

onset in this study. McCaul et al. (1982) found no association between boys' smoking and participation in extracurricular activities. Among urban black females in Brunswick and Messeri's (1984) study, those who reported minimal concern about their health and those who reported a larger appetite were more likely to begin smoking; in contrast, black males who had the greatest number of health-related activities and were of normal body weight were more likely to begin smoking than other black males (Brunswick and Messeri 1983). Sussman et al. (1993) found that among youth at the highest risk of smoking, those who did not smoke reported that they valued their health. Finally, in Kelder's (1992) longitudinal study of secondary school students in the north-central United States, cigarette smoking was found to be related to poor food choices and less exercise after the eighth grade; the correlation between these behaviors was stronger with increasing age.

Behavioral Skills

The final set of behavioral factors comprises the behavioral skills that are necessary to begin smoking, those that are necessary to resist influences to smoke, and those that are necessary to cope with other social situations that might indirectly encourage cigarette use. Hahn et al. (1990) found that 42 percent of smoking experimenters had asked for their first cigarette. In the Sussman et al. (1987) study in southern California, difficulty in refusing offers to smoke predicted onset for all four ethnic groups, particularly for whites and blacks, for whom it was the strongest predictive factor found in the study. This difficulty in refusing an offered cigarette appears to be strongly influenced by the offering friend's attitudes and behaviors (e.g., being persistent or critical if refused), particularly for high-risk adolescents (Salomon et al. 1984; Lawrance and Rubinson 1986; Reardon, Sussman, Flay 1989). Conrad, Flay, and Hill (1992) reviewed three prospective studies and found that refusal or resistance skills against smoking were associated with lower rates of onset.

Generally, cigarette use can be viewed as a coping mechanism—a skilled response designed to close the gap between an adolescent's current position and goals (Leventhal et al. 1991). Smoking serves as a coping response if it brings the adolescent closer to a valued goal, such as acceptance in a peer group. Smoking may also serve as a coping response to stress or distress (Wills and Shiffman 1985; Castro et al. 1987). These studies suggest that youth need more general social skills, such as being able to cope with various kinds of stress or social pressures, to help them manage the many developmental demands of adolescence (Franzkowiak 1987). A more comprehensive concept of skills that has been

used in prevention efforts is discussed in Chapter 6 (see "Instilling Skills for Resisting Social Influences to Smoke" and "Exemplary Programs for Resisting Social Influences").

Personal Factors in the Initiation of Smoking

Personal factors are those that are inherent in the individual; they include cognitive processes, values, personality constructs, and psychological well-being. These factors can be considered the personal filters through which sociodemographic and environmental factors pass as they influence behavior. Personal risk factors also explain differences in behavior among individuals exposed to the same or similar environments. The personal factors that have been examined in the research literature include levels of knowledge about the health consequences of smoking, the functions or meanings of cigarette use among adolescents, the subjective expected utility (SEU) of smoking, self-esteem, self-image, self-efficacy in refusing offers of cigarettes, personality variables, and emotional well-being.

Knowledge of Long-Term Health Consequences

Knowledge of the long-term health consequences of smoking has not been a strong predictor of adolescent onset (Collins et al. 1987; Krohn, Naughton, Lauer 1987; Sussman et al. 1987; Conrad, Flay, Hill 1992; Royal College of Physicians of London 1992), perhaps because virtually all U.S. adolescents—smokers and nonsmokers alike—are aware of the long-term health effects of smoking and because many adolescents feel inherently invulnerable in their characteristically short-term view (Gerber and Newman 1989). Belief that smoking has short-term effects on health appears to be a more powerful influence than knowledge of long-term health effects (Krohn, Naughton, Lauer 1987; McNeill et al. 1988). Similarly, belief in personally relevant negative social consequences of smoking has been associated with a decline in smoking prevalence among secondary school students (Chassin et al. 1987). Botvin et al. (1992) found that lack of concern about the harmful effects of smoking was associated with intentions to smoke among young, inner-city black adolescents. Similarly, dismissing or minimizing the health consequences of smoking has been associated with both initiation of cigarette use and adult smoking levels (Mittelmark et al. 1987; Swan, Creeser, Murray 1990). Krohn, Naughton, and Lauer (1987) found that smoking behavior predicted beliefs about the health effects of smoking more than beliefs predicted future cigarette use. Knowledge of the health consequences of smoking may or may not deter some adolescents from beginning to smoke; beginning to smoke appears to accentuate adolescents' denial of the health consequences.

Functional Meanings of Adolescent Smoking

The question of why adolescents begin to smoke has led to multiple examinations of the meanings of cigarette use, the utility of smoking, and the functions that smoking serves in an adolescent's life (Leventhal and Cleary 1980; Perry, Murray, Klepp 1987). Examining smoking from the perspective of the adolescent is a departure from viewing the onset of smoking exclusively as a response to the social environment or as capricious, arbitrary behavior. Since knowledge of the harmful consequences of cigarettes does not appear to deter onset, researchers are examining the social reasons and purposes of smoking.

Adolescents who begin to smoke perceive a more functional purpose of smoking than those who are nonsmokers (Gerber and Newman 1989). Adolescent smokers are more likely to view smoking as a way to act mature, be accepted by a peer group, have fun, cope with personal problems and boredom, or be rebellious (Perry, Murray, Klepp 1987). Cigarette smoking has also been shown to be a coping behavior for adolescents who are dealing with disruptive and stressful family events (Castro et al. 1987). Hunter et al. (1987) found that adolescent smokers were significantly more likely than nonsmokers to believe that smoking has psychological and physiological benefits. They were also less likely to believe that others smoked for negative reasons, such as to "show off."

In the research of Hahn et al. (1990), regular smokers were asked why they first had tried cigarettes and why they had most recently smoked. Sixty percent reported that curiosity was the reason for their first try, 13 percent said that they wanted to fit in with a group, and 10 percent reported that they were pressured into it. For most recent use, 27 percent reported that they smoked for pleasure, 20 percent out of dependence, 17 percent because they were curious, and 10 percent to fit in with the group. These findings are consistent with Chassin et al. (1984), who suggest that positive attitudes toward smoking, such as the idea that smoking is fun or pleasurable, are a better predictor of the transition to regular smoking than they are for first experimentation. In general, these investigators found that positive attitudes toward smoking may increase as a function of age. Botvin, Botvin, and Baker (1983) found that independent of the smoking status of friends, students in the eighth grade (13- and 14-year-olds) were more likely to have a positive social image of smoking than students in the seventh grade (11- and 12-year-olds).

Subjective Expected Utility

Bauman et al. (1984) have examined the SEU of smoking for adolescents in a longitudinal study in North

Carolina. SEU is defined as the extent to which an individual expects the overall consequences of a behavior, such as smoking, to be positive or negative. Fishbein (1980) found that behavioral intentions to smoke were related to whether more positive or negative consequences were expected from smoking. SEU was found to be predictive of the onset of smoking over a one-year interval and of increased smoking levels among baseline smokers (Bauman et al. 1984). In a second study, SEU was found to be mediated by the adolescent's perception of personal control; current smokers with the highest scores for internal locus of control (that is, the belief that they have control over what occurs to them) were more likely to have been influenced by SEU (Bauman and Fisher 1985). Therefore, regular smoking appears more likely to be motivated by internal processes than are initiation and trying, which may primarily be products of exposure to a high-risk social environment.

Self-Esteem

The process of individuation and identity formation is inherent to adolescence. The adolescent's sense of self evolves as she or he interacts with parents, school, and peers and considers options for the future. Self-esteem, or an individual's qualitative self-evaluation, emerges from these contexts (Young and Werch 1990). In several studies, the onset of smoking has been associated with lower self-esteem. Young and Werch (1990) found that young nonsmokers and those with no intention of smoking in the future had higher self-esteem relative to family, school, and peers than frequent users or those who intended to use in the future. Ahlgren et al. (1982) found that low self-esteem within family or school contexts was associated with initiation and continuance of smoking. Self-esteem concerning school predicted intentions to smoke among young, inner-city black adolescents (Botvin et al. 1992) but did not predict actual smoking. Stacy et al. (1992) found that general low self-esteem directly predicted smoking onset in a multiracial, southern California sample yet did not significantly mediate friends' social influences. In their review of prospective research, Conrad, Flay, and Hill (1992) conclude, "Self-esteem received fairly consistent support [as a predictor of initiation] from the reviewed longitudinal studies. This is better than we would have expected from our reading of previous cross-sectional studies" (p. 20).

Self-Image

Some adolescents may smoke cigarettes to enhance their low self-esteem by improving their external image—that is, by appearing mature or "cool." Smoking onset was seen as a way to improve self-image among

whites, blacks, and Hispanics in southern California (Sussman et al. 1987). Role models who smoke are frequently seen to have socially desirable attributes—they seem tough, sociable, and sexually attractive (Chassin, Presson, Sherman 1990). Adolescents who believe that smoking bestows these attributes may see smoking as a powerful mechanism for self-enhancement. These young people may experiment with smoking to try to adopt a perceived positive social image and thereby improve the way others, particularly peers, view them (Chassin, Presson, Sherman 1990; Leventhal et al. 1991). If peers respond favorably to this strategy, these new young smokers may continue to smoke, since the behavior has proved functional for them in creating an acceptable self-image.

Self-Efficacy

An individual's efficacy (or confidence) in performing specified skills and behaviors is a significant mediator of peer influences to smoke (Bandura 1986). Ellickson and Hays (1990–91) found that low self-efficacy, as measured on a scale of having little or much confidence in resisting offers of drugs, was associated with drug use, including smoking. DeVries, Kok, and Dijkstra (1990) found that self-efficacy in resisting offers to smoke was the best predictor of smoking among adolescents in the Netherlands over a one-year interval. Similarly, Lawrance and Rubinson (1986) found that young adolescents' perceptions of their ability to resist cigarette smoking corresponded to their self-reported smoking. Finally, Stacy et al. (1992) found in their cross-sectional study of high school students not only that low self-efficacy in resisting social influence was a significant predictor of smoking, but also that high self-efficacy was the only significant mediator of friends' social influences on smoking. Therefore, self-efficacy, a personal factor, appears to act as a buffer that protects adolescents from potent peer influences to smoke (Conrad, Flay, Hill 1992).

Personality Factors

The research on personal factors has also examined many personality factors for their association with onset, in part to assess whether underlying emotional or psychological problems predict adolescent smoking. Personality characteristics that are related to deficiencies in self-control, such as impulsiveness and sensation-seeking tendencies, are important and were discussed earlier in this chapter in connection with behavioral factors.

Psychological Well-Being

Several studies have associated cigarette smoking and symptoms of depression among adolescents. Covey

and Tam (1990) showed an independent relation of depressive mood, friends' smoking behavior, and living in a single-parent home with cigarette smoking among 205 urban 11th-grade males and females. Depression scores correlated with the number of cigarettes smoked. Malkin and Allen (1980) found a significant association between smoking and depression among males in a study of 229 rural 8th- and 11th-grade students, a finding that was replicated for both genders by Kaplan et al. (1984).

Stein, Newcomb, and Bentler (unpublished data) found that cigarette use was positively associated with being extroverted and negatively associated with having symptoms of depression among junior high school students in Los Angeles. Cigarette use, however, significantly predicted symptoms of depression in these young people four and eight years later (Newcomb, McCarthy, Bentler 1989). These findings may reflect the addictive quality of tobacco use beyond the earliest experimental states and the relationship between smoking and depression, since depression is a personality factor that usually persists over time. Smoking might be a short-term, self-medicating response to symptoms associated with depression. In the long-term, however, this effect would diminish; as tolerance to nicotine increases, the possible antidepressant effects of smoking (such as alertness, euphoria, and calm) dissipate (Newcomb, McCarthy, Bentler 1989). Similarly, Leventhal, Fleming, and Glynn (1988) found that reported feelings of helplessness were associated with more rapid movement to a second and third experiment with smoking; however, these feelings were not related to the initial experimentation. The association of smoking and suicide attempts, another clearly serious symptom of depression, is presented in Chapter 3 (see "Cigarette Smoking and Other Health-Related Behaviors").

Flay (1993) suggests that symptoms of depression may be a response to distress associated with stress and poor family bonding. He points out that stress and distress have been associated with drug use, including tobacco use (Wills and Shiffman 1985). The research of Kellam, Ensminger, and Simon (1980) suggests that this cycle may begin early in life. In their study of first-graders (aged five through seven) in Chicago, they found that males rated by observers as aggressive or as alternately shy and aggressive had the highest rate of drug use, including cigarette use, 10 years later; no long-term psychological predictors were found for females. In another study (Brunswick and Messeri 1984), adolescent males were more likely to begin smoking if they were pessimistic about the likelihood of the world becoming any better or if they held low expectations for their own future; for adolescent females, a shortened time perspective (i.e., a

limited ability to conceptualize their future) was the most important psychogenic predictor of initiation.

Adolescent Smoking Behavior as a Risk Factor for Subsequent Smoking

Intentions to Smoke

Since intentions are viewed as proximal to performance, the research on smoking behavior as a predictive factor of smoking includes behavioral intentions to smoke. In several studies, intentions to smoke have been associated with both the onset and continuation of smoking. Sussman et al. (1987) found in their longitudinal study in southern California that the intention to start smoking was one of only three factors that predicted onset among all ethnic groups. McNeill et al. (1988) found that future intentions to smoke increased the odds of starting to smoke by a factor of 2.44 and was the strongest predictor of change in smoking status after current behavior (having tried smoking) and gender were entered into the analysis. In the Chassin et al. (1984) longitudinal study, behavioral intentions were "significant predictors of future smoking transition in all subgroups, accounting for between 1.9 percent and 10.2 percent of the variance in transition. . . . In fact, behavioral intentions were typically the most important single predictor of future transition" (p. 237).

Intentions to smoke appear to be a particularly strong predictor of future smoking for those who have already tried smoking. Shean (1991) found that intentions to smoke a "next cigarette" among 14-year-old Western Australians predicted smoking eight years later. Conrad, Flay, and Hill (1992) found that in eight of nine prospective studies of young adolescents, the intention to smoke was significantly associated with onset. Because of the strength of this association, several researchers have used intentions to smoke as an outcome measure in their studies, especially in populations (such as pre-adolescents) where smoking prevalence is low relative to adolescents' intentions to smoke. Intentions to begin smoking seem a much more reliable predictor of future behavior than do intentions to quit smoking (see "Adult Implications of Adolescent Smoking" in Chapter 3).

Present Smoking Status

Any cigarette use places an adolescent at higher risk for subsequent use and for further progression through the stages of smoking behavior. Conrad, Flay, and Hill (1992) document seven prospective studies in which prior experience with, or exposure to, smoking predicted tobacco use. McNeill et al. (1988) found that

the act of having tried smoking was the most predictive factor in initiation and that it more than quadrupled their study participants' odds of taking up smoking. Collins et al. (1987) found that prior smoking behavior was the most important predictor of future smoking over a 2.5-year interval. Even though the physiological effects of the first tries are mostly adverse (unpleasant taste, coughing, headache, nausea, dizziness) (Hahn et al. 1990), those who persist report increasingly positive reactions (pleasant taste, euphoria, alertness, relaxation, curbing of appetite) and develop tolerance (experience fewer unpleasant sensations) (Flay 1993). Stein, Newcomb, and Bentler (unpublished data) reported a more established pattern of cigarette use among young adults than among adolescents. In their study, the standardized regression coefficient of prior smoking for smoking behavior between Year 1 and Year 5 (youth in junior high and high school age groups) was 0.43, yet from Year 9 to Year 13 (young adulthood) it was 0.82. The authors suggest that in early adolescence, some cigarette triers never fully develop a pattern of smoking, but by late adolescence, the addictive properties of cigarette use figure prominently in behavior formation. These findings underscore the need for antismoking efforts to focus on preventing initial tries, on discouraging transitions to more regular smoking, and on encouraging early cessation (Leventhal, Fleming, Glynn 1988; Kelder 1992).

Summary of Psychosocial Risk Factors for Cigarette Smoking

Some clear convergence of research findings emerges from this review, a summary of which is highlighted in Table 1. Table 3 provides a second summary of supportive and unsupportive findings from the Conrad, Flay, and Hill (1992) review of 27 prospective studies; for the most part, this summary table is consistent with Table 1. Among the sociodemographic factors, age is the risk factor consistently linked with onset in early adolescence; ages 11 through 15 (seventh through ninth grades) are the peak age group for first trial and experimentation. Cigarette smoking clearly has social meanings that are attractive to many young and vulnerable identity-seeking adolescents. This age factor is even more pronounced when linked with SES, another important sociodemographic risk factor for smoking onset. Alternative health-enhancing avenues for independence and identity may be less readily available to adolescents from lower SES families, especially those adolescents who live in a single-parent home. Limited by fewer opportunities for healthy development and parental supervision, lower-SES youth are generally at greater risk to begin smoking. The gender difference, another major factor, is no longer evident, although the meanings of

cigarette use and the pathways to regular use may vary by gender. Finally, differences by ethnic group do not appear to show a consistent pattern across communities, particularly when income level and cigarette availability are considered. The review of sociodemographic factors thus concludes that a young adolescent from a low-SES family is at highest risk to begin smoking.

Proximal environmental factors, such as the influence of peers, friends, and siblings, play a powerful role in the initiation of adolescent smoking. Smoking initiation appears to be a component of peer associations and peer bonding in adolescence, as peer groups establish shared behaviors to differentiate themselves from other adolescents and from adults. Adolescents usually try their first cigarettes with their peers; peer groups may subsequently provide expectations, reinforcement, and opportunities for continuation. The influence of peers seems to be particularly potent in the stages of smoking that precede regular use; in later stages, personal and pharmacological factors appear to predominate.

Data on the influence of parental smoking are not as compelling as those on peer influence; only about half of the prospective studies show a clear predictive relationship. The influence of parental smoking appears to be strongest for whites and females, particularly in the early stages of smoking onset. This review suggests that parental influence might include other important factors, such as parents' approval or disapproval of smoking, their involvement in free-time supervision, their manner and extent of communication on health-related matters, or their promotion or nonpromotion of academic achievement for their children. Lastly, young people are exposed not only to role models but also to the consequences of the behavior of these role models; having a parent who smokes might even serve to deter an adolescent from smoking if the parent is struggling with cessation or displays the health consequences of tobacco use.

How adolescents perceive their social environment also influences their smoking behavior. Adolescents overestimate the number of young people and adults who smoke, and those with the highest estimates are more likely to become smokers. In addition, young people are more likely to smoke if they feel that their peers approve of smoking, and particularly if adults do not seem to disapprove. In each of these cases, the perceived environment could accurately reflect the actual environment. Those who begin to smoke may actually be exposed to more role models who smoke, more peers who approve of smoking, and fewer adults who disapprove than those who never begin to smoke.

Families in which parents are considered to be generally concerned and supportive, or in which the children are involved in family decisions, are home

environments in which adolescents are less at risk for smoking initiation. Parental strictness and parental approval or disapproval of smoking have indirectly and inconsistently predicted initiation and are therefore less influential on adolescent smoking behavior than the general family environment. The research on parental skills in coping with adolescent smoking is limited and warrants further investigation.

The behavioral factors examined were consistently associated with the initiation of cigarette smoking. Patterns of behavior that are associated with smoking include alcohol and drug use, risk-taking and rebellious actions, and involvement in peer groups in early adolescence. Patterns of behavior that are associated with less risk of smoking include academic achievement, involvement in sports (for females), healthy eating and physical activity patterns, and the ability to resist offers of cigarettes. Thus, encouraging and providing opportunities for health-enhancing activities and academic achievement might, by fulfilling some of the needs that smoking apparently meets for adolescents, prevent some young people from trying their first cigarette.

The personal factors—those most proximal to the individual and to the immediate decision to smoke a cigarette—reflect, in part, the adolescent's internalization of the social environment. An adolescent's knowledge of the health consequences of smoking is a poor predictor of subsequent cigarette use, although smoking risks that are personalized appear to be important. More significant predictors include the meanings, the perceived positive functions, and the expected utility of cigarette use. These aspects are linked to having a positive social image, bonding with peers, and being "mature"—all of which are particularly socially relevant for adolescents. Compared with nonsmoking adolescents, those who begin to smoke appear to have lower self-images and lower self-esteem; for them, smoking becomes a self-enhancement mechanism. Similarly, self-efficacy toward avoiding cigarettes seems particularly linked with the ability to resist cigarette offers from peers. Of the personality variables, symptoms of depression, helplessness, aggression, pessimism, and a limited ability to conceptualize the future were all found to be smoking-predictive in a small number of studies. The most predictive personal factors were those linked to the social environment, to peers, and to the meanings of cigarette smoking learned in youth.

Intentions to smoke and prior experimentation with cigarettes strongly predict subsequent smoking. The adverse physiological reactions to first tries at smoking wane with repetition, and tolerance levels to nicotine increase. Adolescents who smoke are more likely than nonsmokers to discount the negative health consequences of smoking, report positive functions of smoking, and

perceive that their peers are smokers. The shift from social to more personal reasons for smoking is associated with increasing nicotine dependence and addiction.

Several other factors that influence smoking initiation are not covered in this chapter. First, the combined influence of tobacco advertising and promotion represents a powerful environmental risk factor (see Chapter 5). Second, cultural or community-level research on the causes of smoking onset is decidedly limited. In particular, the effect of taxation, of restrictions to public smoking, of vending machine regulations, and of limiting access to tobacco for underage buyers needs to be addressed prospectively (Chapman and Bloch 1992; Sweanor et al. 1992; see Chapter 6). Third, even at the school level, smoking prevalence rates have been shown to be partly attributable to attendance at a particular school and to school smoking policies (Best et al. 1984; Semmer, Lippert, et al. 1987; Pentz et al. 1989; Santi et al.

1990-91; see "Smoking Restrictions in the School" in Chapter 6). Still, which aspects of schools contribute to smoking onset—whether their rules, consistency of rule enforcement, grade structure, or discipline procedures—need to be studied. These distal environmental factors partly determine the meaning for, and acceptability of, cigarette use at a community level, determine the ease or difficulty with which adolescents can obtain tobacco, and reinforce or inhibit the continuation of use into adulthood. Proximal factors are strong determinants of use once the meaning of smoking is established and access to cigarettes is possible. Therefore, the more distal risk factors might be considered the proper targets of intervention research efforts, which should test the potency of these factors and provide the clear community-level message that cigarette smoking among the young is unacceptable.

Initiation of Smokeless Tobacco Use

Compared with the research literature on smoking initiation, the knowledge base on smokeless tobacco initiation is modest. Far fewer longitudinal studies have been conducted. For the most part, research efforts on smokeless tobacco have been cross-sectional; a few have also been guided by behavioral theory. Nonetheless, a number of methodologically sound studies provide knowledge about the risk factors associated with the initiation of smokeless tobacco use. In parallel with the research on cigarette smoking among young people, sociodemographic, environmental, behavioral, and personal factors have all been explored as correlates of smokeless tobacco use. With only a few exceptions, the consistency of the findings with those found for cigarette smoking suggests that both smoking and the use of smokeless tobacco products share a common causality as well as similar functions and meanings for young people.

Sociodemographic Factors in the Initiation of Smokeless Tobacco Use

National survey data on the demographics of smokeless tobacco use are presented in detail in Chapter 3 (see "Recent Patterns of Smokeless Tobacco Use") and are only summarized here. These data clearly indicate that smokeless tobacco use among young people is particularly prevalent among non-Hispanic white males.

The three youth surveys that assessed smokeless tobacco prevalence (that is, use during the month preceding the survey) also found that males were 10 to 15 times more likely than females to use smokeless tobacco. Although nationally representative data on American Indian and Alaskan Native youth are not available, community-level studies of these populations have reported high rates of weekly smokeless tobacco use among both males (43 percent) and females (34 percent), even at very young ages (Schinke et al. 1987, 1989; Bruerd 1990).

The Monitoring the Future Project survey, a national survey of high school seniors, indicated that 54 percent of males had used smokeless tobacco. Among those, 23 percent first used smokeless tobacco before or during the sixth grade, and over 53 percent first used it before or during the eighth grade (see "Grade When Smokeless Tobacco Use Begins" in Chapter 3). Data from a number of other recent surveys suggest that early adolescence is the peak age for first using smokeless tobacco (Schaefer et al. 1985; US Department of Health and Human Services [USDHHS] 1986; Ary, Lichtenstein, Severson 1987; Ary et al. 1989; Riley, Barenie, Myers 1989; Brownson et al. 1990; Riley et al. 1990, 1991).

Limited evidence suggests that the following sociodemographic factors may also be related to higher rates of smokeless tobacco use among youth: one or no parents in the household (Jones and Moberg 1988; Murray et al. 1988; see "Sociodemographic Risk Factors for

Smokeless Tobacco Use" in Chapter 3); lower parental education (Bauman, Koch, Lentz 1989; Botvin, Baker, Tortu 1989); blue-collar parental occupation (Burke et al. 1989; Elder, Molgaard, Gresham 1988; Novotny et al. 1989); and rural environment (Olds 1988; Botvin, Baker, Tortu 1989; Rouse 1989; Lisnerski et al. 1991; see "Sociodemographic Risk Factors for Smokeless Tobacco Use" in Chapter 3). As is reported in Chapter 3 (see "Current Use of Smokeless Tobacco"), prevalence varies among regions and is somewhat lower in the Northeast than in other regions.

Environmental Factors in the Initiation of Smokeless Tobacco Use

Factors That Influence Acceptability and Availability

Ease of access to smokeless tobacco appears to be an important factor in initiation, and young people seem to have little trouble obtaining smokeless tobacco (USDHHS 1992a, CDC 1993). In interviews conducted by the Office of Inspector General (USDHHS 1986), 90 percent of smokeless tobacco users in junior and senior high school reported that they purchased their own smokeless tobacco; 94 percent reported that although they were minors, it was either never or only rarely difficult for them to purchase smokeless tobacco. Convenience stores were the most frequent purchase site (55 percent); supermarkets and grocery stores accounted for an additional 33 percent of sales. Barovich et al. (1991) found that 50 percent of store personnel were willing to sell to minors. In another study (Leopardi et al. 1989), junior high school students reported that their leading sources of smokeless tobacco were friends (43 percent) and direct store purchase (30 percent); senior high school students' chief sources were direct purchase (62 percent) and friends (25 percent). In a recent study in Texas, minors successfully purchased smokeless tobacco in 59 percent of stores selling the product (CDC 1993).

Interpersonal Factors

Parental Use

As in the research on cigarette smoking, the evidence depicts either a modestly positive or no significant association between parental use of smokeless tobacco and adolescent use. The only prospective study that examined parental use found no link to onset or continued use of smokeless tobacco among youth (Ary, Lichtenstein, Severson 1987). However, several cross-sectional studies have reported significant relationships between concurrent use by parents and youth (Cohen et al. 1987; Hall and Dexter 1988; Colborn, Cummings,

Michalek 1989; Glover et al. 1989; Brownson et al. 1990). Bauman, Koch, and Lentz (1989) found that an adolescent was more likely to use smokeless tobacco if the father did, although there was an interaction with the level of the father's education. Two cross-sectional studies found no significant association between concurrent use of smokeless tobacco by parents and adolescent offspring (Chassin et al. 1985; Ary, Lichtenstein, Severson 1987).

Sibling Use

The evidence from cross-sectional studies generally supports a relationship between a sibling's use of smokeless tobacco and an adolescent's use. However, one prospective study did not find significant sibling relationships (Ary, Lichtenstein, Severson 1987), and another study found no effect for "older family members" (Chassin et al. 1985). The sole longitudinal study did not find that sibling use was related to adolescent onset (Ary, Lichtenstein, Severson 1987).

Peer Use

Although a substantial amount of cross-sectional research has examined the use of smokeless tobacco by peers, only two longitudinal studies have been published. Every cross-sectional study found that peer use was significantly related to adolescent use (Cohen et al. 1987; Hall and Dexter 1988; Lucas and Christen 1988; Glover et al. 1989; Leopardi et al. 1989; Riley, Barenie, Myers 1989; Brownson et al. 1990; Hunter, Vizelberg, Berenson 1991). Peer use of smokeless tobacco was related to the onset of adolescent use at the 9-month follow-up in one longitudinal study (Ary et al. 1989) but not in another study (Ary 1989) at the 6- and 12-month follow-up times. However, peer use was found to be related to continued use among initial daily users of smokeless tobacco at 6-, 9-, and 12-month follow-ups (Ary, Lichtenstein, Severson 1987; Ary 1989).

Perceived Environmental Factors

Norms

Current evidence indicates that most adolescents who use smokeless tobacco perceive that this behavior is socially acceptable. The Office of Inspector General (USDHHS 1986) reported the following findings from a survey of male adolescents who used smokeless tobacco:

- 86 percent perceived that most or some students at their school approved of smokeless tobacco use.

- 98 percent said their best male friends either approved of, or were neutral toward, their smokeless tobacco use.
- 93 percent said their parents knew of their smokeless tobacco use.
- 68 percent said their fathers and 45 percent said their mothers approved of, or were neutral toward, their smokeless tobacco use.
- 91 percent said their brothers and 71 percent said their sisters either approved of, or were neutral toward, their smokeless tobacco use.
- 87 percent listed their home as a setting where they regularly used smokeless tobacco.
- 43 percent whose dentist knew of their use were not advised by that professional to quit.
- 51 percent said their coaches either approved of, or were neutral toward, their smokeless tobacco use.

These findings were replicated in the 1992 Office of the Inspector General study on Spit Tobacco and Youth (USDHHS 1992b). The adolescents in this study who used smokeless tobacco said that the greatest influences on their trying smokeless tobacco were peer pressure and other family members' use. The majority of these young users felt their parents would agree that their using smokeless tobacco was preferable to smoking cigarettes (USDHHS 1992b).

In another study, only 14 percent of smokeless tobacco users reported that their father disapproved of their smokeless tobacco use, whereas 60 percent said their mother disapproved (Marty, McDermott, Williams 1986). Williams et al. (1986) found that 55 percent of smokeless tobacco users indicated that their parents disapproved of their use. In a study by Ary et al. (1989), only 13 percent of daily smokeless tobacco users reported that their dentist had said anything to them about their use. Brubaker and Loftin (1987) found that smokeless tobacco users reported greater peer acceptance of, and less parental opposition to, their use than did nonusers.

Social Support

Chassin, Presson, and Sherman (1988) examined the relationship between family social support and current use of smokeless tobacco. Three cross-sectional analyses found no pattern of relationships between smokeless tobacco use and perceived parental expectations (for success or academic accomplishment), parental supportiveness,

parental strictness, agreement between parents, parent-peer agreement, or the adolescent's reported motivation to comply with parents. Similarly, two sets of analyses examining one-year prediction of smokeless tobacco onset found no statistically significant effects for the same set of factors, although the statistical power to detect such effects was minimal because the sample contained few cases of smokeless tobacco onset.

Parental Reaction to Smokeless Tobacco Use

Parents appear to be more accepting of smokeless tobacco use than of cigarette smoking. About 40 percent of high school smokers reported that their parents knew about their smoking, whereas smokeless tobacco users reported that 71 percent of their parents knew of their use (Chassin et al. 1985). Similarly, young people who did not use tobacco reported that their parents and peers were more accepting of smokeless tobacco use than of smoking (Chassin et al. 1985; Ary et al. 1989). These findings suggest that adolescents may begin using smokeless tobacco partly because they perceive that it is less deviant than smoking or other drug use and therefore is more likely to be accepted by their peers and parents (Hahn et al. 1990).

Some research evidence indicates that the anticipated parental response to an adolescent's use of smokeless tobacco is related to that youth's likelihood of using smokeless tobacco. Riley, Barenie, and Myers (1989) found that high school students' anticipation of their parents' response was highly predictive of the first trial of smokeless tobacco and of the level of continued use. Brubaker and Loftin (1987) found that adolescents who did not currently use smokeless tobacco but who intended to become users reported that it would be unlikely that their parents would respond by taking away their privileges, reprimanding them, becoming angry, expressing disappointment, or prohibiting them from continued use. These youth also reported that it was likely that their parents would ignore their smokeless tobacco use.

Behavioral Factors in the Initiation of Smokeless Tobacco Use

Academic Achievement

For males, smokeless tobacco use was related to poor academic performance (Jones and Moberg 1988) and to a low grade point average (Brownson et al. 1990). The NIDA national household survey indicated that for males, the prevalence of daily use of smokeless tobacco was highest among school dropouts (13 percent) and lowest among college students (6 percent) (Rouse 1989).

Smoking as a Risk Factor for Smokeless Tobacco

Five longitudinal studies examined the prospective relationships between cigarette smoking and the onset or continued use of smokeless tobacco (Ary, Lichtenstein, Severson 1987; Dent et al. 1987; Murray et al. 1988; Ary 1989; Sussman et al. 1989). (The relationship between smokeless tobacco use and subsequent cigarette smoking is reviewed later in this chapter.) In a longitudinal study of eighth graders, Dent et al. (1987) reported that smoking status at baseline predicted the onset of smokeless tobacco use one year later. Twenty-nine percent of regular smokers at baseline—but only 6 percent of those who had never smoked—reported smokeless tobacco onset at follow-up. Ary, Lichtenstein, and Severson (1987) used discriminant analysis to identify predictors of the onset of smokeless tobacco use nine months after smoking onset among 7th, 9th, and 10th graders. The discriminant function accounted for 11 percent of the variance, and having tried smoking was an important predictor, correlating at 0.64 with the discriminant function. In a similar study using a separate sample of 7th, 9th, and 10th graders in Oregon, smoking did not significantly predict smokeless tobacco onset at 6-month or 12-month follow-ups (Ary 1989). Another longitudinal study found general support for the influence of smoking on seventh graders who had tried smokeless tobacco (Murray et al. 1988). Longitudinal analysis of one-year follow-up data from two other samples of seventh graders indicated that both males and females exhibited a fairly consistent relationship between the onset of smokeless tobacco use and pretest smoking (Sussman et al. 1989).

Three of the longitudinal studies cited above also examined the prospective relationship between cigarette smoking and continued use of smokeless tobacco among adolescents. Ary, Lichtenstein, and Severson (1987) found that baseline smoking did not predict frequency of later smokeless tobacco use at nine-month follow-up. In a separate study, Ary (1989) examined these relationships and found that frequency of smoking was related to continued daily smokeless tobacco use at 12-month follow-up but not at 6-month follow-up. A 24-month follow-up study of ninth graders also found general support for the influence of smoking on later use of smokeless tobacco (Murray et al. 1988). Although the findings from these three prospective studies are inconclusive, numerous studies report significant concurrent relationships between smoking and smokeless tobacco use. The degree of statistical power exhibited by these relationships varied widely, but every study found at least one significant association between smokeless tobacco use and smoking.

Other Adolescent Behaviors

Twelve studies fairly consistently indicated that smokeless tobacco use is related to concurrent use of alcohol and marijuana (Lichtenstein et al. 1984; Ary, Lichtenstein, Severson 1987; Burke et al. 1988, 1989; Jones and Moberg 1988; Murray et al. 1988; Ary 1989; Riley, Barenie, Myers 1989; Rouse 1989; Sussman et al. 1989; Riley et al. 1991; Stevens et al. 1991). One of these studies (Sussman et al. 1989) found that seventh- and eighth-grade females showed no relationship between having tried smokeless tobacco and concurrently using alcohol, but two of four samples with male subjects showed significant relationships. Only three studies examined the prospective relationships between smokeless tobacco use and the use of alcohol and marijuana. In one study, the onset of smokeless tobacco use among those who had not used at baseline was related to marijuana use but not to alcohol use (Ary, Lichtenstein, Severson 1987). In a separate study, initial use of alcohol or marijuana did not predict onset of smokeless tobacco use at 6-month follow-up, but initial alcohol use predicted smokeless tobacco use at 12-month follow-up (Ary 1989). In another 12-month longitudinal study, onset of smokeless tobacco use among those who at baseline had never used smokeless tobacco was predicted by initial alcohol use in one of two samples of seventh-grade females but not in two samples of males (Sussman et al. 1989). Taken together, there is some evidence that prior use of either alcohol or marijuana is related to subsequent onset of smokeless tobacco use and to continued use of smokeless tobacco among daily users.

Several studies suggest that adolescents who use smokeless tobacco are more likely to use multiple drugs than are adolescents who do not use smokeless tobacco. Ary, Lichtenstein, and Severson (1987) found that among male adolescents who reported use of smokeless tobacco, cigarettes, alcohol, or marijuana in the week preceding the survey, 43 percent (47 percent in Ary's separate study [1989]) indicated that they used more than one of these substances during that week. The percentage of daily users of smokeless tobacco who reported use of alcohol during the preceding week was particularly high (76 percent in Ary, Lichtenstein, and Severson's study [1987] and 74 percent in Ary's separate study [1989]). Among daily smokeless tobacco users, 83 percent in Ary, Lichtenstein, and Severson's study (1987) (80 percent in Ary's 1989 study) also reported using a drug other than alcohol, a fact suggesting that daily smokeless tobacco users are particularly likely to be multiple drug users.

Smokeless Tobacco Use as a Risk Factor for Smoking, Alcohol, and Other Drug Use

Although the known literature indicates that the use of cigarettes and other drugs is a risk factor for smokeless tobacco use, several studies also indicate that the converse is true; that is, smokeless tobacco use is a risk factor for the onset and maintenance of cigarette smoking and for the use of alcohol and marijuana (see "Smokeless Tobacco Use and Other Drug Use" in Chapter 3). Ary, Lichtenstein, and Severson (1987) examined the prospective relationship between smokeless tobacco use and the onset of the use of cigarettes, alcohol, and marijuana at nine-month follow-up. Smokeless tobacco users were found to be more likely than nonusers to begin using cigarettes (22 percent vs. 7 percent), alcohol (18 percent vs. 7 percent), and marijuana (37 percent vs. 18 percent). These findings were replicated in Ary's (1989) 12-month follow-up study of a separate sample. Smokeless tobacco users were significantly more likely than nonusers to report smoking cigarettes (6 percent vs. 0.5 percent), drinking alcohol (29 percent vs. 12 percent), and smoking marijuana (12 percent vs. 2 percent).

Similarly, smokeless tobacco users were more likely than nonusers to increase their use of other drugs. A greater proportion of smokeless tobacco users than of nonusers reported increased use (in the week preceding the survey) of cigarettes (18 percent vs. 8 percent), alcohol (34 percent vs. 20 percent), and marijuana (20 percent vs. 8 percent) (Ary, Lichtenstein, Severson 1987). The 1989 study replicated these findings for each substance: cigarettes (7 percent vs. 2 percent), alcohol (25 percent vs. 13 percent), and marijuana (15 percent vs. 2 percent) (Ary 1989).

Several studies provide additional evidence for the progression from smokeless tobacco to other drugs. In one, decreases in smokeless tobacco use were accompanied by increases in cigarette smoking (Hunter et al. 1986). In a different longitudinal study, smokeless tobacco users were more likely to report cigarette smoking at a two-year follow-up (67 percent) than were nonusers (14 percent) (Schinke et al. 1986). A study of undergraduates found that switching from smokeless tobacco to cigarettes was a more likely progression than the converse (Glover, Laflin, Edwards 1989).

Risk Taking and Rebelliousness

Although smoking is associated with rebelliousness and unconventionality, several studies have found no such association for smokeless tobacco use. A significant but modest relationship has been found between smokeless tobacco use and risk taking. In one of the few longitudinal studies of smokeless tobacco use, Dent et al. (1987) found that among eighth graders, current risk

taking predicted the onset of smokeless tobacco use one year later. In another study, a significant relationship was reported between seventh-grade students' smokeless tobacco use and risk taking (Botvin, Baker, Tortu 1989). Studies with high school students found that risk taking was related to trying smokeless tobacco but not to the level of smokeless tobacco use (Riley, Barenie, Myers 1989; Riley et al. 1991). In two of eight replication samples in another study, risk taking was a significant correlate of trying smokeless tobacco (Sussman et al. 1989).

Participation in Athletics

Given the number of professional athletes who use smokeless tobacco, and given the associated advertising efforts by smokeless tobacco companies, youth who participate in athletics would seem likely to be at greater risk of using smokeless tobacco than nonparticipants. Current studies have mixed findings about this possible relationship. Although 28 percent of predominantly white Little League baseball players (aged 12 or less, $N = 1,141$) in southeast Texas believed that more than half of professional baseball players use smokeless tobacco, this belief was not strongly associated with use of smokeless tobacco among these youth (Evans, Raines, Getz 1992). Similar findings on a stratified random sample of rural and urban youth in grades one, three, five, and seven were reported in North Carolina (Lisnerski et al. 1991). In a one-year longitudinal study of seventh graders, sports participation did not predict onset of smokeless tobacco use in two samples of males and in one of two samples of females (Sussman et al. 1989); for the other sample of seventh-grade females, the relationship was positive but modest. Sussman et al. (1990) reported that self-identified "dirts" (i.e., "heavy metal" music enthusiasts and marijuana users) and "skaters" (i.e., skateboarders and surfers) were more likely to be currently using smokeless tobacco than were "jocks/athletes." Another study of high school students yielded inconclusive results (Riley, Barenie, Myers 1989). On the other hand, Ringwalt (1989) found that 11th- and 12th-grade athletes (students who played on school teams) were more likely than nonathletes to have used smokeless tobacco, to have used smokeless tobacco in the preceding 30 days, and to perceive fewer (if any) health risks for smokeless tobacco use. Jones and Moberg (1988) found that frequency of smokeless tobacco use was related to participation in team sports. Glover et al. (1989) found that smokeless tobacco use among U.S. college students was related to participation in organized sports. Taken together, the current evidence is inconclusive and warrants further investigation that might consider team rules regarding smokeless tobacco use, coaches' use of smokeless tobacco or attitude toward team members' use, and parents' degree of involvement in the team.

Personal Factors in the Initiation of Smokeless Tobacco Use

Knowledge of Long-Term Health Consequences

Because the long-term health consequences of smokeless tobacco use have not been as widely communicated as those of smoking, knowledge of these consequences is potentially an important predictive factor for smokeless tobacco use. Most youth appear to be aware that smokeless tobacco use can be harmful to health, but most smokeless tobacco users do not perceive their own risk to be great. In interviews with smokeless tobacco users, 80 percent of junior high school and 92 percent of senior high school users acknowledged that smokeless tobacco use can be harmful, but about 60 percent of the junior high users and 40 percent of the senior high users believed that there was no risk or only slight risk in regular smokeless tobacco use (USDHHS 1986). A study of 7th- through 10th-graders found that 31 percent of daily users of smokeless tobacco believed that there was very little health risk associated with this use (Ary, Lichtenstein, Severson 1987). Similarly, only 40 percent of 7th- through 12th-grade students in another sample perceived smokeless tobacco use as very harmful (Schaefer et al. 1985). Marty, McDermott, and Williams (1986) reported that 35 percent of high school students who use smokeless tobacco believed that such use had little or no effect on their health.

Many youth appear to believe that smokeless tobacco use is much safer than cigarette use. Schaefer et al. (1985) found that 77 percent of smokeless tobacco users perceived smoking to be very harmful, whereas only 40 percent perceived smokeless tobacco use as very harmful. Another study reported that 86 percent of fifth- and sixth-grade smokeless tobacco users believed that smoking would hurt their health, but only 33 percent believed this of smokeless tobacco use (Schinke et al. 1986). Ary et al. (1989) found that when smokeless tobacco users were asked why they preferred smokeless tobacco to cigarettes, they most often gave "lower health risk" as the reason. Users of smokeless tobacco are more likely than nonusers to perceive that smokeless tobacco is a comparatively safe alternative to cigarette use (Chassin et al. 1985; McDermott and Marty 1986; Boyle 1989; Glover, Laflin, Edwards 1989; Brownson, DiLorenzo, Van Tuinen 1990; Brownson et al. 1990; Lisnerski et al. 1991).

A number of studies have examined the relationship between concurrent smokeless tobacco use and health knowledge and beliefs about smokeless tobacco, but none of these studies have examined the prospective relationship. Most of these studies show that youth with more health knowledge of, or greater beliefs in, the risks

of smokeless tobacco use are indeed less likely to use smokeless tobacco. Three studies reported that having tried smokeless tobacco was related to lack of health knowledge and beliefs (Cohen et al. 1987; Riley, Barenie, Myers 1989; Riley et al. 1991); only one study that examined this possible link failed to find such a relationship, and that study involved very young subjects (first through seventh graders) (Lisnerski et al. 1991). Multiple studies have reported that health knowledge and beliefs were significantly related to various categories of smokeless tobacco use (Boyle 1989; Polcyn et al. 1991), current smokeless tobacco use (Chassin et al. 1985; Colborn, Cummings, Michalek 1989; Glover, Laflin, Edwards 1989; Marty, McDermott, Williams 1986), level or amount of smokeless tobacco use (Riley, Barenie, Myers 1989; Riley et al. 1991), or daily smokeless tobacco use (Ary, Lichtenstein, Severson 1987). In only two studies was no relationship found between health knowledge and beliefs and smokeless tobacco use (Brownson et al. 1990; Lisnerski et al. 1991).

Functional Meanings

In a study of seventh- and eighth-grade students, favorable personal attitudes toward smokeless tobacco use were significantly related to concurrent use of smokeless tobacco (Polcyn et al. 1991). In another study, 8th- through 11th-grade students' expectancy and beliefs about the positive attributes of smokeless tobacco use (e.g., tastes good, is relaxing, helps concentration) were related to current smokeless tobacco use (Colborn, Cummings, Michalek 1989). Negative attributes of smokeless tobacco use (i.e., gives bad breath, stains teeth) were negatively related to current smokeless tobacco use (Colborn, Cummings, Michalek 1989). No prospective studies were found.

Social Image

Other research suggests that smokeless tobacco use has a more positive social image than smoking (Chassin et al. 1985; Chassin and Presson 1988). One study of high school students found that students were more likely to have used smokeless tobacco during the past month and that nonusers were more likely to have intentions of using if the students' real and ideal self-concepts were similar to their perceived image of smokeless tobacco users (Chassin et al. 1985). This finding suggests that youth may take up smokeless tobacco as a method of attaining a valued social image. Positive social attributes expected from smokeless tobacco use (e.g., increases attractiveness, brings more friends, makes one become more "macho") were also shown to be significantly related to concurrent use of smokeless tobacco (Colborn, Cummings, Michalek 1989). No prospective research was found.

Personality Traits

Some studies have examined relationships between smokeless tobacco use and a number of personality traits. A positive association was found with anger (Jacobs et al. 1988), anxiety (Jacobs et al. 1988), assertiveness (Botvin, Baker, Tortu 1989), depression (Jones and Moberg 1988; Rouse 1989), and locus of control (Dignan et al. 1986). A negative association was found with anxiety, curiosity (Jacobs et al. 1988), and self-concept (Dignan et al. 1985).

Smokeless Tobacco Use as a Risk Factor for Continued Use

Intentions to Use Smokeless Tobacco

Consistent with data on youth smoking, the research indicates a strong relationship between concurrent smokeless tobacco use and intention to use in the future. Brubaker and Loftin (1987) found that reported intention to use smokeless tobacco in the week after the survey was strongly related to current smokeless tobacco use in a small sample of fifth- through eighth-grade males. Intention to use in the next two weeks was also related to current-use status (Gerber, Newman, Martin 1988). No studies were found, however, that examined the prospective relationship between intention to use smokeless tobacco and the initiation or continuation of use.

Current Use of Smokeless Tobacco

Ary, Lichtenstein, and Severson (1987) prospectively examined the predictors of frequency of smokeless tobacco use at a nine-month follow-up for their sample of daily users of smokeless tobacco. Current use of smokeless tobacco was the best predictor of later use; the initial rate of use was highly correlated with the rate of use nine months later and accounted for 33 percent of the variance. This finding suggests that the successful reduction of smokeless tobacco use will require early intervention before the development of physiological addiction.

Summary of Psychosocial Risk Factors for Smokeless Tobacco Use

The major factors associated with the initiation and development of smokeless tobacco use found in this review are shown in Table 1. With the exception of adequate knowledge of the health consequences of smokeless tobacco use and the social acceptance afforded by smokeless tobacco use, these factors are nearly identical to those found for the onset of smoking. Although most youth perceive that smokeless tobacco use can be harmful to health, most smokeless tobacco users

do not perceive the risk to be great, particularly to themselves, and particularly compared with the health risk of cigarette smoking. Peer modeling of smokeless tobacco use seems to be strongly and consistently related to the onset and continued use of smokeless tobacco. Smokeless tobacco use serves social functions within the peer group that may support experimental and continued use. The evidence is less conclusive for modeling by parents and siblings. Peer and, notably, parental acceptance of smokeless tobacco use is much higher than for cigarette smoking.

Fairly consistent evidence indicates that smokeless tobacco use is related to concurrent use of cigarettes, alcohol, and marijuana. Findings from prospective studies suggest that the use of smokeless tobacco may precede the use of these other substances and occurs early in a sequence of drug use by some adolescents. Prospective evidence shows that smoking and the use of alcohol and marijuana are also related to the onset and continued use of smokeless tobacco. Engaging in risk-taking behavior and having poor academic performance also appear to be related to smokeless tobacco use (see "Smokeless Tobacco Use and Other Health-Related Behaviors" and "Sociodemographic Risk Factors for Smokeless Tobacco Use" in Chapter 3). There is mixed evidence that smokeless tobacco use is associated with youthful athletic participation; nonetheless, some professional athletes have promoted its use both indirectly (through visible personal use) and directly (through advertising).

Finally, there is evidence of concurrent relationships (but no prospective evidence) between smokeless tobacco use and health beliefs/knowledge, attitudes, expectancies, and social image. The perception that smokeless tobacco use may be a healthier choice than cigarette smoking consistently emerges in the data and indicates the need for prevention programs that stress the health consequences of smokeless tobacco use.

Smokeless tobacco use, then, appears to be a function of the social world of young people, who see this "adult" behavior as an aid—a generally accessible one—in improving their individual social image. Moreover, perhaps because even among adults the health consequences of smokeless tobacco use are not widely understood, adults lack consensus on whether smokeless tobacco use should be actively discouraged. Peer use of smokeless tobacco thus becomes a strong motivator for initiation and continued use.

These misperceptions on the part of adolescents and adults alike are of serious concern, given the health-compromising, addictive aspects of smokeless tobacco use. More strikingly, smokeless tobacco use is associated strongly with other drug use and may serve as an entry behavior to the use of cigarettes, alcohol, and illegal substances.

Implications of Research for Preventing Tobacco Use: Modifying Psychosocial Risk

Although substantial research has examined the onset of tobacco use for individual adolescents, there is clearly a need to examine how change in community and cultural factors may modify onset rates. This review of the literature strongly suggests that the onset of tobacco use is socially learned and is a social behavior for adolescents, with socially relevant meanings, images, and functions. Therefore, rather than focusing only on individuals and families as the primary targets of prevention efforts, attention should also be directed to the social environment of adolescents. These efforts should consistently and persuasively promote the prevention and cessation of tobacco use and should demonstrate that the meanings of tobacco use are negative. Prevention efforts should portray tobacco use as a behavior that is nonnormative, unattractive, addictive, and immature.

Although the meanings of tobacco use are learned in childhood, early to middle adolescence appears to be the time of greatest need for direct intervention. This idea is not only supported epidemiologically by the occurrence of highest onset rates during this time, but also developmentally, in that the challenges of adolescence can expose youth to the perceived utility of tobacco use. The meanings of tobacco use that have been established in our society become personally relevant during adolescence. Tobacco use becomes a mechanism to establish social relationships, display independence, and create a new, mature identity. Moreover, because many adolescents believe themselves to be all but invulnerable, have a short perspective on their future, have limited abstract cognitive abilities, and highly value their associations with same-age peers, adolescents may view tobacco use as particularly functional to them and not potentially harmful. Adolescence is clearly a vulnerable time when adult involvement and protection is still warranted and required. Adults should see the prevention of adolescent tobacco use as an important part of their responsibility in the healthful socialization of the young.

The onset of tobacco use is strongly associated with peer influences, peer smoking, and peer approval of smoking. Programs that prevent tobacco use should systematically seek peer-group involvement and enlist peer role models who do not use tobacco. The emphasis of this involvement should be to affect peer-related norms and to persuade adolescents that most people their age do not use tobacco, that tobacco use has negative social consequences, and that tobacco use projects an image that, instead of being "cool," is unattractive, unpopular, and immature. Parents should also pay attention to the

amount of time adolescents spend with peers, to peers' behavior, and to unsupervised peer-group activities.

The increased need for social competencies during adolescence (i.e., the ability of young people to decipher, cope with, and deal with the social environment) should be a critical focus of comprehensive efforts to prevent tobacco use. Adolescents need skills to help them identify, resist, and refute environmental influences—whether from the media, adults, or peers—to use tobacco. Similarly, adolescents may need to be taught how to cope better with difficult, stressful situations at home or at school. Without such skills, many youth may continue to use tobacco as a mechanism to deal with low self-esteem, depression, and the feelings of helplessness that can result from the ordinary challenges of growing up.

Positive social bonding with family and schools and health-enhancing behavior, such as physical activity, should be encouraged among youth as protective factors against tobacco use. Students who perform poorly in school should be offered tutoring and academic counseling; besides being personally motivating, such support can increase students' affiliation with school and decrease their involvement in tobacco use. Encouraging sports participation (and countering the negative role models of some professional athletes by providing explicit messages about the health consequences of smokeless tobacco use), regular physical activity, and a healthy diet may increase adolescents' valuation of, and attachment to, health and a healthy body that might be compromised by tobacco use. Parents may also need to demonstrate their support for academic achievement, health activities, and a greater link between home and school.

Finally, to substantially modify tobacco use and to provide adolescents with consistent messages against tobacco use, the community (and society on the whole) should embrace the prevention of tobacco use. A focus on individuals, families, or peer groups is necessary but not sufficient to address the origins of tobacco's appeal to young people. Limiting the acceptability of tobacco use through restrictive policies, such as legislation supporting clean indoor air and school policies banning tobacco use, provides a clear message to adolescents that tobacco use is not acceptable as a public behavior. Severely limiting adolescents' access to tobacco products makes it clear that cigarettes and smokeless products are dangerous substances. Mandating tobacco-use prevention programs in schools signals the importance of this topic through the use of explicit, earmarked resources. These

community actions provide external support for parents, teachers, and adolescents to assert their beliefs about the health hazards of tobacco use and to assist their demand for tobacco-free environments. Such clear, normative messages emanating from the community level reinforce those messages given at school or at

home. Above all, community action at multiple levels of the social environment directly and consistently refutes the notion that tobacco use is an attractive adult behavior. Community intervention should be a top priority in poorer communities, where the need for action is especially great.

Conclusions

1. The initiation and development of tobacco use among children and adolescents progresses in five stages: from forming attitudes and beliefs about tobacco, to trying, experimenting with, and regularly using tobacco, to being addicted. This process generally takes about three years.
2. Sociodemographic factors associated with the onset of tobacco use include being an adolescent from a family with low socioeconomic status.
3. Environmental risk factors for tobacco use include accessibility and availability of tobacco products, perceptions by adolescents that tobacco use is normative, peers' and siblings' use and approval of tobacco use, and lack of parental support and involvement as adolescents face the challenges of growing up.
4. Behavioral risk factors for tobacco use include low levels of academic achievement and school involvement, lack of skills required to resist influences to use tobacco, and experimentation with any tobacco product.
5. Personal risk factors for tobacco use include a lower self-image and lower self-esteem than peers, the belief that tobacco use is functional, and lack of self-efficacy in the ability to refuse offers to use tobacco. For smokeless tobacco use, insufficient knowledge of the health consequences is also a factor.

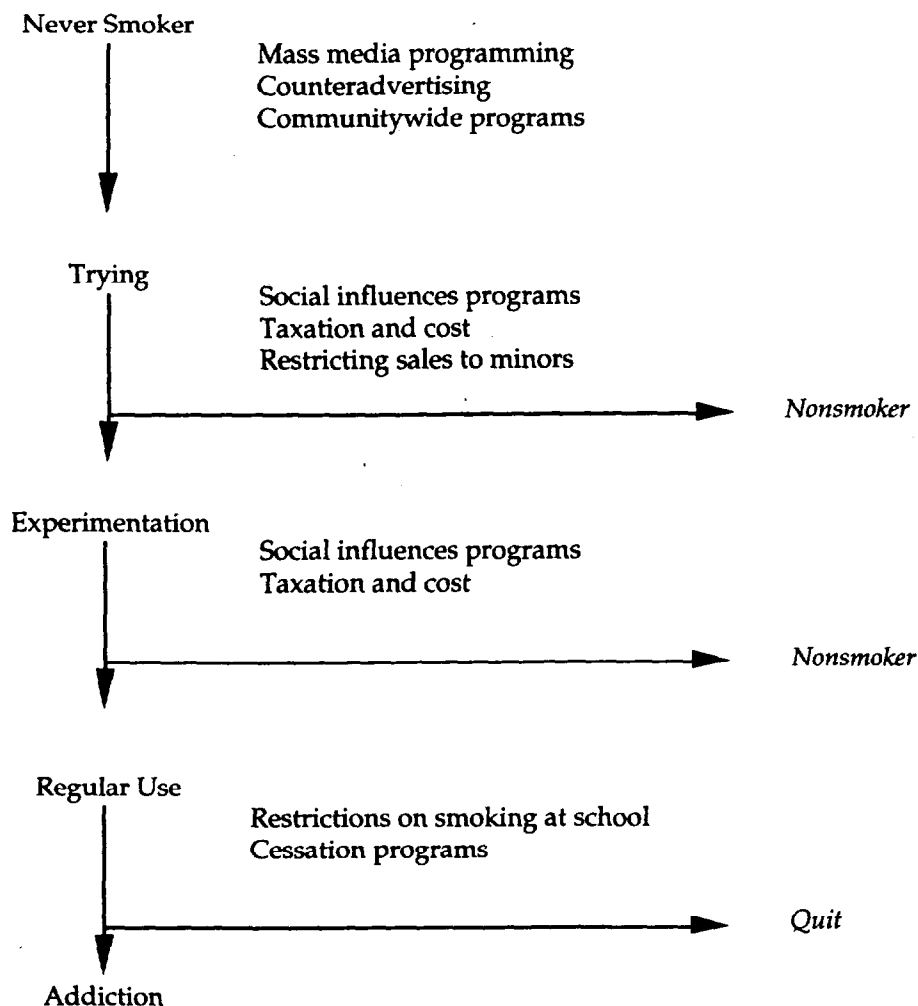
Chapter 5: Efforts to Prevent Tobacco Use Among Young People

Introduction

This chapter examines the range and effectiveness of efforts to prevent tobacco use among young people. The first section provides data on recent public opinion of strategies to reduce tobacco use among young people. The second set of sections focuses on educational efforts to reduce cigarette smoking and smokeless tobacco use among young people, including school-based, clinic,

and communitywide programs. The third set of sections examines the impact of social conditions and public policies, including the effects of mass media programming, legal restrictions, warning labels, and tobacco taxation. Together, these efforts can inoculate against the psychosocial risk factors discussed in Chapters 4 and 5, as shown in Figure 1.

Figure 1. Efforts to prevent tobacco use among young people, by stage of initiation



Source: Adapted from U.S. Department of Health and Human Services (1991).

Public Opinion About Preventing Tobacco Use Among Young People

Introduction

The information in this section is derived from several different sources, including national surveys conducted by the federal government and by private organizations (e.g., the Gallup Organization, Louis Harris and Associates), statewide surveys conducted by government agencies or private organizations (e.g., the American Cancer Society [ACS]), and community-based surveys. A remarkably consistent pattern emerges regarding public opinion of tobacco-control policies. First, both smokers and nonsmokers express much greater support for policies to prevent youth from smoking than for policies to discourage adult smoking. A second finding is that nonsmokers are consistently more supportive of government efforts to regulate tobacco than are smokers.

Public Opinion About Tobacco Education

Historically, public support for efforts to keep children from smoking has been stronger than support for efforts to reduce smoking among adults. During the first half of this century, most states instituted laws that prohibited the sale or gift of cigarettes to minors (Hawkins 1964), since tobacco use was viewed as an adult behavior and children were seen as a group to be protected from potentially harmful substances. However, as the health dangers of smoking became known, the public looked to schools to do more to educate children about the hazards of tobacco use. For example, a 1957 national survey of adults (N = 1,541) conducted by the Gallup Organization (1957) found that 68 percent of respondents believed that the danger from smoking was great enough to warrant literature being distributed to schoolchildren to warn them of these dangers. Fifty-three percent of the respondents also felt that the danger was sufficient to warrant an announcement from the federal government (presumably, to adult smokers) regarding the danger of smoking.

Traditionally, public and private efforts to reduce the initiation of smoking by children have involved schools (U.S. Department of Health and Human Services [USDHHS] 1989). A number of states have enacted laws that mandate education about smoking and health in schools. In part, the emphasis on school-based education reflects a belief that education is the most effective way to discourage children from smoking. A 1984 national survey of adults sponsored by the American Board of Family Practice (Research and Forecasts, Inc. 1985) asked respondents to indicate what approaches they believed were effective in discouraging smoking. The highest-rated approach, mentioned by 81 percent of those

surveyed (N = 1,007), was providing smoking-related education to children in grade school. The use of public service campaigns, television shows, and other media to motivate teenagers not to smoke was mentioned by 66 percent of respondents. Twenty-one percent felt that legally banning the use of tobacco would be effective.

There is strong public support for tobacco education efforts in the schools. The 1989 Smoking Activity Volunteer-Executed Survey (SAVES), which was administered to adults in four states (Arizona, Michigan, Pennsylvania, and Texas), collected information on a wide range of issues relevant to policies concerning smoking (Marcus et al., in press). Trained and supervised ACS volunteers used standardized questionnaires to conduct telephone interviews of the sampled adults. Data collected in this survey found that a high proportion of the respondents (87 to 91 percent) agreed with the statement, "There should be a strong tobacco education program in the school system" (Marcus et al., in press). Only a minority of these respondents (13 to 33 percent) agreed with the statement, "Currently, schools are doing enough to prevent children from starting to use tobacco." This finding is consistent with the results of a 1990 telephone survey of California adults, in which 74 percent of respondents felt that antitobacco education in schools should be increased (California Department of Health Services 1991).

Restrictions on Smoking in Schools

Traditionally, even secondary schools that prohibit smoking by students have allowed teachers and staff to smoke in designated areas away from students (USDHHS 1989). This double standard reflects public opinion about restricting smoking in school settings. A 1987 telephone survey of adults in Minnesota (Forster et al. 1991) found strong support (93 percent) for a policy prohibiting students from smoking in school, and a smaller percentage (77 percent) favored a ban on smoking among teachers and staff. School smoking policies, like those for other workplaces, have become more restrictive in recent years. Several states and many communities have enacted laws that completely ban or severely restrict smoking in schools and on school property (Coalition on Smoking OR Health 1992). These laws are discussed later in this chapter.

The 1989 Surgeon General's report on smoking and health (USDHHS 1989) clearly documented the trend of Americans to increasingly support restrictions on smoking in a wide range of public locations, such as restaurants, worksites, and schools. In general, surveys that

ask about limiting smoking in various settings have found that support for such restrictions in schools is usually stronger than for other locations. For example, findings from a telephone survey for the 1989 National Cancer Institute (NCI) Community Intervention Trial for Smoking Cessation (COMMIT) (Centers for Disease Control [CDC] 1991a) revealed that fewer than one-quarter of adult respondents in 10 U.S. intervention communities supported a complete ban on smoking in private worksites and restaurants, whereas over half endorsed a ban on smoking on school grounds. Support for banning smoking in secondary schools possibly reflects the broad societal belief that schools have an important role to play in discouraging tobacco use by children.

Restrictions on Tobacco Advertising and Promotion

Numerous national, state, and local surveys have tried to assess public opinion about restrictions on tobacco product advertising. In a series of national Gallup surveys (Gallup Organization 1978, 1987, 1988, 1991, 1993) conducted between 1977 and 1993, support for a complete ban on cigarette advertising increased from 36 to 53 percent. The 1989 COMMIT survey (CDC 1991a) of a representative sample of 300 to 400 adults 25 to 64 years old in each of 10 intervention communities in 9 states found that between one-half and three-quarters agreed with the statement, "All tobacco advertising should be eliminated."

Some surveys have asked about limiting specific types of tobacco advertising (e.g., billboards, newspapers, magazines) and promotional practices (e.g., distribution of free tobacco samples, tobacco company sponsorship of sporting and cultural events) (Table 1). A 1987 telephone survey (Forster et al. 1991) of 821 adults from seven Minnesota communities asked respondents to indicate their support for restrictions on various forms of advertising. Seventy-three percent of respondents favored a ban on tobacco signs and billboards; 70 percent supported a ban on tobacco advertising in newspapers and magazines. The ACS-sponsored 1989 SAVES survey of four states found that support for a ban on cigarette advertising in newspapers, in magazines, and on billboards ranged from 61 to 69 percent (Marcus et al., in press). Over three-quarters of respondents in this survey agreed with the statement, "Tobacco companies should be prohibited from distributing free tobacco samples on public property or through the mail." Comparable results were obtained in a 1990 telephone survey of adults in California (California Department of Health Services 1991). Fifty-four percent of respondents in this survey supported a ban on tobacco ads on outdoor billboards; 49 percent supported a ban on tobacco ads in

newspapers and magazines; 67 percent supported a ban on the distribution of free tobacco samples or coupons to obtain free samples by mail; and 75 percent supported a ban on the distribution of free tobacco samples on public property.

Three surveys (California Department of Health Services 1991; CDC 1991a; Marcus et al., in press) have measured public opinion about tobacco company sponsorship of sporting and cultural events (Table 1). In the 1989 COMMIT survey (CDC 1991a) of 10 communities, from one-third to more than one-half of respondents supported a ban on such sponsorship. The 1989 SAVES survey (Marcus et al., in press) found that about one-half of respondents agreed with the statement, "Tobacco companies should be prohibited from sponsoring sports events or advertising their products at these events." Fifty-two percent of respondents in the aforementioned 1990 California survey (California Department of Health Services 1991) believed that sponsorship of sporting or cultural events by tobacco companies should be banned. In all three surveys, support for a ban on tobacco company sponsorship of sporting and cultural events was about twice as strong among nonsmokers as it was among smokers.

The function and effect of tobacco advertising have been the subject of much controversy and debate among scientists and within the tobacco industry. The tobacco industry has argued that advertising targets adults only and encourages regular smokers to switch brands or to maintain brand loyalty (Tobacco Institute 1964; see "The 'Maturity' of the Cigarette Market" in Chapter 5). Many health experts assert that tobacco advertising targets children to encourage them to start using tobacco (Tye 1987; DiFranza et al. 1991; Fischer et al. 1991; Pierce et al. 1991; CDC 1992a). In fact, a major newspaper, the *Seattle Times*, voluntarily discontinued tobacco advertising in June 1993, citing "growing medical evidence on the dangers of smoking, as well as tobacco advertisers' recent targeting of youth and racial minorities" (Nogaki and Gupta 1993, p. E1). Legislative proposals to restrict or prohibit tobacco advertising are often presented as a means of protecting children (Myers and Hollar 1989). In 1986, about half of the respondents to the Adult Use of Tobacco Survey (AUTS) (USDHHS 1990c) agreed with the statement, "If cigarettes were not advertised anywhere, fewer young people would start smoking." In July 1990, a national Gallup survey (Gallup Organization 1990c) of adults found that more respondents (49 percent) thought that advertising and promotion paid for by the tobacco companies represented an active attempt to get teenagers and young people to start smoking than believed that such efforts were to encourage brand switching among people who already smoke (38 percent).

Table 1. Public opinion about restricting or banning different types of tobacco advertising and promotions, United States, 1987-1991

Source and year of survey	Description of survey	Questions or statements	Responses
University of Minnesota 1987 (Forster et al. 1991)	Telephone survey of a random sample of adults (aged 18-74 years) in seven communities in Minnesota (N = 821)	Do you favor or oppose prohibiting tobacco signs and billboards?	73% favored a prohibition
		Do you favor or oppose prohibiting tobacco advertising in magazines and newspapers?	70% favored a prohibition
American Cancer Society 1989 (Marcus et al., in press)	Telephone survey of a random sample of adults (aged ≥ 18 years) in four states: Arizona (N = 294), Pennsylvania (N = 291), Texas (N = 303), and Michigan (N = 98)	Advertising of cigarettes should be banned in newspapers, magazines, and outdoor posters or billboards.	Agreement across the four states sampled: 61%-69%
		Tobacco companies should be prohibited from distributing free tobacco samples on public property or through the mail.	73%-81%
		Tobacco companies should be prohibited from sponsoring sports events or advertising their products at these events.	49%-59%
National Cancer Institute 1989 (Centers for Disease Control 1991b)	Telephone survey of a random sample of 300 to 400 adults (aged 25-64 years) in each of 10 U.S. COMMIT* intervention communities	Tobacco companies should not be allowed to sponsor sporting and cultural events.	Agreement across the 10 communities sampled: 31%-56%
California Department of Health Services 1990 (California Department of Health Services 1991)	Telephone survey of a random sample of adults (aged ≥ 18 years) in California (N = 6,600)	Do you think advertising of tobacco products on outdoor billboards should be allowed or banned?	54% favored a ban (42% smokers; 62% nonsmokers)
		Do you think advertising of tobacco products through newspapers and magazines should be allowed or banned?	49% favored a ban (38% smokers; 57% nonsmokers)
		Do you think sponsorship of sporting or cultural events by tobacco companies should be allowed or banned?	52% favored a ban (39% smokers; 61% nonsmokers)
		Do you think that distribution of free cigarettes and tobacco products on public property should be allowed or banned?	75% favored a ban (62% smokers; 84% nonsmokers)
		Do you think that distribution of free tobacco samples or coupons to obtain free samples by mail should be allowed or banned?	67% favored a ban (52% smokers; 78% nonsmokers)

*COMMIT = Community Intervention Trial for Smoking Cessation.

Data collected in a 1992 national telephone poll (N = 1,200) of adults (Louis Harris and Associates 1992) suggest that a predominant belief in the individual's right to smoke coexists with a less predominant concern about the persuasive power of tobacco advertising. An overwhelming majority (87 percent) of respondents agreed with the proposition that "to smoke or not to smoke is a personal decision that adults should be free to make for themselves." On the other hand, 68 percent favored a ban on tobacco ads in newspapers, in magazines, and on billboards; 73 percent said they would support an initiative to require stronger warning labels on cigarette packages; and 83 percent would favor legislation banning tobacco ads targeted at teenagers. Three-quarters of smokers themselves supported a ban on tobacco ads targeted at teenagers. The survey report concludes that "even smokers see smoking as something to be discouraged, especially where teenagers are concerned" (p. 39).

Restrictions on the Sale of Tobacco Products to Minors

Public opinion strongly favors measures to discourage tobacco sales to minors (persons under the age of 18). A 1962 national Gallup personal interview survey (Gallup Organization 1962) found that 79 percent of adults supported the idea that there should be a law against selling cigarettes to people under 16 years old. According to the 1964 AUTS (U.S. Department of Health, Education, and Welfare [USDHEW] 1969), only 9 percent of adults thought that sales of cigarettes to young people under a certain age should not be against the law. Today, all states have laws prohibiting the sale of cigarettes to persons under 18 years old (CDC, OSH, unpublished data).

On July 10, 1992, Congress passed Public Law 102-321, the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) Reorganization Act, which contained Section 1926, providing for the enforcement of minors' access legislation in all states receiving funding for the prevention and treatment of substance abuse. These provisions required funded states to enforce legislation prohibiting the sale or distribution of tobacco products to individuals under the age of 18. Enforcement included yearly random, unannounced inspections as well as annual reports to the Secretary of Health and Human Services describing the state's enforcement activities for that year, the extent of success in reducing the availability of tobacco to children under 18, and enforcement strategies to be used in the next year for which funding was being sought. By June 1993, 49 states and the District of Columbia had passed legislation in compliance with Section 1926, prohibiting the sales and distribution of tobacco products to children under the

age of 18. (Virginia restrictions applied only to sales of tobacco products.)

Most people do not believe that laws prohibiting the sale of tobacco to minors are adequately enforced, and the overwhelming majority of both smokers and nonsmokers support stronger measures to limit minors' access to tobacco. The 1989 SAVES (Marcus et al., in press) found that 8 out of 10 adults felt it was "very easy" or "somewhat easy" for teenagers to buy cigarettes near where they live (see "Factors That Influence Tobacco Acceptability and Availability" in Chapter 4). The overwhelming majority of respondents to this survey (86 to 92 percent) felt that there should be better enforcement of existing laws banning the sale of tobacco to minors, and most (83 to 88 percent) endorsed the idea that the laws should be strengthened. Results of a 1990 survey of California adults (California Department of Health Services 1991) provide a similar picture; 76 percent responded negatively when asked, "Do you think the laws banning the sale of tobacco products to minors have been adequately enforced?"

Several different surveys have tried to assess public opinion regarding specific types of legislative actions (e.g., licensing retailers and banning cigarette vending machines) to prevent minors' access to tobacco (Table 2). A 1987 survey of adults in Minnesota (Forster et al. 1991) found that 75 percent favored a policy whereby retailers would lose their tobacco licenses if they sold cigarettes to minors. Two-thirds of adult participants in the 1989 COMMIT survey (CDC 1991a) agreed with the statement, "Tobacco products should be as strictly controlled as alcohol products." The majority of respondents in this survey (from 77 to 93 percent) also agreed with the statement, "Merchants who sell tobacco to minors should be fined."

The 1989 SAVES (Marcus et al., in press) asked respondents in four states if they thought the sale of cigarettes through vending machines should be banned. Overall, between 60 and 68 percent of respondents favored a ban on cigarette vending machines; smokers were much less likely than nonsmokers to support a ban (42 to 58 percent vs. 66 to 72 percent). The 1987 Minnesota survey (Forster et al. 1991) found that 57 percent of adults supported a policy eliminating all cigarette vending machines; 80 percent favored a policy banning vending machines in locations where teenagers gather. In the 1990 California survey (California Department of Health Services 1991), a majority of both smokers (74 percent) and nonsmokers (87 percent) favored the idea of banning cigarette vending machines that are accessible to minors. A similar result was found in the 1989 COMMIT survey (CDC 1991a), where between 76 and 89 percent of adults agreed with the statement, "Cigarette vending

Table 2. Public opinion about different legislative actions to prevent minors' access to tobacco, United States, 1987-1991

Source and year of survey	Description of survey	Questions or statements	Responses
University of Minnesota 1987 (Forster et al. 1991)	Telephone survey of a random sample of adults (aged 18-74 years) in two communities in Minnesota (N = 871)	Do you favor or oppose suspending a retailer's tobacco license for sale to minors? Do you favor or oppose eliminating all cigarette vending machines? Do you favor or oppose eliminating cigarette vending machines where teenagers gather?	70% favored suspending a retailer's tobacco license for sale to minors. 62% favored eliminating all cigarette vending machines. 70% favored eliminating cigarette vending machines where teenagers gather.
American Cancer Society 1989 (Marcus et al., in press)	Telephone survey of a random sample of adults (aged ≥ 18 years) in four states: Arizona (N = 294), Pennsylvania (N = 291), Texas (N = 303), and Michigan (N = 98)	Do you think there should be laws to ban the sale of cigarettes through vending machines?	Support for a ban across the four states sampled: 60%-68%
National Cancer Institute 1989 (Centers for Disease Control 1991b)	Telephone survey of a random sample of 300 to 400 adults (aged 25-64 years) in each of 10 U.S. COMMIT intervention communities	Tobacco products should be as strictly controlled as alcohol products. Merchants who sell tobacco to minors should be fined. Cigarette vending machines should be eliminated in places where teens gather.	Agreement across the 10 communities sampled: 81% (75% smokers, 87% nonsmokers) agreed with the statement that tobacco products should be as strictly controlled as alcohol products. 77% (70% smokers, 84% nonsmokers) agreed with the statement that merchants who sell tobacco to minors should be fined. 70% (63% smokers, 77% nonsmokers) agreed with the statement that cigarette vending machines should be eliminated in places where teens gather.
California Department of Health Services (California Department of Health Services 1991)	Telephone survey of a random sample of adults (aged ≥ 18 years) in California (N = 6,600)	Do you think cigarette vending machines that are accessible to minors should be allowed or banned?	82% favored a ban (74% smokers; 87% nonsmokers)

*COMMIT = Community Intervention Trial for Smoking Cessation.

machines should be eliminated in places where teens gather."

Taxes on Tobacco Products

Public opinion surveys consistently show that most people would support an increase in tobacco taxes over other taxes (such as income tax, sales tax, or gasoline tax) (Gallup Organization 1989, 1990a, 1993; Hart Research

Associates and Robert Teeter 1990a, b, c; Yankelovich, Clancy, Shulman 1990a, b; ACS 1992; Kleine 1993). Surveys conducted between 1989 and 1993 show strong support for raising taxes on tobacco and alcohol as a way of reducing the federal budget deficit or to pay for health care reform (Toner 1993) (Table 3).

Support for raising tobacco taxes tends to increase when tax revenue is earmarked for specific purposes,

especially for health and educational programs (Gallup Organization 1993), such as those aimed at preventing children from smoking or from using drugs. A 1989 national survey sponsored by the Associated Press (Associated Press/Media General 1989) found that 75 percent of adults supported increasing the federal excise tax on

cigarettes to pay for an expanded federal antidrug program. The same questions asked in 1990 found that 77 percent supported raising cigarette taxes (Associated Press/Media General 1990). The 1989 SAVES (Marcus et al., in press) found that about two-thirds of adults favored using an extra tax on tobacco to cover the cost of

Table 3. Public opinion about increasing tobacco taxes, United States, 1989–1990

Source and year of survey	Description of survey	Questions	Responses
Gallup Organization 1989	National personal interview survey with 2,048 adults (aged ≥ 18 years)	Taking into account the amount each (tax) would raise, and your opinion about these taxes, which, if any, would you favor as a means of reducing the federal budget deficit?	64% favored raising cigarette taxes by 16 cents per pack; the only other tax measure mentioned more frequently was raising the tax on alcohol (69%)
Gallup Organization 1990b	National telephone survey of 1,255 adults (aged ≥ 18 years)	If taxes were raised to reduce the deficit, which one of the following would be your first choice to help reduce the deficit?	First choice of largest proportion of respondents (42%) was raising taxes on cigarettes and alcohol
Hart Research Associates and Robert Teeter 1990a, b, c	National telephone survey of a random sample of registered voters (January survey N = 1,510; May survey N = 1,007; July survey N = 1,555)	Let us suppose the government needed to raise taxes. Do you favor or oppose raising alcohol and tobacco taxes?	January 1990: 78% favor May 1990: 83% favor July 1990: 78% favor
Yankelovich, Clancy, Shulman 1990a, b	National telephone survey of adults (aged ≥ 18 years) (May survey N = 1,000; October survey N = 500)	Do you favor or oppose raising taxes on cigarettes to reduce the federal budget deficit?	May 1990: 72% favor October 1990: 71% favor
Associated Press/Media General 1989, 1990	National telephone survey of adults (aged ≥ 18 years) (September 1989 survey N = 1,071; May 1990 survey N = 1,143)	To pay for a bigger federal antidrug program, would you support or oppose higher federal taxes on cigarettes?	September 1989: 75% favor May 1990: 77% favor

campaigns to reduce smoking. A 1987 national survey sponsored by the American Medical Association (Harvey and Shubat 1987) found that 79 percent of adults favored an increase in the tax on tobacco products if the money from the increase went to Medicare. A 1992 survey of Michigan adults (ACS 1992) found that 72 percent would support raising the state's cigarette excise tax if the additional revenue would be targeted for health care and education. Interestingly, 58 percent of respondents to this survey claimed that they would vote for a candidate who supported the tobacco tax increase, whereas 27 percent would vote for a candidate who opposed the tax increase.

Some relevant information on public opinion regarding tobacco taxes comes from a survey conducted in Canada, where tobacco taxes have increased sharply in the past decade. A December 1990 poll conducted for the

Council for Tobacco-Free Ontario (Council for a Tobacco-Free Ontario/Non-Smokers' Rights Association 1992) questioned Ontarians about their support for a substantial increase in the tobacco tax. Overall, 58 percent of Ontarians supported a 50-cent per pack increase in the cigarette tax; this support did not change when respondents were informed that taxes currently accounted for 60 percent of the retail price of cigarettes. However, when respondents were told that higher tobacco prices could prevent children from starting to smoke, support for the tax increase climbed to 67 percent. Support was even higher when respondents were told of different ways to use revenues raised by the new tax, such as reducing the budget deficit (70 percent support), helping people quit smoking (78 percent support), and establishing a fund to help prevent smoking among young people (84 percent support; 77 percent among smokers).

Educational Efforts to Prevent Tobacco Use Among Young People

School-Based Smoking-Prevention Programs

Introduction

Since the 1964 publication of the first Surgeon General's report on smoking and health (Public Health Service [PHS] 1964), smoking prevention has been recognized as a primary strategy for controlling smoking in the general population. The first report identified the difficulty that long-term adult smokers typically experience in their attempts to quit. The report thus advocated programs directed at educating high school and college students about the health hazards of smoking; in theory, school-based programs would interfere with the development of smoking behavior before smoking became firmly established.

When the term "prevention" was applied to health-related issues in the 1960s, however, the concept referred not exclusively to school curricula but also to efforts to disseminate warnings about products and practices that public health professionals considered potential health hazards (Schwartz 1969). The approach to prevention research at that time consisted of biomedical research to establish physiological mechanisms of smoking-related diseases, coupled with epidemiologic research to identify etiologic characteristics of smokers. This research led, when appropriate, to the dissemination of findings and recommendations to the public. A proclamation and direct warning from the U.S. Surgeon General about the life-threatening characteristics of cigarette smoking was

expected to convince smokers to quit and nonsmokers to avoid taking up the practice. Had this effect been the case, the concept of smoking prevention might never have amounted to more than "spreading the word" to those segments of the population who had not yet received it. Unfortunately, nearly three decades later and despite monumental efforts to disseminate warnings, cigarette smoking remains the single most preventable cause of death and disease in our society (USDHHS 1989).

This section reviews the evolution of the concept of smoking prevention since the 1960s and identifies avenues for future progress in this area.

Early Approaches to Smoking Education and Prevention

In the 1960s and early 1970s, strategies to prevent the onset of cigarette smoking were often based on the premise that adolescents who engaged in smoking behavior had failed to comprehend the Surgeon General's warnings on the health hazards of smoking (Thompson 1978). The assumption was that these young people had a deficit of information that could be addressed by presenting them with health messages in a manner that caught their attention and provided them with sufficient justification not to smoke. Improvements in knowledge levels, or cognitive factors, would thus lead directly to changes in behavior.

Information Deficit Model

Early prevention programs based on this information deficit model tried to heighten young people's awareness and comprehension of the negative consequences of smoking. Programs based on this model used various educational methods to convey information, including books, pamphlets, posters, films, and lectures (Thompson 1978). Through images and messages often intended to arouse fear, these programs were designed to convince the adolescent audience that persons who smoke risk a variety of serious physical consequences throughout their lives, including an increased likelihood of premature death in adulthood from cardiovascular disease or cancer.

The underlying assumption of these information-focused programs proved to have limited grounding. Although expanded educational efforts in schools throughout the 1970s provided adolescents with various kinds of smoking-related information, this information alone did not deter them from beginning to smoke. Comprehensive reviews published at that time concluded that smoking-prevention programs based on the information deficit approach were not effective (Thompson 1978; Goodstadt 1978). Providing knowledge of the health consequences of smoking is still an important task for public health, but this single strategy is not sufficient to change most young people's behavior.

Affective Education Model

The information deficit model did not take into account the complex relationship between knowledge acquisition and subsequent behavior (nor, as will be discussed later, did it consider the addictive nature of tobacco use). For example, cognitive factors are mediated by different personal variables, including changes in attitudes, beliefs, intentions, and perceived norms (McGuire 1964; Fishbein 1967). To rectify the shortcomings of information-focused interventions, alternative smoking-prevention approaches that evolved during the 1970s tried various forms of motivational or affective education. These approaches, which came to be referred to collectively as the affective education model, were based on the assumption that adolescents smoke cigarettes because their self-perceptions are somehow compatible with a health-compromising behavior like smoking (Durell and Bukoski 1984). Interventions based on the affective model sought to increase adolescents' perceptions of self-worth and to establish or clarify a health-related value system that would support a young person's decision not to smoke.

Another assumption typically made by prevention programs based on the affective education approach was that information specific to tobacco was neither

necessary nor sufficient for reducing the onset of cigarette smoking among adolescents (Goodstadt 1978). These affective approaches evolved out of the direct experiences of educators and counselors who had begun to associate cigarette smoking among adolescents with various problem behaviors, including school absenteeism, low achievement motivation, and antisocial behavior. The intervention programs suggested that adolescents who experienced such problems could rectify them through changes in their attitudes toward school, family, or community, if sufficiently motivated to do so.

Reviews based on more than a decade of research have concluded that interventions based on the affective education model were no more effective in reducing adolescent smoking than those based on the information deficit model. Some studies have even suggested (that is, without conclusive findings) that these programs may have had the untoward effect of eliciting interest in the behaviors they attempted to discourage (Kinder, Pape, Walfish 1980; Schaps et al. 1981; Hansen et al. 1988). Nonetheless, affective education programs marked the beginning of an era during which enormous effort was expended to design smoking-prevention interventions that were more directly related to the factors believed to cause smoking among adolescents.

Correlates of Adolescent Smoking Behavior

Evaluations of interventions before the mid-1970s suggested that these approaches were insufficient for several reasons. For example, although high school and college students were the intended targets of smoking-prevention programs in the 1960s and 1970s, the development of smoking behavior follows a series of stages that typically begin earlier in life, when students are in the sixth or seventh grade (Leventhal and Cleary 1980). Such findings suggest that smoking-prevention interventions need to be initiated earlier than high school and that attention should be given to the various stages that adolescent smokers moved through as they developed from nonsmokers into regular smokers (Chassin, Presson, Sherman 1985).

As opposed to the narrow focus of prevention models based solely on information or affective factors, a broader focus and a more diverse set of correlates or antecedents began to emerge as important determinants of adolescent cigarette smoking. As reviewed by Evans (1984), these factors have been studied categorically as sociodemographic, environmental, behavioral, and personal variables. Throughout the 1980s, using data from both longitudinal (McAlister, Krosnick, Milburn 1984) and cross-sectional (Chassin, Presson, Sherman 1984) surveys, researchers developed a clearer understanding of the etiology of smoking behavior.

This research showed that prevention strategies in the 1960s and 1970s had greatly underestimated the extent to which adolescent smoking was determined by social environmental variables. An exception was the early work of the proactive physicians group Doctors Ought to Care (DOC), which argued that tobacco advertising and promotional activities strongly influence the social environment of adolescents (Blum 1980). A detailed overview of the relationships of social environmental variables to the acquisition of smoking behavior is found in Chapter 4 of this report (see "Environmental Factors in the Initiation of Smoking").

As the major risk factors associated with smoking onset were identified, they were translated into new intervention methods, and the programs that resulted were substantially different from the approaches that had preceded them.

Instilling Skills for Resisting Social Influences to Smoke

Prevention research grants from the National Institute on Drug Abuse (NIDA) and the National Institutes of Health (Bell and Levy 1984; USDHHS 1984; Stone 1985; Glynn 1989) were largely responsible for creating a wave of prevention program development from the late 1970s throughout the 1980s. These efforts fundamentally redefined the concept of primary prevention in several ways.

First, programs began to make better use of social, psychological, and behavioral theories as a basis for understanding what approaches might work to modify patterns of smoking onset among adolescents. Program design became far more data driven, as researchers began to design intervention components based directly on findings from theory-based etiologic research on adolescent smoking. This orientation led to an improved understanding and targeting of the determinants and correlates of smoking behavior among adolescents. Much information was published about the characteristics and components of successful smoking-prevention programs. Much of what has been learned focuses particularly on social influences, norms, and skills training and has the objective of attaining behavioral abilities, methods, skills, and techniques (rather than knowledge, beliefs, or motivation) that make it easier to adopt and maintain health-enhancing behavior patterns, such as not smoking. Lastly, the research methodology used to evaluate the efficacy of preventive interventions became far more sophisticated and considerably more rigorous.

Intervention Objectives

This prevention intervention approach recognizes the social environment as the most important

determinant of smoking onset and focuses on the development of norms and skills to identify and resist social influences to smoke. Underlying this approach is the assumption that adolescents who smoke may lack specific skills to deal successfully with various social influences that support smoking. Such influences include the misperception that most people smoke, the perceived desirable social image of smoking, the appeal of cigarette advertising and promotional activities, and the persuasive effects of sibling and peer smoking. Although considerable variation can be found across curricula, programs that instill the skills needed to resist such social influences have included a fairly consistent group of components that include training in resisting social pressures (e.g., marketing) and peer pressures to smoke and training that fosters general assertiveness, decision making, and communication skills (Botvin and Wills 1985). These programs also promote healthful normative expectations and particularly correct the misperception that most adolescents smoke.

Earlier programs for adolescents designed their messages to generate fear and anxiety about long-term disease risk. Approaches that teach skills to guard against social influences have assumed that scare tactics based on long-term health risk are not pertinent to the short-term perspective of many adolescents. The principal messages of skills-based intervention have thus focused on the negative, short-term social consequences of smoking, on the techniques of tobacco advertising that may be falsely appealing to adolescents, and on the socially salient advantages of being a nonsmoker.

Overall Program Structure

In 1987, the NCI convened a panel of experts to establish consensus regarding the essential structural elements of effective smoking-prevention programs (USDHHS 1991). The panel agreed that eight features could be considered both necessary and sufficient for effective school-based smoking-prevention programs (Glynn 1989) (Table 4). In a recent meta-analysis (Rooney 1992) of outcomes of research studies conducted from 1974 through 1989 on school-based smoking prevention, the essential elements of the NCI expert panel were examined and mostly supported. This meta-analysis will be discussed later in this chapter.

Most of the successful programs that provide skills for resisting social influences share several major curriculum components. One of these is to convey the short-term negative consequences of cigarette smoking, including social undesirability and physiological impairment. Another component is to have students explore inaccurate normative expectations; students thus learn that cigarette smoking is not a normative behavior for

adolescents their age and that the majority of persons in any age group are nonsmokers. Students examine the reasons that adolescents say they smoke, including to be accepted by peers, to appear mature, or to help cope with difficult situations. The factors that affect adolescent smoking can also be explored, including the influence of parents, peers, and mass media; for example, students can learn how role modeling and advertising can falsely establish positive cultural meanings for smoking (see "Research on the Effects of Cigarette Advertising and Promotional Activities on Young People" in Chapter 5). A related component is to engage students in training, modeling, rehearsing, and reinforcing methods that counter these influences and to coach students to communicate these techniques to others. Some approaches also include generic personal and social skills training to promote overall competence and reduce motivations to smoke (Botvin and Wills 1985).

Curriculum Format

Among the numerous approaches to teaching skills to resist social influences to smoke, the format variations are in most cases minor (Best et al. 1988). For example, a number of these approaches rely on classroom teachers to deliver the smoking-prevention program. The six-session program designed by Colquhoun and Cullen (1981) focused on refusal skills training provided by classroom teachers with the help of local physicians.

Biglan, Glasgow, et al. (1987), on the other hand, trained health and science teachers to deliver intervention sessions on four consecutive days, followed by a booster session two weeks later.

Other intervention variations have used a combination of trained staff or teachers plus student peer leaders. Perry, Klepp, and Sillers (1989), for example, used same-age peers in a smoking-prevention program that promoted cardiovascular health. Ellickson and Bell (1990), on the other hand, employed trained health educators to deliver their intervention to seventh graders and contrasted this approach by delivering the intervention through students' regular teachers assisted by teen leaders. Similarly, Arkin et al. (1981) organized seventh-grade student nominations of classmates who students felt would be effective peer leaders. Those selected then served as discussion leaders and helped students rehearse and role-play appropriate responses to situations that simulated social pressure.

In Project SHOUT (Students Helping Others Understand Tobacco), college undergraduate students in psychology, health sciences, and other majors worked for college credit toward their degrees by serving as peer leaders to young adolescents. The college students were mature and reliable enough to deliver interventions (both in the classroom and over the telephone, in booster calls) yet sufficiently youthful to be acceptable to an adult-youth audience (Young et al. 1988; Young et al. 1990; Elder et al. 1993).

Table 4. Essential elements of school-based smoking-prevention programs

1. Classroom sessions should be delivered at least five times per year in each of two years in the sixth through eighth grades.
2. The program should emphasize the social factors that influence smoking onset, short-term consequences, and refusal skills.
3. The program should be incorporated into the existing school curricula.
4. The program should be introduced during the transition from elementary school to junior high or middle school (sixth or seventh grades).
5. Students should be involved in the presentation and delivery of the program.
6. Parental involvement should be encouraged.
7. Teachers should be adequately trained.
8. The program should be socially and culturally acceptable to each community.

Source: Glynn (1989).