community-based events, chapters, and conferences. Although the results of these organizational efforts are not usually published in scientific journals, their contributions to smoking-prevention programs and policies in the United States are widely recognized.

STAT, for example, is the only organization in the United States dedicated solely to issues of teenage access to tobacco. Public education and information form a major part of STAT's activities. Central to this are the STAT newsletter, the *Tobacco Free Youth Reporter*, which appears quarterly and is sent to over 100,000 persons worldwide. This newsletter, along with STAT-authored journal articles and press advisories and a STAT-sponsored annual conference, has been used to present and analyze the practices of the tobacco industry. Statewide and community projects to reduce sales of tobacco products to youth have also been central to STAT's activities since its inception. Currently, STAT has a major grant from the Robert Wood Johnson Foundation to expand activities related to teenage access to tobacco in communities in four states and to demonstrate how other communities can take similar actions.

The Teens as Teachers program has been created and disseminated by the American Nonsmokers' Rights Foundation. Teens as Teachers reaches young people most vulnerable to tobacco addiction. Although many current smoking-prevention programs do a good job of teaching adolescents how to resist peer influence, Teens as Teachers also teaches them to think critically while examining both the nature of the tobacco industry's strategies and their right to be protected from primary and secondhand smoke. Teens as Teachers has reached over 1,000 high school students, who in turn have reached over 6,000 elementary and middle school students.

Role of the Mass Media in Reducing Tobacco Use

Introduction

Mass media are particularly appropriate prohealth channels for tobacco education among young people, who are heavily exposed to—and often greatly interested in—the media (Minnesota Department of Health 1989). However, although the general public has received many antismoking messages in one form or another since the 1964 Surgeon General's report on smoking and health (Warner 1989), few messages have been designed specifically to prevent young people from trying tobacco.

Programmatic Use of Mass Media to Reduce Adolescent Tobacco Use

By the early 1980s, the Office on Smoking and Health had responded to the lack of media messages discouraging tobacco use among youth by developing a series of national public service announcements (see Table 7). The major voluntary health agencies have also produced a national broadcast message for youth.

DOC began creating counteradvertising in 1977, often involving young people in designing parodies of tobacco advertisements. DOC purchased advertising space, used counterpromotions (e.g., the Emphysema Slims Tennis Tournament) (Solberg 1992), and encountered occasional censorship (Fitzgerald 1990). DOC has maintained visibility by enlisting medical professionals, youth, and parents for innovative media- and community-based antismoking campaigns. The program has not been formally evaluated.

Young people have also been a major (but not exclusive) target group of several important statewide tobacco-use prevention and cessation campaigns. At their onset in the late 1980s and early 1990s, campaigns in Minnesota, Michigan, and California used funds from dedicated cigarette taxes to fund multimedia promotions. The programs have received funding for several years. These states have employed sophisticated marketing techniques (i.e., they have used marketing experts, focus groups, pretesting, pilot campaigns, and ongoing evaluations) to increase their effectiveness and have arranged for extensive paid and donated advertising to ensure adequate reach and frequency of statewide coverage (Minnesota Department of Health 1991; Kizer and Honig 1990). Each of these campaigns also included an outdoor billboard or poster component that mirrored themes in the broadcast media. In 1989, the Michigan Legislature dedicated revenues from a tax on computer software (about $9 million per year) to health promotion, primarily for AIDS and smoking education (Moore &

Table 7. Major mass-media campaigns to prevent tobacco use among young people, United States, 1983–1992

Source and dates Year of survey	Campaign description	Representative spots
Office on Smoking and Health (1983–1990)	A series of TV spots with attractive images of young people dancing or playing sports; the general theme is that living is positive and smoking is out of fashion	Cigarette Mash Nic (A Teen)
National Cancer Institute (1987)	Radio campaign featuring national radio personality Casey Kasem	Smoking's Out
American Lung Association (1988)	TV spot with awareness message	Cigarettes Are Drugs
Michigan Department of Public Health (1988–1992)	TV spots, billboards, and bus cards showing negative social aspects of smoking	Boy Mouth Girl Mouth
California Department of Health Services (1989–1992)	Culturally diverse multimedia campaign to deglamorize tobacco use, reposition tobacco marketers as part of the problem, and inform about the dangers of smoking	Rappers/Pick It Smart Kids Industry Smokesman In Your Mouth
Minnesota Department of Health (1989–1992)	TV, radio, and billboard campaign showing immediate negative consequences of smoking and emphasizing that most young people don't smoke; negative aspects of chewing tobacco shown	Clothes Animals Smoking Crate Death Breath Charming Intro Billy
American Cancer Society (1990)	TV spot showing peer disapproval of smoking	Smoking Is Real Gross
Vermont Department of Health (1992)	TV spots showing positive aspects of not smoking and negative aspects of smoking, showing how to refuse a cigarette, and emphasizing that most young people don't smoke	Mindy at the Party Breakaway Nicoflame Shy Girl Beautiful Lady

Format and duration (in seconds)	Content
TV (60)	Dancing girls stomp on cigarettes to model quitting; viewers invited to write in for poster
TV (60)	Cartoon of a "butthead" getting shunned by peers
Radio (60)	Smoking portrayed as "out"
TV (30)	A boy in a run-down neighborhood appears to be buying drugs, but it's a pack of cigarettes
TV (15)	Quick and humorous messages: smoking stinks!
TV (15)	
TV (60)	Fast-paced music video: smoking's not cool
TV (30)	Cartoon: young kids are smart and don't smoke
TV (30)	Tobacco executives joke about "getting" smokers
TV (15)	Disgusting look of a cigarette butt in the mouth
TV (15,30)	Smoking makes your clothes smell
TV (30)	Smoking for animals and people is unnatural
TV (30)	It may look like kids are smoking, but not many do
Radio (60)	A rap song says smoking makes breath smell
Radio (60)	Smokeless: disgusting goo on teeth
Radio (60)	Smokeless: heavy metal tune, chewing isn't cool
TV (30)	Three boys show disgust for a girl's smoking
TV (60)	Situation comedy: it's okay to refuse a cigarette
TV (60)	Rock video: benefits of quitting
TV (30)	Cartoon: drawbacks of smoking
TV (30)	Situation comedy: girl pummels talking cigarette pack
TV (30)	Dramatic — and disgusting: smoking gives you wrinkles

Associates, Inc. 1990). The Michigan Department of Health invited representatives from television stations and newspapers to participate in the creative process; the multimedia campaign has included paid and public-service broadcast time, as well as space on television, radio, billboards, and buses.

Several other state health departments have developed smaller campaigns. In 1986, Arizona created a smokeless-tobacco-prevention campaign that included a short television message (or "spot"), a series of peer-influence radio spots, a poster, and a ballplayer spokesperson (Arizona Department of Health Services 1986). Indiana created a television spot to discourage smokeless tobacco use (Indiana State Board of Health 1992); a smoking-prevention campaign with monthly broadcast spots was conducted in Alabama (Alabama Department of Public Health 1992); and in Tennessee, a local television spot was used to support the Smoke-Free Class of 2000 school program (Tennessee Department of Health 1992).

State health departments often use advertising agencies and production companies to create their campaign messages. The campaign in Vermont, however, used materials developed previously by other states and by a research grant from the University of Vermont (Flynn et al. 1992). Using focus groups of Vermont children, the Vermont Department of Health pretested the existing materials (including 15-second messages titled "Girl Mouth" and "Boy Mouth") borrowed from Michigan and the "Smoking Is Real Gross" spot produced by the ACS. The spots that were rated highest by the focus groups were included in Vermont's 1992 statewide campaign.

Most of the major mass-media campaigns listed in Table 7 employed social influence strategies similar to those that were successful in school-based smoking-prevention programs. The California campaign, however, focused more on information-based approaches and most prominently on a strategy to deglamorize tobacco use by exposing the business side of the tobacco industry and by repositioning tobacco marketers as playing a significant role in the problem of adolescent tobacco use (Kizer and Honig 1990). Messages alerting young people to the negative impact of tobacco promotion were also included as a part of research-oriented campaigns (discussed later in this section) in Richmond, California (Hunkeler et al. 1990), and in Vermont (Flynn et al. 1992), but results have not yet been published about the effectiveness of these specific messages. It has yet to be established that making young people aware that they can be vulnerable targets of tobacco advertising contributes to smoking prevention (McKenna and Williams 1993).

Theory and Research on Using Mass Media to Reduce Adolescent Tobacco Use

During the past 20 years, various ideas have emerged on using mass media effectively to prevent the onset of tobacco use or bring about its cessation among young people. An important article by Flay, DiTecco, and Schlegel (1980) expanded previous information-based models to include new elements that would increase the likelihood of promoting and maintaining health behaviors through the mass media. These elements included techniques to ensure that messages are attended to, comprehended, and accepted, as well as techniques to convey skills, stimulate social interaction, and reinforce behavior. Schilling and McAlister (1990) integrated social and behavioral research and theory into media-based prevention strategies for tobacco and drug use. Further, DeJong and Winsten (1990) incorporated more developed principles of social marketing and experiences of researchers and other practitioners in health promotion and commercial marketing to present a detailed set of recommendations on the use of mass media to prevent substance abuse.

As in the case of national campaigns, research on the use of mass media to bring about the prevention or cessation of tobacco use among young people has been sporadic and may warrant further commitment at the national level (Bauman 1992). The best-organized research effort was coordinated in the mid-1980s through the NCI's Smoking, Tobacco, and Cancer Program (Bettinghaus 1988). Three research grants coordinated by this program tested approaches for using mass media for smoking prevention and cessation among young people.

The first of these studies, at the University of Southern California (Flay et al. 1988), evaluated a strategy developed in previous projects. In that strategy, school-based programs that emphasized skills to resist social influences to smoke were extended to include segments on southern California's evening news broadcasts (Sussman et al. 1987). Although school programs were effectively carried out, the television segments were not able to meet the objectives of the study, because the commercial news organization and its labor contracts did not allow the newscast to include scripted demonstrations of prevention skills. Researchers from the university were not able to participate in the production process, nor were they able to pilot-test the television segments. The authors conclude that "the resulting programming did not demonstrate social resistance skills in the progressive and detailed way that is necessary for adequate learning to take place" (p. 604).

The second study, at the University of North Carolina at Chapel Hill (Bauman et al. 1988), used

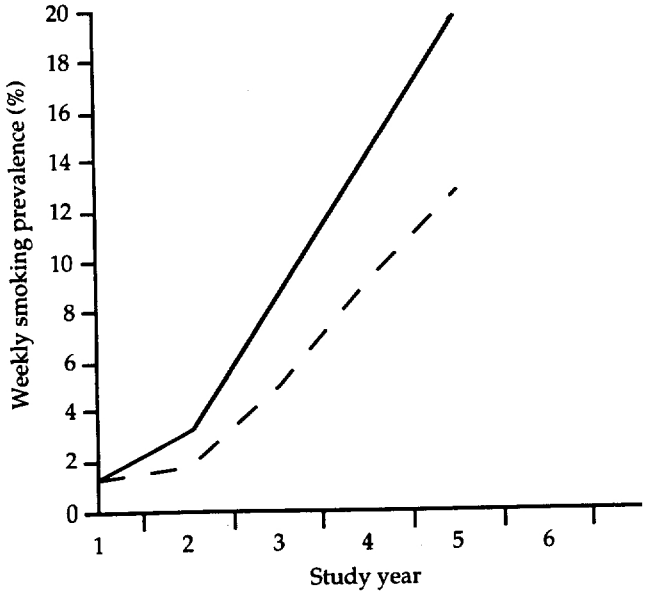
contemporary marketing techniques coupled with behavioral science theory to develop three campaigns that could be practical and inexpensive enough to be disseminated nationally if proven successful. A radio campaign used eight messages about expected consequences of smoking. Another radio campaign invited young people and their friends to enter a sweepstakes by pledging not to smoke. Lastly, a television campaign combined these two approaches. These campaigns were conducted as paid media, not as public service announcements. The intervention, which involved 10 media markets in the southeastern United States, was expected to reach 75 percent of its adolescent target audience during 1985 and 1986. Although none of these campaign approaches resulted in reductions in the onset of smoking, improvements were observed in two important psychosocial factors—the expected utility of smoking and friends' approval of smoking (see "Social Support for Smoking" and "Subjective Expected Utility" in Chapter 4). The authors also found that radio was as effective as television for reaching the adolescent audience (Bauman, Padgett, Koch 1989; Bauman et al. 1991).

The third study, at the University of Vermont (Worden et al. 1988), tested the ability of mass media interventions to increase the efficacy of a school-based smoking-prevention program. In this intervention strategy, media and school programs shared educational objectives but were otherwise independent. A total of 36 television and 17 radio messages were developed by using extensive diagnostic and formative research with students in grades 4 through 10. The messages were broadcast in a four-year paid campaign in cities in Montana and the northeastern United States from 1986 through 1989. Results indicated that the smoking prevalence for students who received both the media campaign and the school program was 34 to 41 percent lower than for students who received the school program only (Figure 4). The study observed consistently positive results for intervening measures (Flynn et al. 1992). An alternative approach that used the community as the unit of analysis also showed a significant difference between treatment groups over time (Flynn et al. 1992). This campaign used various message formats and production styles, including nonauthoritarian appeals that avoided direct exhortations not to smoke. The authors suggested that because the media campaign was not explicitly linked to the school program (e.g., the two components did not share materials, designs, or slogans), adolescent viewers may have perceived that young people across the nation were receiving the same nonsmoking messages—and that nonsmoking was indeed the norm.

Other than the three studies funded by the NCI, little mass-media research has been directed at adolescent smoking. The recent California mass media campaign included young people as a major target audience; about one-third of the television messages, one-quarter of the radio messages, and over one-half of the outdoor advertisements addressed young people as well as other specified groups (e.g., pregnant women, young adults, adults) (Kizer and Honig 1990).

Although the goals of the California campaign intermingle youth and adult priorities, the goals that seem to apply to youth are those that deglamorize the myths about tobacco use, expose problems created by the tobacco industry, and provide information about the hazards of smoking. A few spots touch on these topics (Table 7), but several others, said to be targeted to the youth audiences in the California media plan, seem to be intended for adults, such as spots about youth access to cigarette vending machines and about spots that show children worrying about their parents' smoking. Measurements before and after campaign waves, however, indicated significant changes in message awareness (Popham et al. 1991), and a report by Glantz (1993) indicates an association between the media campaign and a decline in cigarette consumption throughout California. Recently released data suggest, however, that this decline is not being observed among youth (Pierce et al. 1993).

Figure 4. Smoking prevalence in University of Vermont program using mass media to prevent adolescent smoking



Source: Adapted from Flynn et al. (1992).

Mass media were also used in the Midwestern Prevention Project, a multicomponent community program (Pentz, MacKinnon, Dwyer, et al. 1989) in Kansas City in 1987, but effects of the media were not assessed separately. An evaluation of the statewide Minnesota campaign indicated that youth were aware of the negative personal and social consequences of smoking and could recall two campaign themes—that "smoking is unnatural" and that "not many kids my age smoke" (Minnesota Department of Health 1991). Mass media were also an integral part of a community-based smoking-cessation program for minorities in Richmond, California, in which billboards, bus posters, direct mail, television, coverage on a national evening television news show, and rap music video presentations supported community program activities. Both participation and awareness were high among these minority youth, although summary results have yet to be reported (Hunkeler et al. 1990).

Effective Designs for Mass-Media Campaigns

Although mass media in the United States have been used to convey messages urging youth not to use tobacco, efforts to use the media for this purpose have been meager when compared with the highly coordinated, well-funded campaigns of tobacco advertisers. In the absence of a national campaign against tobacco use, with coordinated themes and paid counteradvertising, state agencies and voluntary organizations have launched short-term efforts that have had limited evaluations of their impact. Research on the potential uses of the media has been restricted to a few experimental studies using divergent media strategies, and only one of the studies has resulted in a significant reduction in smoking among adolescents (Flynn et al. 1992).

Although a national commitment to using mass media to prevent tobacco use among youth has been limited, sufficient evidence now exists to examine this tactic further. The effectiveness of a large-scale mass-media and school-based program has been demonstrated in the University of Vermont study (Flynn et al. 1992), albeit with largely white student populations in northern states. In addition, several applicable principles of effective campaign design have been identified within the disciplines of marketing, advertising, health education, and the social sciences (Flay, DiTecco, Schlegel 1980; Flay 1986; Schilling and McAlister 1990; DeJong and Winsten 1990; Flay and Burton 1990; Flynn et al. 1992). These principles, which are discussed below, can be applied to future mass media programs for young people.

- In planning campaigns to prevent tobacco use, target groups should be carefully differentiated. If a campaign is aimed at youth only, it may be best to separate it from community or school ties and to use media and message formats that appeal to youth only (Flynn et al. 1992). Even within the youth population, segmentation (e.g., by age, gender, racial/ethnic group) may be necessary. If the campaign is community based, either for youth or their parents, it should closely connect with community resources and appeal specifically to either the youth or the parent target group—not to both (Hunkeler et al. 1990).
- The planning of prohealth campaigns for young people should attend to the critical issues of message design identified in the literature (Flay, DiTecco, Schlegel 1980; Flay 1986; Schilling and McAlister 1990; DeJong and Winsten 1990; Flynn et al. 1992). These issues include appealing to the needs and interests of the target group (e.g., peer approval, freedom, autonomy); using peer models, image appeals, or lifestyle appeals instead of cognitive appeals; providing novelty and humor (Blum 1980); avoiding exhortation; using celebrity spokespersons cautiously; and demonstrating preventive skills.
- Messages should be carefully scrutinized by knowledgeable persons and by representatives of target groups to ensure that these messages are not conveying unintended effects that may eclipse their positive value (Flay and Burton 1988). Antismoking messages that show young people smoking or asking someone for a cigarette may unintentionally employ powerful images of the social functions of smoking, particularly if the supposedly negative role model is in any way attractive or appealing to the target audience. These images may greatly outweigh the impact of a voice-over narrator's message—a message that could be almost meaningless to the image-oriented target group of young people.
- Diagnostic and formative research, including surveys and focus groups, should be employed at appropriate points throughout the creative process. Diagnostic research can identify perceptions and needs in the target audience that are critical for concept development (Worden et al. 1988). Formative research, at both preliminary and advanced stages of message execution, avoids potentially damaging, unintended message effects (Flay and Burton 1988) and gives producers confidence that the message will be accepted and appreciated by the target audience. Pretesting during the execution phase is critical for messages aimed at youth, because much of the