Chapter 6: Efforts to Prevent and Reduce Tobacco Use Among Young People

Introduction

This chapter examines the history and effectiveness of efforts to prevent and reduce tobacco use among young people, with an emphasis on those under 18 years of age. The first section provides background on changes in prevention strategies since the 1994 Surgeon General's report on preventing tobacco use among young people (U.S. Department of Health and Human Services [USDHHS] 1994), including summaries of scientific evidence on strategies to reduce youth smoking, the theories underlying prevention efforts, various approaches to prevention, and the criteria for judging the evidence of the effectiveness of prevention strategies. The remaining sections, which review the evidence for the effectiveness of prevention, are divided into (1) large social environments, such as community and statewide programs and mass media campaigns; (2) regulatory and policy-driven approaches, such as the Synar Amendment to the *ADAMHA Reorganization Act* (1992), which seeks to limit the access of youth to tobacco products (Substance Abuse and Mental Health Services Administration [SAMHSA] 2011), and policies that affect product labeling, create smoke-free environments, restrict advertising, and raise tobacco taxes; (3) small social environments, such as families, clinical settings, and schools; and (4) special issues, such as preventing the use of smokeless tobacco and other tobacco products, conducting preventive efforts with vulnerable populations, and implementing cessation interventions for youth. The coordinated use of all the strategies reviewed in this chapter can help to protect youth from the psychosocial risk factors discussed in Chapter 4, "Social, Environmental, Cognitive, and Genetic Influences on the Use of Tobacco Among Youth" and the promotional efforts of the tobacco industry discussed in Chapter 5, "The Tobacco Industry's Influences on the Use of Tobacco Among Youth."

The 1994 Surgeon General's report, which reviewed the history of prevention initiatives (USDHHS 1994), concluded that early informational and affective approaches were not effective in preventing smoking among youth, and that approaches based on social-cognitive theory that focused on the teaching of social and self-management skills held the greatest promise. Since then, social-cognitive approaches have been elaborated, and some approaches focused on changing normative beliefs have also been tried. In addition, social and environmental factors are recognized as increasing risk for, or providing protection against, smoking by young people and are used as venues for prevention. For example, as documented in Chapter 4, families can have a major impact on the likelihood of smoking by young people. Thus, some research during the last 18 years has focused on involving families in educational efforts, and on changing family dynamics, to protect young people against smoking. Other ecologically driven efforts involve reducing youth access to tobacco products, increasing taxes on tobacco, enacting clean indoor air policies, and reducing images of smoking in movies.

In the United States, some researchers and practitioners have focused on individuals, while others have emphasized policies and programs operating at the societal level (Giovino 2007). Both approaches are covered in this chapter, but since 1994 the emphasis on policy and environmental approaches has increased (Warner 2007a,b). However, as will be shown in this report, the effects of nearly all kinds of preventive efforts decay over time if they are not maintained. Just as school-based programs in middle school require booster sessions in high school to maintain their effects, for example, so must mass media programs be repeated or continued to maintain their effects. Similarly, regulations are effective while they are enacted and enforced, and taxation is effective when it is enacted and adjusted for currency values.

Theories Underlying Prevention Efforts

Most prevention efforts have used the public health language of targeting risk and protective factors, sometimes buttressed by various psychological, educational, sociological, or ecological theories. Interventions attempt to change the causes of tobacco use behaviors or to take advantage of protective factors. Among the many causes of and influences on tobacco use among young people, some are proximal (such as an adolescent's attitudes toward smoking or intentions to use tobacco), others are more distal (such as the motivation of an adolescent to comply with parents or friends), and still others are broad and even more removed from use (ultimate influences, such as cultural backgrounds and personality traits).

Flay and colleagues have provided a useful model for understanding the development of adolescent behaviors by integrating and organizing these variables along two dimensions—levels of causation and streams of influence—thereby providing a metatheoretical framework:

the Theory of Triadic Influence (TTI) (Flay and Petraitis 1994; Petraitis et al. 1995, 1998; Flay 1999; Flay et al. 2009), discussed in Chapters 4 and 5. This is not the only behavioral theory that has been applied to tobacco use interventions, but it encompasses most of the primary theories in its structure.

TTI was developed with theories and variables arranged by different levels (or tiers) of causation. Some variables, such as intentions to smoke, have direct effects on behavior and are causally proximal or immediate, and some, such as motivation to comply with or please others, are mediated through other variables, such as social normative beliefs, and are more causally distal or predisposing. Additional variables, such as the style of parenting that a youth experienced during childhood or the imposition of taxes on cigarettes, are mediated by still more variables and are even more causally distal, and still others, such as ethnic culture, neighborhood poverty, and personality, represent the underlying or ultimate causes of behavior.

TTI is also based on the assumption that theories and variables can be arranged into three relatively distinct types or streams of influence (see Chapter 5, Figure 5.1), each of which acts through the multiple levels of causation:

1. The *intrapersonal* stream represents personal characteristics that contribute to self-efficacy regarding specific behaviors.

2. The *social/normative* stream represents interpersonal social influences in the social situation or context (the microenvironment) that contribute to social normative beliefs about specific behaviors.

3. The *environmental* stream represents broad cultural and environmental influences (macroenvironmental factors) that contribute to attitudes toward specific behaviors.

In the case of the onset of cigarette smoking among adolescents, for example, these influences include (1) intrapersonal (biological or personality) influences on skills, together with the will or confidence to use them (to avoid smoking) or a presumed lack of will or confidence to use them (resulting in the taking up of smoking); (2) family and school situational/contextual influences on adolescents' perceptions of social norms concerning smoking, together with these youths' motivation to comply or not to comply with them; and (3) broad societal or macroenvironmental influences on the adolescents' knowledge and values that influence their attitudes toward smoking.

TTI then proposes that the effects of ultimate and distal causes of behavior flow predominantly within each of the three streams of influence and act through a small set of proximal cognitive-affective predictors of behavior (self-efficacy, social normative beliefs, attitudes, and intentions), with multiple mediating factors between these levels. In addition, experience with a behavior feeds back and changes the original causes of that behavior; that is, influences on behavior make up a dynamic system that changes as youth develop and as they have (or do not have) experience with the behavior.

The Role of Human Development

In addition to integrating prominent theories of health behavior, TTI helps practitioners, researchers, and policymakers understand tobacco use behavior by emphasizing the three streams of influence. Meanwhile, other investigators have made it clear that the *plasticity* of biological and social development plays an important role in determining behavior (Merzenich 2001; Lerner 2006; Lerner et al. 2009): the multiple causes of behavior constitute a *dynamic system* that changes as people develop and have new experiences with particular behaviors (Lerner 1978, 2006).

The relative importance of self-efficacy (intrapersonal stream), social normative beliefs (social/normative stream), and attitudinal variables (environmental stream) changes as children develop. Attitudinal influences are most important for younger children, social and normative processes become more important during adolescence, and self-efficacy becomes more important as youth gain experience and skills in the area of social behaviors.

From a developmental perspective, three focal areas that are essential for promoting the health of adolescents are the development of personality, social development, and cognitive development. All three present challenges for healthy development with implications for prevention, however. First, adolescents begin to exert their independence from their parents, often by bonding more closely with their peers. At puberty, positive interactions between adolescents and parents may diminish (Steinberg 1991), and adolescents begin seeking independence from their parents (Montemayor and Flannery 1991). Their independence from their parents is accompanied by greater dependence on their peers, and relations with peers "become more pervasive, more intense, and carry greater psychological importance" (Foster-Clark and Blyth 1991, p. 768). Not surprisingly, adolescents are more susceptible to and compliant with social pressures than are younger children or adults (Landsbaum and Willis 1971; Berndt 1979). This is especially true of pressures to engage in substance use (Brown et al. 1986; Flay et al. 1994).

Second, during early adolescence, the search for self-identity begins, and adolescents start "trying out" adult behaviors and roles (Steinberg and Morris 2001; Tanti et al. 2011). The search is not easy, and during this time adolescents are psychologically vulnerable (Konopka 1991), self-conscious, concerned about social appearances (Elkind and Bowen 1979), and highly self-critical (Lowenthal et al. 1975; Rosenberg 1985), possibly because, for the first time, they can envision discrepancies between who they are and who they want or ought to be (Higgins 1987; Damon 1991; Tanti et al. 2011). However, the finding about being highly self-critical might be a cohort effect. Compared with earlier generations, people born after the early 1970s seem less inclined toward self-criticism and higher in self-esteem, but they often face a crisis in early adulthood when their high, but rarely tested or confirmed, self-esteem confronts reality. As a result, self-esteem is at an all-time high for young people today, but so is anxiety (Twenge 2006; Gentile et al. 2010). Risky behaviors, such as substance use, might serve as a coping mechanism as adolescents search for an identity and feel vulnerable and self-conscious during this stage of intrapersonal flux (Flammer 1991; DuBois et al. 2009).

Third, before adulthood, cognitive and affective skills are not fully developed and, to varying degrees, children and adolescents have difficulty understanding abstract information, appreciating events that might occur in the distant future (Orr and Ingersoll 1991), or reacting calmly to emotional situations (Dahl 2001, 2004; Steinberg et al. 2006). These characteristics, paired with generally good health (Brindis and Lee 1991), might contribute to adolescents' cavalier attitudes about their personal health (Levenson et al. 1984) and tendency to underestimate their own risks of health-compromising behaviors (Millstein 1991), such as tobacco use.

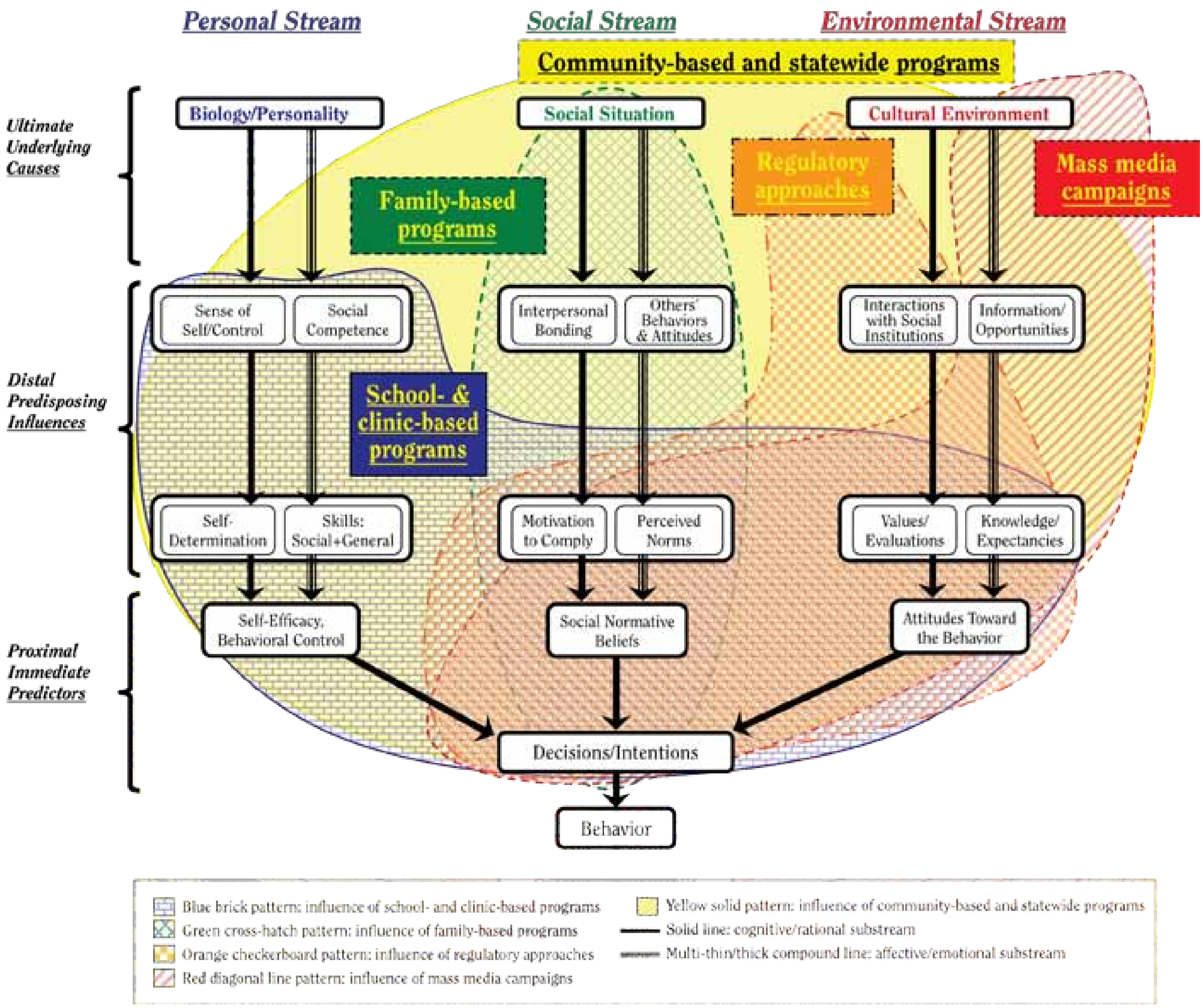
Overall, TTI provides a clear and organized metatheoretical framework for understanding behavior, and it also offers a guide to integrating the theoretical frameworks that interventions to prevent tobacco use have employed. Figure 6.1 demonstrates how the major approaches to preventing tobacco use can be mapped onto TTI; this framework provides a unique display of the levels and streams a specific intervention may influence. For example, the first approaches to prevention were school-based programs that focused on knowledge about the consequences of and attitudes toward smoking; they addressed only one small aspect of TTI (bottom right, Figure 6.1). Subsequent programs, particularly those based on the social influences approach, attempted to address the affective/cognitive elements of all three streams of TTI by addressing attitudes toward smoking, social normative beliefs about this behavior, and the social skills and self-efficacy needed to resist the social pressures to smoke (bluish "bricked" area of Figure 6.1). More recent school-based programs and clinic-based approaches also address a more general set of self-management and social skills. And yet, most school-based programs are still focused on the proximal causes of behavior and can be expected to have limited effects unless the programs are maintained and reinforced. In addition, school-based programs are likely to have broader and more sustainable effects if they are supplemented by school policies and family, clinic-based, or mass media programs.

Family-based interventions are more likely to target both proximal and distal influences but are usually confined to the social stream of TTI (green crosshatched area of Figure 6.1). In particular, they may alter patterns of parent-child bonding and communication and thereby change children's perceived norms and motivation to comply with (or please) their parents or peers. As for mass media, some of the early campaigns targeted information, but more recent mass media campaigns have operated in the TTI areas shown in the general cultural environment (the upper right-hand corner of Figure 6.1) and have targeted a broader array of more distal predisposing influences in the cultural environment. Mass media approaches have, in particular, influenced the informational environment (red-shaded area of Figure 6.1), and regulatory approaches have influenced the regulatory environment (orange-shaded area of Figure 6.1); these approaches have then "flowed down" the environmental stream as well as the other two streams of TTI to influence community, family, and peer group behavior. Regulatory approaches and mass media campaigns have stronger effects on a greater proportion of the population than do many other approaches because they start at such an ultimate level and then flow down and across the streams. In addition, community-based and state-level programs have the potential to provide the optimal combination of interventions to influence the complete population of a community or state (yellow-shaded area of Figure 6.1). Regardless, as will be described further below, a combination of effective evidence-based strategies can provide the most powerful approach to prevention (as opposed to a single strategy) when implemented at a level of high intensity, with integrity, and in a sustained way.

Criteria for Evidence for Prevention

This chapter will rely on the general scale used in other chapters for characterizing the evidence that an intervention approach is effective (see Chapter 1, "Introduction, Summary, and Conclusions"). However, the

Figure 6.1 Approaches to smoking prevention overlaid on the Theory of Triadic Influence



kind of evidence required to meet each of the criteria set forth in the other chapters may differ across the different approaches to prevention. For example, individually focused interventions can be tested in randomized controlled trials (RCTs), some conducted at the individual level and some in cluster- or group-based RCTs. Important examples of the latter include school-based programs, which are most often evaluated by randomly assigning schools to receive a program. For these kinds of studies, well-established standards are applied (Flay et al. 2005). For community-based programs, RCTs are also appropriate, but may be less practical or even impossible, so other evaluation designs have been used. Time-series and multiple-baseline designs meet the highest statistical standards for the evaluation of community programs (Biglan et al. 2000b).

Evidence for Prevention and Reduction of Youth Tobacco Use

The evidence for prevention approaches in this chapter is organized into sections including large social environments, regulatory or legislative approaches, and small social environments. An additional section deals with the special issues of preventing the use of smokeless and other forms of tobacco by youth, prevention for vulnerable populations, and interventions targeting tobacco cessation among youth. Because this literature is large, robust, and important for the primary prevention of tobacco use, this review does not include strategies aimed at reducing tobacco use among young adults, even though there are important emerging strategies with that age group.

Large Community Environments

This section of the report covers three kinds of initiatives: mass media campaigns, community-wide interventions, and state-level tobacco control programs.

Mass Media Campaigns

Mass media campaigns have increasingly become a key strategy in efforts to reduce smoking among youth and young adults. Able to reach large proportions of the population, mass media messages have the potential to influence not only individual behaviors but also social norms and institutional policies, which in turn can shape patterns of population-wide tobacco use (Flay 1981; Flay and Burton 1990; Hopkins et al. 2001; Hornik 2002).

The first antismoking mass media campaign was aired on U.S. television and radio soon after the 1967 Federal Communications Commission ruled that the Fairness Doctrine applied to cigarette advertising, leading to a common practice of airing one free antismoking advertisement for every three cigarette commercials (Siegel 1998). Messages in this campaign were primarily about the health consequences of smoking and continued to be aired into early 1971. Exposure to these messages was associated with reduced prevalence of smoking among both youth and adults (Lewit et al. 1981; USDHHS 1994). Between 1970 and 1971, cigarette advertising decreased substantially and, therefore, the number of antitobacco spots also decreased in that period. Antismoking ads on television and radio ceased when, effective January 2, 1971, Congress banned cigarette advertising on both of these media (Warner 1979; National Cancer Institute [NCI 2008]). Beginning in the 1980s, however, mass media campaigns on television and radio, often combined with school-based prevention programs, began using psychosocial theory-based messages in population-based prevention trials, such as in Minnesota during the 1980s (Murray et al. 1994) and in controlled field trials in various locations (e.g., Flynn et al. 1992). These campaigns focused on awareness among youth of the short-term effects of smoking (bad breath, being unfit), the highlighting of social influences, and teaching skills to resist peer pressure. In more recent times, mass media campaigns broadcast as part of state and national tobacco control programs have focused on (1) changing social norms about smoking through messages about secondhand smoke (e.g., in California beginning in 1990 [Popham et al. 1994]); (2) messages designed specifically for youth that portray the tobacco industry as deceptive and manipulative (e.g., in California from 1989 [Balbach and Glantz 1998], in Florida from 1997 [Sly et al. 2001a,b, 2002], and the American Legacy Foundation's "truth" campaign from 2000 [Farrelly et al. 2002, 2005; Thrasher et al. 2004, 2006]); and (3) campaigns targeting a general audience that emphasize the adverse health consequences of smoking through personal stories or graphic depictions of smoking-related illness (e.g., Massachusetts from 1994 [Siegel and Biener 2000]).

The tobacco industry entered the arena in 1998 with youth-targeted ads that emphasized personal choice about becoming or not becoming a smoker (Philip Morris' "Think. Don't Smoke" and Lorillard's "Tobacco Is Whacko if You're a Teen"). Philip Morris also broadcast a campaign from 1999 to 2006 about parental responsibility for their children's smoking ("Talk. They'll Listen"). These ads are reviewed in Chapter 5. Advertising by pharmaceutical companies for nicotine replacement therapy and other stop-smoking medications began in 1992 (NCI 2008). From 1999 to 2003, ratings data for television indicated that the most extensive tobacco-related advertising was for smoking cessation products from pharmaceutical companies and that tobacco company youth smoking prevention advertising was aired as much as the publicly funded national and state antitobacco broadcast campaigns (Wakefield et al. 2005b; NCI 2008). Since this period, exposure of the population to publicly funded mass media campaigns has declined as overall expenditures on tobacco control have been reduced (Campaign for Tobacco-Free Kids 2011a).

Publicly funded campaigns have used many different media channels to expose youth to antismoking messages, including television, radio, print, and billboards, and they have also employed cessation contests, media activism, and "new" interactive media (NCI 2008). Because the vast majority of the U.S. campaigns tracked by the Centers for Disease Control and Prevention's (CDC's) Media Campaign Resource Center used television (98%), radio (94%), print (89%), and/or billboards (87%) (NCI 2008), the focus of this chapter is on the effects of campaigns that include these media. A comprehensive review of the impact of new interactive media, as well as short-term cessation events, contests, and media advocacy, is available in NCI's *The Role of the Media in Promoting and Reducing Tobacco Use* (2008, pp. 441–445, 463–468).

Studies of the effects of mass media campaigns reviewed here fall into three broad categories: controlled field trials, in which unexposed communities served as a control; evaluations of the effects of campaigns funded by state or national governments; and examinations of elements and factors that may optimize the effectiveness of campaigns. This last category includes examinations of different types of messages (in terms of theme, tone, format, and executional characteristics), how messages may influence youth by personal characteristics (gender, age, race/ethnicity, socioeconomic status, and high risk), and the ideal intensity of these campaigns and duration for airing them. Conclusions on the effectiveness of mass media campaigns from authoritative reviews and new evidence since 1994 from each of these types of studies are reviewed in turn; but first, the theoretical rationale for how mass media campaigns may help to prevent youth and young adult smoking is addressed.

Theories Underlying the Strategy

An understanding of the relationship between ill health, disease, and behavioral choices led early health communication researchers to create prescriptive messages urging people to make healthier choices. Messages focused more clearly on influencing attitudes and beliefs have traditionally been more effective than messages without these types of information (Hornik 2002).

Individual-based theories of behavior change provide a rationale for how public health messages may affect behavior by influencing knowledge, attitudes, and beliefs. Early models of behavior change focused on different aspects of eliciting behavior change. The Health Belief Model focused on susceptibility, perceived severity of consequences for a behavior, cost-benefit analysis, and health motivation (Rosenstock 1974). The Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975) and the Theory of Planned Behavior (TPB) (Ajzen 1991) focused on behavioral beliefs, norms, and control beliefs and their effect on intention to engage in a behavior. Another example is the Social Cognitive Theory, which (Bandura 1986, 2004) focuses on the relationship between personal factors, environmental factors, and behavior, which is often affected by modeling. TRA and TPB have been updated in the Integrated Model of Behavior Change (IMBC). In IMBC, a number of exogenous variables, including exposure to media and health interventions, contribute to beliefs about a particular health-related topic (Bleakley et al. 2011). Behavioral beliefs lead to attitudes, intentions, and finally to behaviors. In these models, an individual's attitudes, beliefs, and environmental factors (such as perception of norms) are thought to be central to influencing intentions and ultimately behavior change.

A number of communication theories on persuasion add to this literature by providing guidance on how to change attitudes and beliefs. The Elaboration Likelihood Model of Persuasion (Petty and Cacioppo 1986) and the Heuristic-Systematic Model (Eagly and Chaiken 1993) propose two processing systems. One system involves "central" or "systematic" processing in which the message content is considered more carefully and is elaborated upon more fully. The other system is the "peripheral" or "heuristic" system that involves processing of cues such as source credibility to reject or accept the message. "Central" and "peripheral" systems can be activated individually or simultaneously at varying levels. The models suggest that lasting change and persuasion are most likely to occur when an individual has the motivation and ability to process a message centrally if the argument contained in the message is presented well. However, if the argument in the message is poor, peripheral processing may produce more desirable effects, depending on the peripheral cues.

Many theorists also emphasize the importance of emotion for message processing and behavior change (Cohen 1990; Eagly and Chaiken 1993; Forgas 1995; Escalas et al. 2004; Dillard and Nabi 2006; Lang 2006; Baumeister et al. 2007). Public health messages that activate emotion systems may increase personal perceptions of vulnerability to a health risk by producing a mental shortcut through increases in emotional associations with actions, images, or ideas (Damasio 1994; Finucane et al. 2000) that a person may use when making decisions or judgments (Slovic 2001). Emotional information may function by increasing resources allocated to processing until information overload occurs, that is, until the number of resources required to process the message becomes more than the resources allocated to processing (Lang 2006). There are two basic parts of emotional activation: arousal, which is related to how much activation is occurring unrelated to the type of emotion being experienced, and valence. Valence can be divided into appetitive (positive) and aversive (negative) activation (Cacioppo and Gardner 1999; Lang 2006) or into discrete emotions such as happiness, sadness, or hopefulness (Nabi 2010).

There has also been increasing work in health communication on using narratives and exemplars to decrease processing defensiveness and thereby increase persuasiveness of health communication messages. Dunlop and colleagues (2010) found that greater levels of transportability (which is associated with becoming absorbed in the message's narrative) were associated with greater intention to quit smoking. Furthermore, Moyer-Guse and Nabi (2010) found that narratives reduce reactance, thus increasing persuasion of messages that were high in narrativity.

Mass media messages may also exert influence through indirect interpersonal or social influences pathways (Rogers 1995b; Ball-Rokeach 1998; Yanovitzky and Stryker 2001). People obtain information about how best to respond to a health threat not only through direct exposure to campaign messages but also from social networks when the message is shared or discussed with others. For example, discussion among peers of antismoking messages is associated with increased perceptions of personal risk in adolescents (Hafstad and Aarø 1997; Morton and Duck 2001), and so, the social context in which a message is received and interpreted may influence the effects of that message (Lazarsfeld et al. 1944; Katz and Lazarsfeld 1955; McCombs and Shaw 1972).

Review Methodology

Many previous reviews have focused specifically on the effects of mass media antismoking messages on youth (USDHHS 1994; Pechmann 1997, 2001; Sowden 1998; Pechmann and Reibling 2000a; Farrelly et al. 2003a; Wakefield et al. 2003b,c). Other reviews have examined the broad impact of antismoking campaigns on both adults and youth (Flay 1987; Friend and Levy 2002; Siegel 2002; Jepson et al. 2006; Schar et al. 2006; NCI 2008) and the effects of campaigns on youth within the context of other strategies to prevent youth smoking (Lantz et al. 2000; Richardson et al. 2007).

This chapter examines the conclusions from these previous reviews and describes in Tables 6.1 and 6.2 the published studies of the effects of mass media campaigns on youth addressed in the three most recent comprehensive reviews (Richardson et al. 2007; Angus et al. 2008; NCI 2008). In addition, a systematic literature review for articles published since the latest review (NCI 2008) from May 2007 to June 2008 was conducted using the same search terms. The focus in that review, and for this section, was on studies that assessed the influence of mass media interventions (e.g., television, radio, print, and outdoor advertising) alone or in combination with other interventions (e.g., school, community, policy) (NCI 2008). These newer studies on youth are included in Tables 6.1–6.3.

Overall Effectiveness of Mass Media Campaigns in Preventing Youth Smoking

Controlled field trials. The NCI review (2008) of the media and tobacco use described above highlights the difficulty of evaluating the media components of several early quasi-experimental studies of community-based cardiovascular programs because the media elements were combined with other program elements (e.g., in the North Karelia Project and the Minnesota Heart Health Program). However, the evaluations of the overall effects of these programs indicate positive immediate and intermediate effects on smoking levels among youth (Vartiainen et al. 1986; Perry et al. 1992) and on long-term effects on initiation of smoking by youth at 8- and 15-year follow-ups (Vartiainen et al. 1990, 1998). In contrast, another cardiovascular program aimed primarily at adults, the Stanford Five-City Project, allowed for the examination of the media effects alone and did not show any differences between intervention and control communities in the prevalence of smoking that could be traced to the media component. There was evidence, however, of a strong secular trend that may have reduced the ability to detect effects (Winkleby et al. 1993).

Early reviews of the published literature focused heavily on the findings of some of the controlled field experiments on the effectiveness of community-based antismoking programs for youth. Some of these trials were able to randomize allocation to the media campaign (Bauman et al. 1991; Flay et al. 1995; Biglan et al. 2000a), and others used matched "unexposed" communities as controls (Flynn et al. 1992; Slater et al. 2006). These programs varied greatly in the length and intensity of exposure to the campaign message and the time to follow-up assessment.

Reviewing the available literature up to the early 1990s from controlled field trials and limited population-based evaluations, the 1994 Surgeon General's report on preventing tobacco use among young people emphasized that the mass media campaigns to prevent smoking by youth conducted up to that point were "meager" compared with the highly coordinated and well-funded marketing activities of the tobacco industry (USDHHS 1994). State agencies and volunteer organizations had conducted only "short-term efforts that have had limited evaluations" (USDHHS 1994, p. 150), and evaluations were completed on only a handful of the campaigns described in the report. Of the few reviewed experimental studies of different media strategies that had been conducted, only one had found a significant reduction in smoking among adolescents (Flynn et al. 1992).

Table 6.1 Summaries of controlled field trials of community-based mass media programs, by review(s)

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
USDHHS 1994; Pechmann and Reibling 2000b; Friend and Levy 2002; Farrelly et al. 2003a; Wakefield et al. 2003b; Richardson et al. 2007; Angus et al. 2008; National Cancer Institute (NCI) 2008	Southeastern United States Study Bauman et al. 1988, 1991	Longitudinal sample of adolescents in probability sample of 12- to 14-year-olds was assessed for a number of attitudinal and smoking behavior variables at baseline and 11 and 17 months postintervention Prescreened standard metropolitan statistical areas (SMSAs) were randomly allocated (2 each) to 6 intervention (I) and 4 control (C) conditions Started in 1985 Number of subjects across SMSAs ranged from 132 to 232 (2,534 eligible)	C = no intervention I^1 = 11 radio antismoking messages I^2 = same as I^1 plus radio advertisement of a nonsmoking sweepstakes (encouraging communication with peers to discourage smoking) I^3 = same as I^2 plus television advertisement of the sweepstakes Lasted 15 months Messages reached 81% of intended audience on average 4.5 times in each of the 3- to 4-week periods	• Moderate effect of the radio campaign (I^1 and I^2) on expected consequences of smoking and friends' approval of smoking • No differences in smoking behavior detected at 11 and 17 months postintervention	Individual-level variation taken into account in analysis of SMSAs; selection of SMSAs was influenced by cost of advertising, legal restrictions (e.g., sweepstakes illegal in some areas), and need for nonoverlapping broadcast areas; salivary validation of smoking status was conducted

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
USDHHS 1994; Sowden 1998; Lantz et al. 2000; Pechmann and Reibling 2000a,b; Pechmann 2001; Farrelly et al. 2003a; Wakefield et al. 2003a,b; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Vermont Study Worden et al. 1988, 1996 Flynn et al. 1992, 1994, 1995, 1997	Quasi-experimental 2 pairs of matched study communities assigned to intervention on the basis of available media markets Students in grades 4–6 Smoking behavior index, interpreted as the number of cigarettes smoked per week, any smoking in the past week, or smoking yesterday Longitudinal cohort of youth, randomly selected from metropolitan statistical areas, were surveyed at baseline and annually until 2 years postintervention; analyzed on both an individual and community basis Unclear whether community-level analysis accounted for individual-level variability	C = school-only antismoking educational program I = school-based education (same as C) plus television and radio antismoking media campaign Started in 1985; lasted 4 years	• At 2 years postintervention, students receiving the full intervention were significantly lower on the smoking index (41%), smoking last week (35%), and smoking yesterday (34%) than those receiving just the school curriculum • The combined program appeared particularly effective in high-risk youth	

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
USDHHS 1994; Sowden 1998; Pechmann and Reibling 2000b; Friend and Levy 2002; Wakefield et al. 2003b; Angus et al. 2008; NCI 2008	Television, School and Family Smoking Prevention and Cessation Project Flay et al. 1988, 1995; Brannon et al. 1989; Sussman et al. 1989	Schools in Los Angeles (35; 7 per condition) and San Diego (12; 6 per condition) randomly assigned to treatment conditions Started in 1986 and lasted 4 years Subjects: 12- to 14-year-olds Students assessed longitudinally, twice in grade 7 and once in each of grades 8 and 9 Smoking in the past week and ever smoking were analyzed	Los Angeles: C^1 = no treatment C^2 = basic health information curriculum only I^1 = school-based (social-resistance) education I^2 = television media intervention I^3 = school-based education plus television media intervention San Diego: C = no treatment I = school-based (social-resistance) education only (no television)	• No significant effects on smoking behavior (at 2-year follow-up) • Strong, significant effects on knowledge of smoking consequences, perceived prevalence of smoking, and efforts to resist trying cigarettes	Analysis accounted for individual variability within classrooms within schools

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
Sowden 1998; Farrelly et al. 2003a; Wakefield et al. 2003b; Jepson et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Hafstad et al. 1996, 1997a,b; Hafstad 1997; Hafstad and Aarø 1997	Quasi-experimental One pair matched counties. Unknown basis for assignment to I or C Subjects: 14- to 15-year-old students; both males and females, but females were targeted Daily, weekly, less than weekly, occasional, or nonsmoker status analyzed with longitudinal assessment at 6–12 months and at 3 years (1 year after third campaign) Main analyses examined any current smoking with interaction effects of baseline status and gender Attrition slightly higher in C, but differential attrition not analyzed	C = no intervention I = 3 consecutive waves of mass media campaigns designed to prevent adolescent smoking (newspaper advertisements, poster, television spot, and cinema spot); each of the 3 waves had a different message focus and was broadcast for 3 weeks once a year Started in 1992 in Norway; lasted 3 years	Three-year follow-up: • Significant reduction in overall odds of being a smoker for I group compared with C group for boys and girls • Reduction in odds of smoking for baseline male and female smokers • Reduction in odds of smoking for baseline nonsmokers evident only for the girls	
Lantz et al. 2000; Pechmann and Reibling 2000b; Pechmann 2001; Farrelly et al. 2003a; Wakefield et al. 2003a,b; Angus et al. 2008; NCI 2008	Minnesota Heart Health Program (MHHP) Pentz et al. 1989b,d; Perry et al. 1992	Quasi-experimental 6th graders in all 13 grade schools in MHHP study community and matched control community in South Dakota Weekly prevalence of smoking and smoking intensity among students in all schools in each community were assessed annually (longitudinally through 3-year follow-up, and cross-sectionally) until their senior year in high school	C = no intervention I = health behavior and smoking prevention school program plus mass media focused on heart health, including smoking cessation Started in 1983; lasted 6 years	• Both 3-year longitudinal and cross-sectional results showed significantly less weekly smoking and lower smoking intensity for the students in the intervention community than in the control community; difference was present early and maintained through the senior year	Intraclass correlation considered in analyses; attrition analysis showed bias in favor of finding no effect

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
Lantz et al. 2000; Wakefield et al. 2003b; Angus et al. 2008; NCI 2008	Project Sixteen Biglan et al. 2000a	Eight matched pairs of small Oregon communities were randomly assigned to 1 of the 2 conditions Subjects: students in grades 7 and 9 Students in grade 7 and all students in grade 9 in all schools in each community were surveyed annually and cross-sectionally (preintervention, 3 times during intervention, postintervention) A composite measure of weekly smoking was evaluated	C = school intervention only I = school-plus-community intervention with paid antismoking media on radio, newspaper articles, and posters Messages based on social influences theories (health facts, refusal skills, modeling) Started in 1990; lasted 3 years	• Both at project completion and at 1-year follow-up, students in the school-plus-community intervention had significantly lower rates of past-week smoking	Analyses were nested students within communities; schools had to agree to implement prevention program and to be assessed; smoking status was validated by measuring carbon monoxide in expired air from students
Wakefield et al. 2003a,b; Angus et al. 2008; NCI 2008	North Karelia Vartiainen et al. 1986, 1990, 1998	Quasi-experimental 7th-grade students (12- to 13-year-olds) from 4 schools in North Karelia (intervention province) received school program for 2 years and were compared with 2 schools in a control province that did not receive it, starting in 1978 Schools were selected to match for various characteristics Smoking at least once or twice a month was assessed in the same cohort before and after intervention; additional follow-ups later	I^1 = peer-led social influences school program plus adult-focused mass media campaign plus community activities aimed at promoting cessation among adults I^2 = teacher-led social influences school program plus adult-focused mass media campaign plus community activities aimed at promoting cessation among adults Lasted 2 years	• At 4-year follow-up, smoking prevalence was significantly lower in both intervention groups relative to the comparison group • At 8- and 15-year follow-ups, smoking initiation rates were still lower for baseline nonsmokers in the intervention groups, with no difference in quit rates for baseline smokers	Some differences in follow-up rates not analyzed; analysis of simple proportions smoking at each follow-up

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
Wakefield et al. 2003a; Angus et al. 2008; NCI 2008	Stanford Five-City Project Fortmann et al. 1995; Winkleby et al. 1996	Quasi-experimental 2 pairs of matched communities in each condition Cross-sectional population surveys assessed prevalence of daily smoking before, during, and following the intervention Target: 12- to 24-year-olds	C = no intervention I = media advocacy and (primarily) adult-focused antismoking advertising Started in 1979; lasted 6 years	• At no time (1979–90) was there a difference in the prevalence of daily smoking between intervention and control communities	Strong secular trend was present
Richardson et al. 2007	Smith and Stutts 2006	Random assignment to conditions Over a semester, 235 Texas high school students were assigned to 1 of 9 messages x media conditions; in each condition, there were different executions of the message via TV, print, and Internet Baseline smoking behavior and self-classified smoking status (nonsmoker, smoker who quit, experimenter, or regular user) were compared with status at final follow-up	Short-term cosmetic effects, long-term health effects C = filler ads only (control) Presented in either TV, print, or Internet format All 3 ads' themes (in all 3 media) depicted 3 scenes of a boyfriend/girlfriend relationship in a high school setting in front of school lockers	• Those exposed to antismoking messages were less likely to smoke, had lower intentions to start smoking, and had greater intentions to quit than those not exposed	One of few studies to examine differential effects of different media
Angus et al. 2008	Chicago: culturally relevant program Kaufman et al. 1994	Quasi-experimental Grade 6 and 7 public school students from 3 predominantly African American inner city neighborhoods in Chicago were randomly assigned to intervention (2 schools, N = 131) or control (1 school, N = 76) Baseline and follow-up surveys at 1 week and 6 months postintervention conducted to measure the message's reach, substance use, knowledge about cigarettes, attitudes toward smoking, social support, and minor delinquency	C = media program only (newspaper curriculum, 8 radio announcements, call-in talk show, a rap contest, billboard contest) I = school-plus-media program	• Smoking rates between intervention and control were not significantly different at posttest or follow-up • Smoking rates for both intervention and control groups decreased significantly from pretest	Media intervention was not compared with a no-media control

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
NCI 2008	Multiple U.S. communities Slater et al. 2006	Randomization constrained Two schools in 8 no-media communities were randomly assigned to I^1 and I^2, and 2 schools in 8 media communities were randomly assigned to I^3 and I^4 Middle and junior high school students, mean age 12.2 years Longitudinal sample was measured pre-program, following curriculum, and twice thereafter	I^1 = no intervention I^2 = no community media, no in-school curricula I^3 = community media, no in-school media, curricula I^4 = community media, in-school media, curricula Communities were selected from all regions of the United States The 2-year media period was staggered for communities Started in 1999; ended in 2003	• Study evaluated uptake of marijuana, alcohol, and smoking. • The community-media intervention significantly reduced uptake rates for all substances • By survey 4, the lowest uptake rates were observed for condition I^4	Four-level model included time, student, school, and community

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
NCI 2008	Texas Tobacco Prevention Pilot Initiative Meshack et al. 2004	Random assignment of intervention level to communities contingent on having a unique media market The largest and most ethnically diverse school in each community was selected for evaluation; in some cases, 2 schools were selected; 11 schools evaluated altogether Subjects: students in grade 6 Eight sites selected for maximum ethnic diversity Pre-post cross-sectional school surveys evaluated student attitudes and tobacco use (any in the last 30 days) and susceptibility to smoking Preintervention survey was conducted in spring 2000 Various interventions took place during the summer and fall of 2000, with the postintervention survey of a new 6th-grade cohort in late fall 2000	C = no intervention I^1 = no program/no media I^2 = no program/low media I^3 = no program/intensive media I^4 = enhanced school/no media I^5 = enhanced school/low media I^6 = enhanced school/intensive media I^7 = multicomponent/low media I^8 = multicomponent/intensive media Started in 2000; lasted 6 months	• Combining the intensive or low media campaign with the multicomponent community program (I^7 or I^8) was most effective in suppressing positive attitudes toward smoking • Combining the intensive media campaign with the multicomponent community program (condition I^8) consistently reduced tobacco use, susceptibility to smoking, and prosmoking attitudes • Smoking was reduced more in I^2 than in I^3, but not tested against C	Analyses considered intraclass correlation within schools

Table 6.1 Continued

Reviews that included the study/studies	Study	Design/population	Intervention description	Findings	Strengths, limitations, and comments
Not previously reviewed	Solomon et al. 2009	Longitudinal analyses of exposure to campaign in 4 media markets in 4 states (Florida, South Carolina, Texas, Wisconsin), with 4 matched media markets as comparison communities Subjects: 2,030 adolescents, grades 7–10, who had smoked in the past 30 days at baseline school survey were recontacted to complete a baseline telephone survey (987 in intervention; 1,043 in control) and were surveyed annually for 3 years Measured smoking in past month, number of cigarettes smoked per day, demographic characteristics, number of other smokers in household, social norms, and intention to smoke in the next 30 days Used generalized mixed-model approach to account for similarities in response within individuals and within communities	I = radio/television campaign based on social-cognitive theory; social norms ads were developed and used Typically, 10 television and 15 radio ads were aired each year, with an estimated average of 380 gross ratings points per week over 9 months of each year C = unexposed matched comparison communities During the 3-year campaign, 68%, 62%, and 58% of those in the exposed condition reported seeing or hearing at least 1 sample ad broadcast	• Those in intervention communities had greater cessation rates (30-day point prevalence quit rate of 18.1%) than those in the control communities (14.8%) after the first year of the intervention • However, there were no further gains up to 3 years, with light and occasional smokers most likely to quit • The quit rate was 16% in the intervention community and 12.8% in the comparison group • Fewer ever smokers resumed smoking in the intervention community (59.4%) than in the control group (66.1%) • Increases in intent to smoke were similar across conditions • Social norms variables thought to mediate effects usually did not differ between groups across time • Those in the exposed group who had reported seeing at least 1 television message were less likely to have smoked in the past 30 days than those who had not seen any messages (54% vs. 62.6%) • No differences were found for those who had heard at least 1 radio message	Baseline rates of smoking in comparison group were higher at baseline, and therefore the condition effect at 3-year follow-up, in the absence of a time-by-condition interaction, may have been due to these higher baseline rates; having no effects from mediating variables provides no support for social cognitive theory; used an intent-to-treat method, assuming those who were lost at follow-up to have smoked at least 1 cigarette in the past 30 days, minimizing possible biased attrition effects; used analyses that accounted for similarities in within-individual responses and within-community responses

Note: **USDHHS** = U.S. Department of Health and Human Services.

Table 6.2 Summary of longitudinal and cross-sectional population-based studies examining the effects on youth of mass media antismoking campaigns

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Longitudinal studies					
Lantz et al. 2000; Pechmann and Reibling 2000a,b; Friend and Levy 2002; Farrelly et al. 2003a; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; National Cancer Institute (NCI) 2008	Minnesota Murray et al. 1994	Cross-sectional pre-post surveys Minnesota youth were compared with unexposed Wisconsin youth Measured: recall, attitudes, and smoking behavior Expenditure approximately $2 million per year (NCI 2008, p. 433)	Minnesota's first stand-alone antismoking campaign Launched in 1986 and ran until 1990 Targeted youth TV, radio, print, billboard media Message aimed to increase awareness of negative social consequences of smoking and to change the social norms about smoking	• Small but statistically significant increase in exposure to antismoking messages, but no significant changes in attitudes or smoking behavior	Used a comparison group in another state; reach may have been a problem given the low campaign spending and only small increase in exposure to antismoking message

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Pechmann 2001; Siegel 2002; Farrelly et al. 2003a; Wakefield et al. 2003b; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Florida Sly et al. 2001b	Longitudinal analyses 1,480 nonsmokers were followed up 5–10 months after a baseline survey, conducted within 6 months of the campaign launch Measured: exposure to any of the advertisements that had aired since the inception of the campaign, agreement with key campaign messages, attitudes, and initiation of smoking Controlled for month of the baseline survey, age, gender, whether the respondent had at least 1 friend who smoked, and whether the youth had a parent who smoked Mean monthly exposures of 12- to 17-year-olds to state antitobacco television advertising (target rating points [TRPs]): 1999 = 4.88; 2000 = 2.87; 2001 = 4.19; 2002 = 3.72; 2003 = 1.07 (NCI 2008, p. 437)	Part of Florida's antitobacco program Media campaign began in April 1998, and 12 ads were run during the first 10 months of the campaign Targeted youth who were susceptible to smoking Florida "truth" messages "attacked the [tobacco] industry and portrayed its executives as predatory, profit hungry, and manipulative" (Sly et al. 2001b, p. 233) Total media budget for first year was ~$26.5 million	• Those who scored higher on the exposure index were less likely to become smokers and established smokers	Controlled for a comprehensive set of potential baseline confounders; exposure index was a problem, as it relied on recall at follow-up; exposure index also a problem because it required agreement with a key campaign belief question that may mediate the pathway between exposure to the campaign and initiation of smoking

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Pechmann 2001; Farrelly et al. 2003a; Wakefield et al. 2003b; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Massachusetts Siegel and Biener 2000	Longitudinal analyses 1,069 12- to 15-year-olds at baseline in October 1993–March 1994; 618 were contacted again at 4-year follow-up Measured: knowledge, attitudes, perception of youth smoking prevalence, and smoking behavior Baseline control variables: age group; gender; race; smoking status; exposure to smoking by parents, siblings, and friends; television viewing; and exposure to antismoking messages unrelated to the media campaign Mean monthly exposures of 12- to 17-year-olds to state antitobacco television advertising (TRPs): 1999 = 2.55; 2000 = 2.11; 2001 = 1.83; 2002 = 0.40; 2003 = 0.49 (NCI 2008, p. 437)	Part of Massachusetts antitobacco program that included an increase in the cigarette excise tax in January 1993 Media campaign was launched in October 1993 and ran until 2002 Messages targeted adults but consisted of television, radio spots, and billboards for the youth-focused media Messages aimed to highlight the negative consequences of smoking and positive consequences of quitting and to give advice about quitting	• Among all youth, there was no association between recall of media on 7 of the 8 knowledge and attitude outcomes • At 4-year follow-up, smoking initiation was significantly lower among those aged 12–13 years at baseline who recalled campaign messages than among those who did not • The 12- to 13-year-olds who recalled campaign messages at baseline were also more likely to have an accurate versus an inflated perception of the prevalence of youth smoking • There were no statistically significant effects for youth aged 14 or 15 years	Controlled for a comprehensive set of potential baseline confounders; baseline survey data included weights that reflected probability of each respondent's initial selection; demonstrated that recall of media messages at baseline was not associated with smoking status; analyses or weighting not used to adjust for nonresponse at follow-up; baseline assessment occurred just after the implementation of an increase in the cigarette excise tax

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Florida Sly et al. 2002	Longitudinal analyses 1,805 baseline nonsmokers who were followed up 22 months after launch Measured: self-reported exposure to any of the 11 advertisements that had aired since the inception of the campaign, agreement with key campaign messages, attitudes, and initiation of smoking Controls included age, gender, and how many of the respondent's best friends smoked (susceptibility) at baseline	As above	• The number of advertisements recalled, agreement with the key campaign message, and the industry attitude index were all associated with decreased initiation of smoking • Compared with those who recalled 0 ads, those who recalled 1 to 3 Florida "truth" ads were 23% more likely to have remained a nonsmoker and 22% less likely to become established smokers; those who recalled 4 or more ads were 71% more likely to have remained a nonsmoker and 91% less likely to have become established smokers, after controlling for influence of the message theme, tobacco attitudes/beliefs, age, gender, and susceptibility • Those with higher levels of agreement with campaign-targeted attitudes and beliefs at follow-up were 90% more likely to remain a nonsmoker and almost 4 times less likely to become established smokers than those with low levels of these attitudes	Controlled for a comprehensive set of potential baseline confounders; exposure measure was improved by separating recall from beliefs and smoking behavior; exposure index still relied on recall at follow-up; unlike the above study (Sly et al. 2001b), there was no control for parental smoking or the timing of the baseline survey

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Richardson et al. 2007	California Weiss et al. 2006	Longitudinal analyses Baseline and 3-year follow-up 2,292 middle school students completed self-report on exposure to protobacco and antitobacco media and smoking susceptibility	Part of California antitobacco program Media campaign launched in 1990 and still running Targeted youth and adults TV, radio, print, and billboard messages were aimed to change social norms about tobacco use and include secondhand smoke and anti-industry and cessation/prevention themes	• Increased levels of protobacco media exposure at baseline were positively associated with susceptibility, while increased levels of exposure to antitobacco media were associated with lower rates of smoking susceptibility	
Not previously reviewed	Ohio Evans et al. 2007	Longitudinal baseline and multiple postlaunch surveys of exposure to the Ohio Tobacco Use Prevention and Control Foundation's "Stand" campaign and affiliation with the "Stand" brand 1,657 11- to 17-year-old nonsmoking youth surveyed 2–6 weeks after launch (July to September 2003) and then followed up 8 and 20 months later Measured: smoking attitudes, beliefs, behavior, and affiliation with the "Stand" antitobacco brand Affiliation measures included dimensions of brand loyalty, leadership, personality, popularity, and awareness Controlled for gender, age, race/ethnicity, if 1 or more friends smoke, and smoking susceptibility	Ohio stand-alone "Stand" campaign/brand was launched in 2003 Television, radio, print, and billboard advertising as well as a Web site and Internet advertisements placed on external youth-targeted Web sites Targeted youth	• Those with greater campaign consistent attitudes and beliefs at baseline had lower levels of smoking initiation at the first 8-month follow-up and lower levels to a smaller degree at 20-month follow-up	Did not report any details of media campaign; measures were of "brand awareness"; controlled for a set of potential baseline confounders; differential attrition among older adolescents (who may be more likely to initiate smoking) vs. younger adolescents and among certain racial/ethnic groups; these attrition effects were analyzed but no adjustment was made for them in analyses or through weighting; participation rates were 74.8% for 1st follow-up and 66.7% for 2nd follow-up

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Cross-sectional studies: individual states					
USDHHS 1994; Lantz et al. 2000; Pechmann and Reibling 2000a; Pechmann 2001; Friend and Levy 2002; Siegel 2002; Farrelly et al. 2003a; Richardson et al. 2007; Angus et al. 2008; NCI 2008	California Popham et al. 1994	Cross-sectional pre- and postintervention surveys Grades 4–12 (N = 29,264) were surveyed in schools 3, 7, and 12 months after start of the California antitobacco program but before the media campaign, and 2, 6, and 11 months after the campaign launch Measured: self-reported exposure to campaign ads, tobacco use, smokers' intentions to quit, nonsmokers' intentions not to start, attitudes toward smoking Expenditures for campaign: 59¢ per capita 1989 to 1992–1993, 41¢ per capita 1993–1994 to 1995–1996 (NCI 2008, p. 446)	Part of California antitobacco program that also included tax increases Media campaign launched in 1990 and still running Targeted youth and adults TV, radio, print, billboard media Messages aimed to change social norms about tobacco use and included secondhand smoke, anti-industry and cessation/ prevention themes	• Positive changes in tobacco attitudes, intentions, and use from before the campaign to 2 months after the campaign launch • However, at the 12-month follow-up, there were no differences in prevalence of smoking and thinking about quitting between those exposed and those unexposed • Also, at the 12-month follow-up, comparisons of those who reported awareness of the campaign with those who did not indicated conflicting results; those exposed showed significantly more health-enhancing attitudes, but among the nonsmokers, more indicated they were thinking about starting to smoke; selective attention among nonsmokers susceptible to smoking may explain this result	Very large representative sample; no comparison group in other states; assessment used simple t-tests and did not control for potential confounding influences among those reporting and not reporting exposure; assessment occurred before the implementation of most other statewide tobacco control activities, but it followed a 25¢/pack increase in the cigarette excise tax; protobacco advertising directed at youth increased during the campaign

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Pechmann 2001; Siegel 2002; Farrelly et al. 2003a; Wakefield et al. 2003b; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Florida Sly et al. 2001a	Multiple cross-sectional surveys 1,800 12- to 17-year-olds in Florida compared with 1,000 youth from the rest of the United States (excluding states that had preexisting campaigns), conducted between April 1998 and May 1999 Measured: recall, beliefs, smoking behaviors	As above 89% of youth reported seeing at least 1 of the Florida "truth" advertisements	• Florida youth had more favorable beliefs than those in the national sample by May 1999 • Current smoking declined but not significantly; however, significant decreases occurred in "ever tried" and percent open to smoking • The categories of ever trying, current smoking, and open to smoking among Florida youth compared favorably with national sample • The percentage who reported talking with friends about ads rose from 10% at baseline before the Florida "truth" campaign began, and when audience had been exposed to mild humorous public service announcements (PSAs), up to 34% after 1 year; those reporting the ads made them think increased from 28% to 61%	Control group of states without preexisting campaigns was included

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Friend and Levy 2002; Siegel 2002; Farrelly et al. 2003a; Wakefield et al. 2003b; Schar et al. 2006; NCI 2008	Florida Bauer et al. 2000	Cross-sectional prelaunch and postlaunch surveys More than 20,000 Florida students in more than 240 middle and high schools Surveys conducted before launch in 1998 and postlaunch in both 1999 and 2000 Measured: smoking susceptibility and behavior Mean monthly 12- to 17-year-olds' exposures (TRPs): 1999 = 4.88; 2000 = 2.87; 2001 = 4.19; 2002 = 3.72; 2003 = 1.07 (NCI 2008, p. 437)	Part of Florida's antitobacco program Media campaign began in April 1998 Targeted youth susceptible to smoking Florida "truth" messages "attacked the [tobacco] industry and portrayed its executives as predatory, profit hungry, and manipulative" (Sly et al. 2001b, p. 233)	• Over the 2-year period, both experimentation and current smoking declined markedly for both middle and high school students • Among never nonsmokers, there was a significant increase in those committed to never smoking • Among experimenters, there was a significant increase in those who said they would not smoke again	Very large representative sample used; no comparison group in other states
Richardson et al. 2007	California Unger et al. 2001	Cross-sectional survey Representative survey of 5,870 students in grade 8 Evaluated various measures of receptivity to tobacco marketing and recall and perceived effectiveness of protobacco and antitobacco marketing Sample weighted to represent California youth	As above	• Recognition and perceived persuasiveness of antitobacco marketing was highest among established smokers	

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Richardson et al. 2007; Angus et al. 2008; NCI 2008	Florida Niederdeppe et al. 2004	Multiple cross-sectional surveys 1,097 12- to 17-year-olds in Florida compared with 6,381 youth from the rest of the United States (excluding states with large-scale media campaigns in Arizona, California, Massachusetts, Mississippi, and Oregon), conducted between fall 2000 and spring 2001 Measured: recall, beliefs, smoking susceptibility, and smoking behavior	As above	• Florida adolescents were less likely than youth nationally to have smoked in the past 30 days, to have ever tried smoking, and to be open to smoking in the future (among never smokers) • Higher awareness of "truth" and antitobacco awareness than their national counterparts • Less favorable beliefs about cigarette companies than among youth nationally, but all other beliefs were similar	Control group of states without preexisting campaigns was included
Richardson et al. 2007	Kaiser Permanente and Group Health Northwest campaigns Seghers and Foland 1998	Cross-sectional pre- and postintervention survey ~300 students completed a written questionnaire, and ~200 students completed a telephone survey measuring recall and intention to quit	Kaiser Permanente and Group Health Northwest campaigns	• Intention to quit smoking in the next 30 days increased from 37% to 56% • Those aged less than 13 years increased their intention to quit smoking from 18% to 50% • Television ads were recalled more often than other formats	No information was provided on sampling, data analysis, and measurement methods
Richardson et al. 2007	Mississippi Reinert et al. 2004	Cross-sectional survey Representative survey of 1,151 students in grades 6–12 Structured interviews were conducted after implementation of media campaign against tobacco	Statewide antitobacco campaign in Mississippi	• Students who heard antitobacco messages from a variety of sources were less likely to use tobacco	Measures of use and intentions not clear

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
NCI 2008	Minnesota Sly et al. 2005	Cross-sectional surveys ~1,100 12- to 17-year-olds surveyed between the summer of 2002 and winter of 2003 The last survey was conducted 5 months after the last advertisement aired Measured: self-reported awareness of campaign advertising and brand, attitudes, smoking susceptibility, intentions to smoke Mean monthly 12- to 17-year-old exposures (TRPs): 1999 = 0.02; 2000 = 1.91; 2001 = 4.62; 2002 = 2.99; 2003 = 2.70 (NCI 2008, p. 437)	Minnesota's second stand-alone campaign, "Target Market" Launched in 1999 and ran for 4 years to 2003 TV, radio, print, billboard media Targeted youth	• By the last survey, awareness of the advertising dropped from 59% to 50%, and awareness of the brand dropped from 85% to 57% • By the last survey, the 2 measures of smoking susceptibility increased, as did intentions to smoke in the next year, and scores on all 3 attitudinal scales decreased	Showed the absence of the campaign led to adverse changes; no comparison group in other states were examined
None	Not previously reviewed	Cross-sectional postintervention-only survey More than 900 12- to 18-year-olds who recalled at least 1 antismoking campaign ad were surveyed approximately 6 months after launch Control variables included age, gender, and race Also examined the effects of ever smoking and smoking by family and friends within the first step of the model	Wisconsin's first stand-alone antismoking campaign was launched in July 2001 and ran until December 2001 Television and radio Targeted middle and high school-age youth Messages: primary theme of industry deception and antismoking imagery; additional themes of addiction and "secondhand smoke kills" Cost: $6 million, or $1.21 per capita	• "Liking" the ad campaign predicted antismoking beliefs (agreement that tobacco industry is deceptive, secondhand smoke is harmful, smoking is addictive) and intentions to smoke	One postlaunch was the only survey; no comparison group in other states was used; used "liking" the campaign as predictor of beliefs and intentions

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Not previously reviewed	Florida Niederdeppe et al. 2008	Multiple cross-sectional surveys 5,010 12- to 18-year-olds surveyed for campaign recall, anti-industry beliefs, and nonsmoking intentions Assessed by using 5 waves of the Florida Antitobacco Media Evaluation survey from April 1998 to May 2000 Control measures included demographics, smoking in the home and degree of parental smoking, and parental monitoring Rates of change were examined by using an interrupted time-series technique before and after the Florida Tobacco Control Program budget cuts	Florida's "truth" campaign Budget cuts occurred between waves 3 and 4 of the survey (between May 1999 and September 1999)	• Upward trends in recall and nonsmoking intentions were reduced after budget cuts to the Florida "truth" campaign	This study provides evidence that reductions in tobacco control funding have immediate effects on program exposure and cognitive precursors to initiation of smoking
Not previously reviewed	Wisconsin Tangari et al. 2007	Cross-sectional surveys 901 Wisconsin 12- to 18-year-olds were asked in a telephone survey whether they recalled any of the ads in 4 antismoking campaigns aired (*Mohammed*, *FACT*, *Janet Sachman*, *Patrick Reynolds*) Those who recalled ads were then asked about their attitudes toward the campaign and their perceptions of the ad message's strength Controlled for race/ethnicity, age, head of household's education, gender, and trial of smoking	Targeted adolescents and adults Five ads were based on the following themes: tobacco industry's deceptive practices, addictiveness of smoking, harm of secondhand smoke $6.5 million was allocated over a 7-month period	• Attitudes toward the campaign were positively related to antismoking beliefs, with this effect stronger among those who had tried smoking • A greater number of advertisements recalled was positively associated with most antismoking beliefs • Attitude toward the campaign and number of campaign ads recalled were significantly associated with lower intentions to smoke • Perceptions of strength of the argument were not significantly associated with intentions to smoke	Controlled for demographics and smoking experience; post-intervention-only survey

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Cross-sectional studies: multistate					
Richardson et al. 2007; Angus et al. 2008 NCI 2008	U.S. state campaigns Hersey et al. 2003	Cross-sectional survey Random sample of 6,875 12-to 24-year-olds from California, Florida, and Massachusetts, with enhanced representation of African Americans, Asians, Hispanics, and Latinos conducted in winter 1999–2000 Examined a theoretical model that predicted that campaign-related beliefs mediated the effects of the impact of the American Legacy Foundation (Legacy) "truth" campaign Weighted the sample to allow for comparisons across surveys. Structural equation modeling was used to examine a theoretical model that predicted that campaign-related beliefs mediated the effects of the impact of the "truth" campaign on smoking status Controlled for age, gender, and race/ethnicity	States that ran the Legacy "truth" campaign	• Adolescents from "counter-industry" states were more likely to agree with campaign-targeted beliefs that cigarette companies lie, cigarette companies try to get young people to smoke, and cigarette companies deny that cigarettes are addictive	

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Richardson et al. 2007; Angus et al. 2008; NCI 2008	U.S. state campaigns Emery et al. 2005	Multiple cross-sectional surveys linked exposure to state antismoking commercials Nationally representative Monitoring the Future (MTF) surveys of students in grades 8 (N = 19,043), 10 (N = 16,131), and 12 (N = 15,911) from 1999 and 2000 Used data on commercial ratings from Nielsen Media Research to calculate a measure of audience exposure to antismoking advertising across the 75 largest media markets for 1999–2000 Controlled for other tobacco-related advertisements and a comprehensive set of potential confounding influences, such as demographics, family structure, parents' education, average state cigarette prices, laws on clean indoor air, and secular trends	Various state-based campaigns Various targets	• Exposure to at least 1 state-funded antismoking advertisement in the previous 4 months was associated with lower perceived rates of friends' smoking, greater perceived harm of smoking, stronger intentions not to smoke in the future, and lower likelihood of being a smoker	Multiple large nationally representative surveys; controlled for a comprehensive set of potential confounders, including other tobacco-related advertisements, prices, laws on clean indoor air, and secular trends; could not control for preexisting correlations between levels of smoking and number and frequency of ads aired in each region; actual exposure was estimated rather than directly measured
Richardson et al. 2007; Angus et al. 2008; NCI 2008	U.S. state campaigns Hersey et al. 2005a	Cross-sectional survey National survey of 15,452 12- to 17-year-olds; survey oversampled African Americans, Asians, Hispanics, Latinos, and adolescents from states with active tobacco counter-marketing campaigns; survey was conducted 8 months and 15 months after the launch of the Legacy "truth" campaign Structural equation modeling was used to examine a theoretical model that predicted that campaign-related beliefs mediated the effects of the impact of the "truth" campaign on smoking status	States that ran the Legacy "truth" campaign	• Youth in markets with higher levels of campaign exposure were more likely to agree with beliefs and attitudes targeted by the campaign • Higher levels of cumulative exposure to the Legacy "truth" campaign were associated with less favorable beliefs about the tobacco industry that were targeted by the campaign and with lower values on a smoking status continuum	

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Richardson et al. 2007; Angus et al. 2008; NCI 2008	U.S. state campaigns Hersey et al. 2005b	Cross-sectional multiple surveys National survey of 12- to 17-year-olds that oversampled African Americans, Asians, Hispanics, and Latinos: N = 3,424 at phase 1 in November 1999 to January 2000 before the launch of the national Legacy "truth" campaign; N = 12,967 at phase 2 (autumn 2000–spring 2001); N = 10,855 at phase 3 (spring 2002–autumn 2002) Compared rates of decline in youth smoking between (1) states with long, well-funded counter-industry campaigns (California, Florida, Massachusetts); (2) states with more recently funded counter-industry campaigns (Indiana, Minnesota, Mississippi, New Jersey); and (3) other states Controlled for demographic (age, gender, race/ethnicity) differences between states, number of parents in home, attendance at religious services, employment status, average weekly earnings, and media-use variables (average daily television hours, average daily radio hours) as well as exposure to other elements of state tobacco control programs (taxes, laws on clean indoor air, awareness of community antitobacco groups, exposure to school antitobacco curricula) Also included controls for number of months since baseline survey, the population media market, and launch of the national "truth" campaign	States that ran the Legacy "truth" campaign	• Between 1999 and 2002, rates of current and established smoking decreased significantly faster in states with established and newly funded counterindustry campaigns (52.6%) than in other states (24.9%) after controlling for demographic differences • Over time, campaign-targeted beliefs showed an increasingly strong relationship with smoking status in campaign states	Multiple surveys; addressed missing data and response rates; accounted for confounders; reported reliability of measurement methods

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Richardson et al. 2007; Angus et al. 2008	U.S. state campaigns Johnston et al. 2005	Multiple cross-sectional surveys Nationally representative MTF surveys of students in grades 8 (N = 29,724), 10 (N = 24,639), and 12 (N = 12,138) from 1997 to 2001 Self-reported recall of antismoking advertising was measured, as were judged impact and perceived exaggeration of such advertising Controlled for ethnicity, gender, academic grades, parental education level, frequency of media use, and residence in states that had existing comprehensive media campaigns in effect at least 2 months before survey	Various state-based and national campaigns Various targets	• Among those who had recalled antismoking advertising, there were significant increases in perceptions that these ads made them less likely to smoke but also in perceptions that ads exaggerated the dangers or risks of smoking; both especially increased among students in grade 8 • There was no increase in judged impact for non-tobacco-control states until 2000, suggesting no significant increase associated with the Philip Morris campaign, which began in late 1998 • There were significant increases in overall exposure to antismoking advertising from 1997 to 2001 • Recall was highest in states with active campaigns at baseline and especially for grade 12 in these states; this effect diminished in 2001 once a number of new statewide and national campaigns had begun	Multiple nationally representative surveys; controlled for a comprehensive set of potential confounders, including frequency of media use and residence in states that had existing comprehensive media campaigns in effect at least 2 months before surveying; also included weights to account for multistage sampling procedures

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
NCI 2008	U.S. state campaigns Emery et al. 2005	Cross-sectional multiple surveys linked to exposure to state antismoking commercials Nationally representative MTF surveys of students in grades 8 (N = 25,800), 10 (N = 20,800), and 12 (N = 19,927) from 1999 and 2000 Used commercial ratings data from Nielsen Media Research to calculate a measure of audience exposure to antismoking advertising across the 75 largest media markets for 1999–2000 Controlled for other tobacco-related advertisements and a comprehensive set of potential confounding influences, such as demographics, family structure, parents' education, average state cigarette prices, laws on clean indoor air, and secular trends	Various state-based campaigns Various targets	• Exposure to at least 1 state antitobacco ad within the previous 4 months, compared with lower exposure, was associated with lower odds of current smoking, decreased perceptions that friends smoke, and stronger intentions not to smoke • These findings were generally consistent across different gender and racial/ethnic groups	Multiple nationally representative surveys; controlled for a comprehensive set of potential confounders, including other tobacco-related advertisements, prices, laws on clean indoor air, and secular trends; also controlled for preexisting correlations between levels of smoking and number and frequency of ads aired in each region; actual exposure was estimated rather than directly measured

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Cross-sectional studies: national campaign					
Lantz et al. 2000; Schar et al. 2006; NCI 2008	Fairness Doctrine Lewit et al. 1981	Analyses of cross-sectional surveys 6,768 of 12- to 17-year-olds surveyed between March 1966 and March 1970 Measured: self-reported smoking behavior (current smoking status and number of cigarettes smoked/day) and various measures of exposure to antismoking advertisements Proxy measure of exposure to ads was estimated from the number of antismoking commercials that aired in a given year and the number of hours per day that each youth spent watching television Controlled for cigarette prices, family income, family size, employment status, family structure, parents' education, age, gender, race, and exposure to prosmoking messages	United States Fairness Doctrine requires 1 antismoking ad for every 3 tobacco industry ads Targeted a general audience Messages in this campaign were primarily about the health consequences of smoking	• Prevalence of youth smoking was between 3.0 and 3.4 percentage points lower during the Fairness Doctrine period than during the 16 months before the initiation of the doctrine • Youth who watched more television during the Fairness Doctrine era were less likely to smoke cigarettes • The proxy measure for the number of antismoking messages seen was statistically and negatively associated with a lower probability of smoking; however, the squared term for this proxy had a positive and significant effect on smoking, indicating that this impact was subject to diminishing returns • No effects were found for number of cigarettes smoked per day, but this is not surprising considering that many youth are not yet addicted smokers	Pioneered measures of potential exposure; actual exposure was estimated rather than directly measured

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Farrelly et al. 2003a; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Legacy campaign Farrelly et al. 2002	Cross-sectional prelaunch and postlaunch surveys National sample of 12- to 17-year-olds (N = 3,439 survey 1; N = 6,233 survey 2) from the Legacy survey Enhanced representation of African Americans, Asians, and Hispanics Baseline before launch and a 10-month follow-up Measured: recall, attitudes, beliefs, and smoking intentions	Legacy's national "truth" campaign Launched in 2000 Targeted youth At 10 months postlaunch of Legacy survey, 75% had seen at least 1 specific campaign ad	• Increase in proportion agreeing with campaign-targeted beliefs • Significant reductions in intention to smoke in future • Awareness of ad associated with greater anti-industry attitudes and beliefs • Exposure to Philip Morris' "Think. Don't Smoke" campaign was associated with an increase in intentions to smoke	Multiple measures used
Jepson et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Australia's national tobacco campaign White et al. 2003	Cross-sectional surveys of youth: 1 national telephone survey of 14- to 17-year-olds and 1 school-based survey of 12- to 17-year-olds Measured: campaign recognition, beliefs, smoking behavior	Australia's national tobacco campaign was launched in 1997 and ran until 1997–2003 Targeted adults aged 18–39 years of age Used fear- and disgust-evoking messages that graphically depicted the short-term consequences of smoking: "Every cigarette is doing you damage" In addition, 1 ad showed a smoker calling the quitline	• Recognition of campaign was high (90% or greater) • High agreement with campaign-related beliefs • Compared with never smokers, a higher proportion of those who had ever smoked took at least 1 action; among established smokers, 27% cut down, 26% were thinking about quitting, 18% tried to quit, but 42% did nothing	No comparison group in other states was possible; single surveys after launch of campaign

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008	Legacy campaign Farrelly et al. 2005	Cross-sectional survey linked to exposure to state antismoking commercials Nationally representative MTF surveys of students in grades 8, 10, and 12 (N ~50,000) conducted each spring from 1997 to 2002 Estimated the prevalence of youth smoking as a function of the "truth" campaign's intensity measured at the media market level Used commercial ratings data from Nielsen Media Research to calculate a measure of audience exposure to antismoking advertising	As above	• Significant decline in smoking prevalence • Average annual percentage decline: 1997–1999 = -3.2%; 2000–2002 = -6.8% • Prevalence of smoking among students in grades 8, 10, and 12 combined declined from 28% to 18% between 1997 and 2002 • The Legacy "truth" campaign accounted for approximately 22% of this decline • This effect strengthened over time and, as expected, had little effect in the early months after the campaign's launch • For all grades, there was a significant dose-response relationship between the exposure to the "truth" campaign and the current prevalence of youth smoking (OR = 0.78; 95% CI, 0.63–0.97, $p < 0.05$)	Examined effects of campaign intensity; controlled for a comprehensive set of potential confounders and preexisting levels of smoking in each of the U.S. media markets; relied on self-reported measures of youth smoking; note that Messeri et al. 2007 chemically validated smoking status in a school setting and found a low rate of underreporting, which was not related to recall of the "truth" campaign

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Angus et al. 2008	Australia's national tobacco campaign Edwards et al. 2004	Quasi-experimental 2,038 12- to 17-year-old females attending cinemas in New South Wales, Australia, were surveyed about attitudes toward smoking in movies and their intentions to smoke in the future after viewing a movie with or without a 30-second antismoking ad before the movie was shown	Australia's National Tobacco Campaign "tar" antismoking ad, which graphically demonstrates the damage smoking does by pouring a beaker of tar over a lung, was used in the exposure condition with an altered voice-over from a popular soap opera star emphasizing that she and most other actors do not smoke	• Significantly more nonsmokers exposed to the antismoking message thought that the smoking in the movie was "not OK" than those not exposed; however, there were no differences between groups in smoking intentions • For smokers, there were no differences between groups in perception that the smoking in the movie was "not OK"; however, significantly more smokers in the exposed group were unlikely to smoke in the next 12 months than in the control group	
NCI 2008	Legacy campaign Evans et al. 2004a	Cross-sectional pre- and postintervention launch surveys National sample of 12- to 17-year-olds (N = 20,058) from 3 waves of the Legacy survey from 1999 to 2001; enhanced representation of African Americans, Asians, and Hispanics Using structural equation modeling, aimed to examine relationships between exposure to "truth" campaign, differences in social images about not smoking, related measures, and smoking behavior	Legacy's national "truth" campaign Launched in 2000 Targeted youth	• Model showed satisfactory fit where social imagery and perceived tobacco independence mediated the relationship between exposure to "truth" campaign and smoking status	

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
NCI 2008	Legacy campaign Thrasher et al. 2004	Cross-sectional precampaign and multiple postcampaign launch surveys of 12- to 17-year-olds from the nationally representative Legacy survey Examined attitudes in tobacco-producing states compared with non-tobacco-producing states with low, medium, and high funding	As above	• No significant differences in how antitobacco attitudes changed over time among the different state groups • Concluded that response to the campaign was not influenced by residence in a tobacco-producing state	
Not previously reviewed	Australia's national tobacco campaign White et al. 2008a	Triennial cross-sectional national studies of representative random samples of secondary students, 12–17 years of age, were conducted from 1987 to 2005 Numbers ranged from 19,203 in 1987 to 29,853 in 1996 Self-reported anonymous surveys assessed cigarette use in the past month, week (current smokers), and on at least 3 of the previous 7 days (committed smokers) Students' residential postcodes were collected, and the Index of Relative Socioeconomic Disadvantage associated with each postcode determined socioeconomic status (SES) quartiles	Australia's National Tobacco Campaign was launched in 1997 and ran until 2002–2003 Campaign targeted adults 18–39 years of age Campaign used fear- and disgust-evoking messages that graphically depicted the short-term consequences of smoking, "Every cigarette is doing you damage"; in addition, 1 ad showed a smoker calling the quitline	• Over the period 1987–2005, the prevalence of smoking among Australian adolescents at school increased and then decreased, with a large decrease between 1996 and 2005—a period coinciding with the third phase of tobacco control activity in Australia • No significant change occurred between 1987 and 1990 for either younger or older students • Between 1990 and 1996, the proportion of younger and older students involved with smoking increased significantly • Among younger students, the increase in monthly and weekly smoking was greater among lower-SES students (p for interactions <0.05) • Between 1996 and 2005, the prevalence of monthly and weekly smoking decreased significantly among both younger and older students, and these decreases were consistent across SES groups	Well-funded, population-based tobacco control programs can be effective in reducing smoking among students from all SES groups

Table 6.2 Continued

Reviews that included the study/studies	Study	Design/population	Description of intervention	Findings	Strengths, limitations, and comments
Not previously reviewed	Legacy campaign Thrasher et al. 2006	Used data from a nationally representative survey of 10,035 adolescents, 12 to 17 years of age, to test whether reactions to anti-industry ads, the attitudes these ads targeted, and the relationship between these attitudes and smoking differed by social bonding and sensation-seeking risk factors	As above	• Results indicated that reactions to anti-industry ads and the strength of anti-industry attitudes were comparable between adolescents with high levels of sensation seeking and those with low levels • Weakly bonded adolescents had less favorable reactions to ads and weaker anti-industry attitudes than did strongly bonded adolescents • Social bonding also moderated the influence of sensation seeking on reactions to anti-industry ads, such that sensation seeking had a positive influence among more strongly bonded adolescents and no influence among weakly bonded adolescents • Finally, the relationship between anti-industry attitudes and smoking appeared consistent across risk groups, whether risk was defined using social bonding, sensation seeking, or the interaction between the 2 factors	Overall, these results suggest that anti-industry messages are a promising strategy for preventing smoking among high- and low-risk adolescents alike

Note: **CI** = confidence interval; **OR** = odds ratio; **USDHHS** = U.S. Department of Health and Human Services.

Table 6.3 Controlled exposure and naturalistic exposure studies examining the relative effectiveness of different advertising messages for youth

Reviews that included the study/studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Controlled exposure studies					
Lantz et al. 2000; Pechmann and Reibling 2000b; Pechmann 2001; Siegel 2002; Farrelly et al. 2003a; Wakefield et al. 2003b; Schar et al. 2006; DeCicca et al. 2008a; National Cancer Institute (NCI) 2008	Goldman and Glantz 1998	Controlled exposure Reviewed results of 186 focus groups involving >1,500 children and adults who examined 188 different advertisements and ad concepts from California, Massachusetts, and Michigan	8 themes were compared: industry manipulation, secondhand smoke, addiction, cessation, youth access, short-term effects, long-term health effects, and romantic rejection	• Industry manipulation and secondhand smoke were judged as the most effective themes to use for youth in denormalizing smoking • Addiction messages were average, but when addiction was combined with industry manipulation, it was judged as effective for youth • Short-term effects, long-term health effects, and romantic rejection were judged as not effective for youth	Study has been criticized for failing to provide transparent criteria for how “effectiveness” was determined (Worden et al. 1998; Connolly et al. 1998)
Pechmann 2001; Farrelly et al. 2003a; Schar et al. 2006; Richardson et al. 2007; NCI 2008	Pechmann et al. 2003	Controlled exposure, random assignment 1,129 students in grades 7 and 10 grouped 194 ads into 7 distinct themes 1,667 students in grades 7 and 10 were randomly assigned to view 1 message theme, after which they were asked about their feelings and thoughts in relation to the advertisements, attitudes toward smoking, and intention to smoke	56 advertisements in total were shown; each ad was categorized into 7 antitobacco advertisement themes: disease and death, endangers others, cosmetic effects, smokers’ negative life circumstances, role model of refusal skills, marketing tactics, and selling disease and death	• Industry manipulation and secondhand smoke were judged as the most effective themes to use for youth in denormalizing smoking • Addiction messages were average, but when addiction was combined with industry manipulation, it was judged as effective for youth • Short-term effects, long-term health effects, and romantic rejection were judged as not effective for youth	Study has been criticized for failing to provide transparent criteria for how “effectiveness” was determined (Worden et al. 1998; Connolly et al. 1998)
Pechmann and Reibling 2000b; Siegel 2002; Wakefield et al. 2003b (includes earlier unpublished version of Pechmann and Goldberg Study)	Pechmann and Goldberg 1998			• Impact of smoking on babies and children, smoking is socially unacceptable, and nonsmoking is the norm; these topics significantly influenced youth’s reported intentions to smoke • Tobacco industry marketing practices and health consequences of smoking had no effect	

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Pechmann and Reibling 2000b; Pechmann 2001; Siegel 2002; Wakefield et al. 2003b; Schar et al. 2006; NCI 2008	Teenage Research Unlimited 1999	Controlled exposure 20 focus groups of students in grades 7–10 (N = 120) who were susceptible to using tobacco in Arizona, California, and Massachusetts Youths viewed each of 10 ads and evaluated the main message and how much the ad would make them "stop and think" about not smoking; they discussed the ads as a group	10 ads produced by state tobacco control programs in Arizona, California, Florida, and Massachusetts and by Philip Morris Ads were categorized into 8 message themes, 2 executional styles, and by target group (youth vs. general audience)	• Advertisements portraying the serious negative consequences of smoking in either a graphically or dramatically emotional way were rated most highly • Advertisements using an industry manipulation theme were rated high in terms of "stop and think" by respondents in California only, where these themes were familiar to participants • Advertisements with a theme emphasizing that adolescents need to make a choice about whether to smoke had the lowest ratings	Used a variety of scales to measure response to ads
Schar et al. 2006; NCI 2008	Murphy 2000	Controlled exposure and focus groups 285 youth aged 11–18 years were exposed to 35 spots on primary and secondary prevention Youth ranked their top 10 ads based on attention getting and being most likely to affect intention to maintain smoke-free status or consider quitting Subsequently, 8 focus groups were conducted in Utah to examine which of the identified ads were most thought provoking and likely to result in a behavioral intention to not smoke or to quit	The top 10 ads were identified using the controlled exposure: *Voice Box*, *Cowboy*, *Bad Influence*, *Janet Sackman*, *Cattle*, *Pam Laffin*, *Smart Dog*, *Camel*, *Girlfriend*, and *Maggots*	• The testimonial ads from people who have suffered diseases and disabilities (*Voice Box*, *Cowboy*, *Pam Laffin*, *Janet Sackman*) were more thought provoking and likely to result in a behavioral intention to not smoke or to quit • *Bad Influence* was also rated highly among those who were concerned about their influence over younger siblings • The *Camel*, *Girlfriend*, and *Smart Dog* ads were rated as average and seen as not affecting viewers' behavior • The cessation theme ad *Quit* was rated low	Convenience sample; focus groups' evaluation did not use standardized validated instruments to measure comparative effectiveness

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Richardson et al. 2007	Devlin et al. 2007	Controlled exposure 12 focus groups of students in grades 7–9 (3 or 4 youth in each group) who were either experimenters or regular smokers from 3 regions in England Youth were exposed to 3–4 ads for each of 3 message themes chosen by the moderator from a pool of 16 ads in total Youth discussed their views, attitudes, and behaviors in response to different types of message themes	3 message themes were explored: appeals to fear, social norms, and industry manipulation	• Ads appealing to fear appeared to be effective in evoking strong emotional "shock" emotions and motivation to think about giving up; however, many distanced themselves from the type of smoker portrayed (adult, long-term smoker) • Social norms ads were most effective with those who had just started experimenting; more committed smokers were less likely to identify with images that portrayed smokers and smoking negatively—these were in contrast to their experience • Industry manipulation provided new information that led to greater interest; however, comprehension was a barrier, with many needing the ideas explained	
Richardson et al. 2007	Grandpre et al. 2003	Controlled exposure 612 students in grades 4, 7, and 10 attending 22 different schools were randomly assigned to message condition and then answered a series of evaluation questions	Students were assigned to 1 of 4 message conditions: explicit vs. implicit x antitobacco vs. protobacco messages	• More negative evaluation was given to the source of protobacco messages than the source of antismoking messages • Implicit messages resulted in more positive source evaluation than did explicit messages • Students in grade 7 had the most positive evaluations	
Richardson et al. 2007	Henriksen et al. 2006	Controlled exposure 832 school students in California, aged 14–17 years, were randomly exposed to 5 ads Measures included perception of the ads, intention to smoke, and attitudes toward tobacco companies, as measured immediately after exposure	Five tobacco company ads on preventing smoking among youth (Philip Morris or Lorillard, Inc.), 5 Legacy "truth" antitobacco ads, or 5 ads about preventing drunk driving	• Participants rated tobacco company ads on preventing smoking among youth less favorably than Legacy "truth" ads	

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Richardson et al. 2007	Kim 2006	Controlled exposure 142 nonsmoking male students from South Korea (mean age 16) were randomly assigned to message condition The study examined the role of regulatory focus in the effectiveness of message framing in antitobacco ads After exposure, persuasiveness was measured	2 (goal priming: promotion vs. prevention) x 2 (message frame: promotion vs. prevention), between-subjects design	• Lower intentions to smoke, lower perceived pharmacologic benefits of smoking, and lower perceived psychological benefits of smoking were found when the fit between regulatory goal and the message frame was congruent	
Richardson et al. 2007	Niederdeppe et al. 2005	Controlled exposure 820 U.S. youth aged 13–18 years completed an Internet-delivered baseline questionnaire assessing susceptibility to smoking and sensation seeking They then viewed 5 randomly ordered antitobacco ads and completed 6 individual ratings of each ad These ratings were summed to provide composite ratings of the ads	Three ads from the American Legacy Foundation (Legacy) "truth" campaign (*Body Bags*, *Daily Dose*, and *Shredder*), 1 ad from Philip Morris (*My Reasons*), and 1 ad from a state tobacco control program (result not reported) were compared	• Participants in all smoking risk categories rated Legacy's *Body Bags* and *Daily Dose* more highly than Philip Morris' *My Reasons* and Legacy's *Shredder* • Compared with the 2 highest-ranking Legacy ads, the Philip Morris ad received favorable ratings among 13- to 15-year-olds at lowest risk for future smoking, but 16- to 18-year-olds at elevated risk for future smoking responded significantly less favorably	
Richardson et al. 2007	Smith and Stutts 2006	Controlled exposure Random assignment to conditions Over a semester, 235 Texas high school students were assigned to 1 of 9 messages x media conditions In each condition, there were 3 different executions of the message Baseline self-classified smoking status (experimenter or regular user) was compared with status at final follow-up	Short-term cosmetic effects, long-term health effects, or filler ads only (control) were presented in either TV, print, or Internet format All 3 ads' themes (in all 3 media) depicted 3 scenes of a boyfriend-girlfriend relationship in a high school setting in front of school lockers	• Cosmetic ads and health ads were similarly effective in making youth less likely to smoke; however, ads about health effects were more effective in lowering intentions to start smoking and increasing intentions to quit	Random assignment to different message themes

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
NCI 2008	Donovan et al. 2006	Controlled exposure 257 14- to 18-year-old Australian youth recruited through interception of shoppers were exposed to a tobacco industry ad on preventing smoking among youth or a tobacco control ad, after which they completed ratings of the impact of the ad on their smoking	Three tobacco industry ads on preventing smoking among youth produced and adapted for MTV in Australia, 2 youth-directed tobacco control ads featuring smoking not being cool or short-term harms of smoking (shown to 14- and 15-year-olds only), and several tobacco control ads portraying smoking as disgusting	• Among 14- and 15-year-olds, tobacco industry ads generally scored lower than the tobacco control ads that portrayed smoking as disgusting, but they were rated similarly to the other youth-focused tobacco control ads • Among 16- to 18-year-olds, the tobacco industry ads were rated as having less impact than the disgust-oriented tobacco control ads in terms of not wanting to smoke and, among smokers, in thinking about quitting	
NCI 2008	Henriksen and Fortmann 2002	Controlled exposure 218 18- to 25-year-old undergraduate students in California were randomly assigned to view 4 ads; they completed baseline ratings of various companies, viewed and rated each ad, and then made final ratings of various companies	4 Philip Morris ads on preventing smoking among youth, 4 Philip Morris ads about charitable works, or 4 Anheuser-Busch ads about preventing underage drinking (the control group), and several Pfizer and Chevron ads concerning community service	• Philip Morris' ads on preventing youth smoking and on charitable works were rated less favorably by those who knew Philip Morris was a tobacco company than by those who were unaware of that fact • Ads about Philip Morris' charitable works received more favorable ratings than did Philip Morris' ads on preventing youth smoking	

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Richardson 2008; NCI 2008	Pechmann and Reibling 2006	Controlled exposure 1,725 9th-grade students in California were randomly assigned to view 1 of 9 videotapes containing a television program in which particular themed advertisements or control advertisements were embedded At baseline, personality traits were measured; after exposure, students were asked about smoking intentions, feelings and beliefs, and appraisal of advertisement	8 types of advertisements, including serious health effects of smoking (disease and suffering); tobacco industry manipulation; and social themes from California, Florida, Legacy, Massachusetts, and Philip Morris	• Compared with the control ad, advertisements focusing on young victims suffering from serious smoking-related disease (OR = 0.46; 95% CI, 0.28–0.75) elicited disgust, enhanced anti-industry motivation, and reduced intentions to smoke among non-conduct-disordered youth • Acceptance of nonsmokers, cosmetic effects, counterindustry, and industry marketing tactics did not have any of the above effects • Youth who had conduct disorders were not influenced by any advertisements' themes	Random assignment to different message themes

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Not previously reviewed	Dickinson and Holmes 2008	Controlled exposure 353 14- to 16-year-olds from Western Australia were randomly assigned to 1 of 6 message conditions or the control condition with approximately 50 respondents in each condition Study aimed to examine the utility of protection motivation theory in predicting effective appeals involving threats Survey assessed emotional response (disgust, guilt, shyness, stress and anger) and coping response using adaptations of standardized measures Theoretically, "adaptive" coping responses indicate the message is accepted as a result of rational cognitive processes, while "maladaptive" coping responses indicate avoidance of the notion of danger	6 messages were varied across 3 levels of threat plus 2 types of threat: physical consequences vs. social rejection due to smoking: • Low physical threat included a man having difficulty running • Moderate physical threat showed a man who had been hospitalized • High physical threat showed a lifeless man in a hospital bed • Low social threat depicted a disappointed look from a boyfriend • Moderate social threat depicted a boyfriend not wanting to kiss his girlfriend • High social threat showed the boyfriend having left the girl for another	• Low-level threats, followed by moderate levels of threat (especially social threats), were most effective at producing "adaptive coping responses" • Physical threats produced stronger emotional response than did social threats, with moderate level producing the strongest emotional responses, followed by high-level then low-level threats • There was no significant relationship between strong overall emotional responses and the associated coping response; however, disgust was positively related to coping response	t-tests and ANOVAs were used; i.e., no control variables were included

Table 6.3 Continued

Reviews that included the study/studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Not previously reviewed	Flynn et al. 2007	Controlled exposure 1,255 9- to 18-year-olds from 4 public school districts in California, Florida, Texas, and the District of Columbia (in areas with household incomes below the national median) rated the appeal of messages by the degree to which they liked the antismoking social norms messages Using repeated-measures ANOVA, the authors included student characteristics (age group) and the community of residence as grouping factors, and messages as the repeating factor Additional models that added the effects of race/ethnicity and gender were subsequently conducted The analyses could not account for selection of students from particular schools, as age group was confounded with school	8 television and 5 radio messages were chosen by using a message-rating method from a pool of ads developed using formative research and based on social cognitive theory Themes included "not smoking cigarettes is advantageous," "smoking cigarettes has disadvantages," "most young people don't smoke," and "it is not difficult to avoid smoking in social situations"	• Televised messages generally received higher ratings than did radio messages • Strong differences occurred between age group ratings with younger students more likely than older students to give higher ratings of message appeal • Boys and girls generally rated messages similarly • Overall ratings were similar across race/ethnicity categories; however, there was more variability in older groups, particularly among oldest African American raters • Those at higher risk of smoking (had ever smoked and had family members who smoked) and those with lower academic achievement generally scored messages lower	It may be particularly difficult to design these types of social norms messages to be appealing to older youth, those at higher risk of smoking, and those reporting lower academic achievement

Table 6.3 Continued

Reviews that included the study/studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Not previously reviewed	Helme et al. 2007	Controlled exposure 1,272 Colorado front range area middle school students were randomly assigned to 1 of 2 message conditions (high vs. low sensation value) Responses were tracked as the students completed 3 sessions exposing them to 3 antitobacco and 3 antidrug messages, each separated by approximately 2 weeks; a postmeasure was taken approximately 2 weeks after completion of the final session Students' level of sensation seeking (high vs. low) was also measured	18 antitobacco public service announcements (PSAs) were selected for inclusion from a pool of 195 ads Coding and focus testing indicated the 9 messages with the highest sensation value and the 9 with the lowest sensation value An additional 9 antidrug messages were interspersed with the antitobacco ads	• The study found no differences between high- and low-sensation-value messages in changing antismoking attitudes, future intentions to smoke, self-efficacy not to smoke, perceived effectiveness of the message, and perceived risk for self and others • High-sensation seekers were more likely to show changes than were low-sensation seekers on changes in antismoking attitudes, intentions not to smoke, self-efficacy not to smoke, perceived effectiveness of the message, and perceived risk from smoking	No description was given of the content/story of the messages
Not previously reviewed	Zhao and Pechmann 2007	Controlled exposure Study 1: 443 students in grade 9 who were not past or current smokers were randomly exposed to 1 of 4 message conditions, plus a control condition Students' promotion or prevention focus was measured Study 2: 719 students in grade 9 who were not past or current smokers were randomly exposed to 1 of 4 message conditions exactly the same as in study 1, plus a control condition Students were primed to be promotion or prevention focused before being exposed	4 versions of the same basic social disapproval antismoking message (depicted an indoor gathering of a group of young college students) that varied along 2 dimensions (positive vs. negative frame; promotion- vs. prevention-focused message) The control message was a PSA that attempted to dissuade adolescents from dropping out of school	• All the ads had null effects on intentions to smoke compared with the control unless the student's regulatory focus (promotion vs. prevention focus) was aligned with the message's regulatory focus (promotion vs. prevention focus) and frame (positive vs. negative) • For promotion-focused adolescents, promotion-focused positively framed messages were most effective at persuading them not to smoke • For prevention-focused adolescents, prevention-focused negatively framed messages were most effective • The enhanced ad effectiveness was mediated by message accessibility and diagnosticity	

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Not previously reviewed	Sutfin et al. 2008	Controlled exposure 488 high school students were randomly assigned to 1 of 3 antitobacco ad conditions or a control condition Students completed a measure addressing demographics and smoking behavior before exposure and then rated ads immediately after viewing on cognitive and emotional responses and on intentions to smoke Ads were chosen from a pool of 33 ads being aired as part of state tobacco prevention programs aimed at adolescents Ads were chosen on the likely appeal of the topic to adolescents and the inclusion of actors their own age	Three ads represented 3 message themes: • Endangering others (semi-trailer with chemicals inside, compare hurricane deaths to tobacco deaths, waitress with red eyes) • Negative life circumstances (jeopardizing driver's license, running into glass door, and going outside with metal rod in a thunderstorm were related to smoking) • Industry manipulation (smoking in movies, teaching actors how to smoke, e-mail to big tobacco)	• Participants exposed to industry manipulation ads had less positive cognitive responses than did those exposed to endangering-others ads • Participants who viewed ads on negative life circumstances had stronger positive emotional responses than did those who viewed either industry manipulation ads or endangering-others ads • Participants who viewed the endangering-others ads had more negative emotions than did participants who viewed the ads on negative life circumstances • Those exposed to the ads on negative life circumstances reported lower intentions to smoke than did those exposed to control ads or industry manipulation ads	Number of smokers exposed to each condition was about 20; no smoking attitudes, intentions, or behavior were assessed
Naturalistic exposure studies					
Richardson et al. 2007; NCI 2008	Niederdeppe 2005	Naturalistic exposure 3,409 12- to 15-year-olds and 4,171 16- to 18-year-olds involved in at least 1 of the Florida Antitobacco Media Evaluation surveys The study aimed to explore the relationship between executional characteristics and message processing Message processing was measured by using "thought-listing" measures The study controlled for demographics, smoking behavior, friends, and household smoking	Ads were coded for features that increased the sensation value of the message, such as unrelated cuts, the use of suspenseful images, and second-half punch	• Together, the presence of unrelated cuts, intense images, and second-half punch were associated with increased message processing in younger and older teens • Separately, message processing in older adolescents improved when messages incorporated unrelated cuts and used suspenseful images	

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
NCI 2008	Biener 2002	Naturalistic exposure 733 youth, aged 14–17-years, were asked in a telephone survey whether they had seen any antitobacco advertisements on television in the previous month; if so, they were asked to describe the ad or ads in detail and to rate the ads' effectiveness on an 11-point scale	The most prominent antitobacco ads broadcast by the Massachusetts Tobacco Control Program and those produced by Philip Morris in 4 categories: illness, outrage, other Massachusetts ads, and Philip Morris	• Advertisements featuring serious consequences of smoking were seen as significantly more effective by youth than Massachusetts advertisements that did not discuss illness or the Philip Morris "Think. Don't Smoke" ads	
NCI 2008	Biener et al. 2004	Naturalistic longitudinal exposure 618 Massachusetts youth, aged 12–15-years, were followed from 1993 to 1997 with a telephone survey which confirmed recall of the ads and perceived effectiveness on a scale from 0 to 10	Massachusetts ads broadcast over the period leading up to 1997 4 ads featured serious illness 2 ads used humor 2 ads were about normative behavior	• Youth were more likely to recall and perceive as effective ads featuring messages about serious health consequences that had been independently rated as high in negative emotion than ads featuring messages about normative behavior or ads relying on humor • Advertising intensity was related positively to ad recall but negatively to perceived effectiveness	The measure was "perceived effectiveness," but it is unclear whether ratings of perceived effectiveness predicted future attitudes and behavior

Table 6.3 Continued

Reviews that included the study/studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
NCI 2008	Evaluation of Legacy national "truth" campaign Farrelly et al. 2002, 2009 Davis et al. 2007a	Naturalistic exposure Nationally representative cross-sectional telephone surveys of 12- to 17-year-old youth before launch (N = 6,897) and 10 months after launch of national "truth" campaign (N = 6,233) 2 later studies used data from 35,074 youth in 8 nationally representative cross-sectional telephone surveys from 1999–2003; measures included confirmed recall of ad, attitudes and beliefs about smoking, perceived prevalence of smoking, and intention to smoke in next year	Legacy "truth" ads featuring manipulation messages from the tobacco industry compared with Philip Morris' ads on preventing smoking by youth that asked young people to "Think. Don't Smoke"	• Exposure to Legacy "truth" ads was associated with increase in antitobacco attitudes and beliefs, but exposure to Philip Morris ads was not; those exposed to Philip Morris ads were more likely to be open to smoking • After 3 years, perceived prevalence of smoking was reduced among those who had confirmed recall of the "truth" campaign (generally $p < 0.05$) but was unrelated to confirmed exposure to the Philip Morris campaign • After 3 years, confirmed exposure to the "truth" campaign was associated with stronger antitobacco attitudes and intentions not to smoke in the future ($p < 0.001$), but exposure to the Philip Morris campaign was associated with more favorable beliefs and attitudes toward tobacco companies and a trend for weaker intentions not to smoke	

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
NCI 2008	Wakefield et al. 2006	Naturalistic exposure 103,172 students in grades 8, 10, and 12 in the United States Data collected during the 1999–2002 Monitoring the Future school-based surveys were merged by media market with 12- to 17-year-olds' gross rating points for antitobacco advertisements for the 4 months before survey completion Outcome measures included smoking attitudes and beliefs, intentions, and smoking in the past 30 days	Tobacco company youth-directed advertising campaigns on preventing youth smoking and parent-directed advertising campaigns to prevent youth smoking as well as public-health-sponsored antitobacco advertising campaigns	• Among 8th-grade students, greater exposure to industry youth-directed advertising on preventing youth smoking was associated with increased intention to smoke (OR = 1.04; 95% CI, 1.01–1.08), but exposure was unrelated to other outcomes for this age group or for students in grades 10 and 12 • Among students in grades 10 and 12, greater exposure to advertising directed at parents on preventing youth smoking was associated with lower perceived harm from smoking (OR = 0.93; 95% CI, 0.88–0.98), stronger approval of smoking (OR = 1.11; 95% CI, 1.03–1.12), stronger intentions to smoke in future (OR = 1.12; 95% CI, 1.04–1.21), and greater likelihood of having smoked in the past 30 days (OR = 1.12; 95% CI, 1.04–1.19)	
Not previously reviewed	Niederdeppe et al. 2007	Naturalistic exposure 32,977 adolescents from 7 cross-sectional waves of the Legacy Media Tracking Surveys were assessed for confirmed recall of television ads from the "truth" campaign Need for sensation was also assessed Analyses controlled for a comprehensive set of ad-specific features, demographics, and market-level "truth" gross rating points	Stylistic features of 45 ads from the Legacy "truth" campaign were compared Stylistic features included edits, unrelated cuts, intense images, sound saturation, loud and fast music, "acting out" (youth or adults engaged in actions or activities that directly correspond to the ad's main theme), and second-half punch (shocking or surprising ending)	• Odds of recall increased with more frequent edits and unrelated cuts, intense imagery, sound saturation, loud and fast music, and second-half punch; however, "acting out" decreased the odds of recall • Results were nearly identical for youth with high and low needs for sensation, although the magnitude of recall was somewhat higher for youth with a high need for sensation • Greater recall was linearly related to a greater number of stylistic features within each ad	

Table 6.3 Continued

Reviews that included the study/ studies	Study	Design/population	Comparison of advertisements	Findings	Strengths, limitations, and comments
Not previously reviewed	Biener et al. 2008	Naturalistic exposure 3,332 12- to 17-year-old adolescents from the baseline survey of the UMass Tobacco Study conducted from January 2001 to June 2002 were assessed for confirmed recall of 9 specific antitobacco ads Volume of broadcast of the 9 ads was also estimated from adolescent target ratings points (TRPs) Analyses controlled for demographics, household education level, frequency of TV watching, and smoking status	Ads were given an emotional intensity score based on an ad-rating study with adolescents	• Level of the ads' emotional intensity was a significant predictor of recall • As emotional intensity increased from the lowest to the highest level, the odds of recall increased by a factor of 3.07 (95% CI, 2.86–3.30) • The volume of broadcast was also a significant predictor of recall • As the TRPs increased from the lowest to the highest level, the odds of recall increased by a factor of 2.38 (95% CI, 1.93–2.94) • TRPs were a significantly stronger predictor of recall of the 2 ads low in emotional intensity (2.68) than the 2 ads high in emotional intensity (1.36)	Indicates that for ads high in emotional intensity, less media weight was required to generate recall as compared with those low in emotional intensity; ads of low emotional intensity required more media weight to generate the same levels of recall

Note: **ANOVA** = analysis of variance; **CI** = confidence interval; **OR** = odds ratio.

In that study, Flynn and colleagues (1992) examined the effects of a media (television and radio)-plus-school intervention (refusal skills, accurate social norms, positive views of nonsmoking) and of a school intervention alone that both ran over 4 years. Assessments at the end of the 4-year intervention and then at a 2-year follow-up (Flynn et al. 1994) found that those in the media-plus-school intervention had significantly lower smoking rates than those in the school-only intervention. The 1994 Surgeon General's report (USDHHS 1994) concluded that mass media campaigns can be cost-effective but that messages should be pretested to avoid and test for unintended effects (Worden et al. 1988) and that these campaigns should be intense enough and sufficient in length to ensure impact.

A Cochrane review completed a few years later (Sowden 1998) included longer-term follow-up reports for some of the studies (Bauman et al. 1991; Flynn et al. 1994, 1997; Flay et al. 1995) reviewed in the 1994 Surgeon General's report (USDHHS 1994) as well as a new study (Hafstad and Aarø 1997; Hafstad et al. 1997a) and concluded that there was some evidence, although it was not strong, that mass media can be effective in preventing the uptake of smoking in young people. As did the 1994 Surgeon General's report (USDHHS 1994), the Cochrane review emphasized that the effective campaigns were based on theory, used formative research to develop messages, and had relatively intense and ongoing exposure of messages.

In reviews published after 2000, Pechmann (2001), Friend and Levy (2002), Farrelly and colleagues (2003a), Wakefield and colleagues (2003b,c), and the Task Force on Community Preventive Services (2005) all concluded that the findings from controlled experiments indicate that campaigns have the potential to decrease tobacco use among youth, with some evidence that campaigns are more likely to succeed when they are coordinated with school- or community-based programs. Wakefield and colleagues (2003a,c) also highlighted the idea that the effects seem to be more reliable when exposure occurs in preadolescence or early adolescence and when ads lead to emotional arousal. Consistent with theoretical models indicating that the effect of public health messages may be mediated through interpersonal communication (Flay and Burton 1990; Yanovitzky and Stryker 2001), Wakefield and colleagues (2003a,c) also suggested that the discussion of media campaigns may play an important role in either reinforcing or neutralizing the potential effects of antismoking advertising, as indicated by the findings from Hafstad and Aarø (1997).

Methodologic shortcomings highlighted by Hornik (2002) and NCI (2008) may explain some of the variation in findings from the controlled field trials. These problems have included: (1) difficulties in developing the televised components of the media exposure (Flay et al. 1988, 1995); (2) a low intensity of the media campaign or short duration of exposure to it (Bauman et al. 1991; Meshack et al. 2004); (3) insufficient control for baseline community characteristics and smoking-related risk factors and for prior and concurrent secular trends (Winkleby et al. 1993); and (4) differential attrition in longitudinal samples (Perry et al. 1992; Hafstad et al. 1997a; Vartiainen et al. 1998). Also, most analyses were not based on the primary sampling units considered as a whole that received the intervention (i.e., communities, schools). Rather, analyses were conducted on individuals within these sampling units, which can increase the chance of a Type 1 (false-positive) error due to an artificially inflated sample and failure to consider the effect on responses of shared experience within communities (see Hornik [2002] and NCI [2008] for further discussion of these issues).

In an analysis that considered the early cardiovascular programs of the 1970s and 1980s along with specific controlled field trials of youth media campaigns, NCI (2008) determined that media can "play an important role in affecting smoking behavior" (p. 508). Only one of the four reviewed studies that examined the effect of media alone found a positive effect (Hafstad et al. 1996, 1997a; Hafstad and Aarø 1997), however, the other three did not (Bauman et al. 1991; Winkleby et al. 1993; Flay et al. 1995). In comparison, five of six studies found evidence for an effect when the media was combined with a school-based intervention (Vartiainen et al. 1986; Perry et al. 1992; Flay et al. 1995; Flynn et al. 1997; Biglan et al. 2000a; Meshack et al. 2004).

Adding to this literature, a 2009 longitudinal controlled field trial by Solomon and colleagues included four matched pairs of media markets across four states randomly allocated to receive a 3-year television-and-radio intervention to increase smoking cessation and reduce smoking prevalence among adolescents. The media messages were based on social-cognitive theory. Although the authors did not find a significant time-by-condition interaction, significantly fewer participants in the intervention group were smoking in the past month at 3-year follow-up than in the control group after adjustment for baseline smoking status. Those in the intervention communities had greater cessation rates (an 18.1% 30-day point prevalence rate of quitting) than those in the control communities (14.8%) after the first year of the intervention, but no further gains were made up to 3 years, and light and occasional smokers were most likely to quit. The analyses used an intention to treat (ITT) method, assuming those who were lost at follow-up to have smoked at least one cigarette in the past 30 days, minimizing the possible effects of attrition bias. Unlike many others, this study used multilevel analytic techniques to account for similarities in reaction within individuals and similarities due to shared experience within matched media markets (Solomon et al. 2009).

Longitudinal population studies. Pechmann (2001) stated that there is limited direct evidence from controlled trials that media alone can influence youth smoking, but reported indirect evidence of the effects of stand-alone media campaigns from longitudinal population surveys of adolescents. These population surveys linked self-reported exposure to ads and reductions in smoking initiation (Siegel and Biener 2000; Sly et al. 2001b). Siegel and Biener (2000) examined the effect of the Massachusetts state campaign on smoking initiation by following 12- to 15-year-olds over 4 years and found that those who were 12 or 13 years of age and recalled campaign messages at baseline were less likely to start smoking than those who did not recall the messages. There were no effects for 14- and 15-year-olds and no effects on most knowledge and attitude measures. Similarly, Sly and colleagues (2001b, 2002) conducted longitudinal surveys to examine the effects of the Florida "truth" campaign on smoking initiation; they found that the number of advertisements recalled and campaign-related beliefs among youth at follow-up were associated with decreased smoking initiation.

Pechmann (2001) cautioned, however, that reverse causality cannot be ruled out with this type of evidence because adolescents who had strong antismoking beliefs at baseline and/or follow-up may have been more likely to pay attention to antismoking ads and also less likely to start smoking. However, Sly and associates (2001a,b) and Siegel and Biener (2000) minimized the likelihood of this possibility by controlling for baseline age, gender, prior smoking status, and the smoking status of friends and parents; Siegel and Biener (2000) also controlled for extent of television viewing. But as pointed out in the NCI review (2008) of the media and tobacco use, the studies by Sly and colleagues (2001b, 2002) measured recall at follow-up and the one by Siegel and Biener (2000) did not adjust for nonresponse at follow-up through weighting or analytic techniques. If those in the studies by Sly and colleagues who recalled the advertisements and those in the study by Siegel and Biener who completed the follow-up survey were relatively more likely to be nonsmokers, the possibility of finding an effect could well have been inflated.

Cross-sectional population studies. The 1967 ruling by the Federal Communications Commission that the Fairness Doctrine applied to cigarette advertising provided the first chance to examine the effects of antismoking messages on youth smoking. Much later, Lewit and colleagues (1981) associated various estimates of exposure to the antismoking advertisements with adolescent smoking behavior while controlling for a comprehensive range of covariates (Table 6.2). These authors found that the prevalence of smoking among youth was 3.0–3.4 percentage points lower during the Fairness Doctrine period than during the 16 months before it and that those who watched more television and were exposed to more antismoking messages were less likely to smoke. This study used measures of potential exposure based on hours of daily television watching reported by youth that were related by the authors to the number of antismoking advertisements aired during the Fairness Doctrine period in a given year. The NCI review of the media and tobacco use (2008) described this early study as making "significant strides in using more complex measures of exposure" (p. 518); more sophisticated measures than those used in the early days were not employed again until much later (Emery et al. 2005; Farrelly et al. 2005; Terry-McElrath et al. 2007), when campaign exposure was measured using gross rating points (GRPs). GRPs measure the relative reach and frequency of exposure to the campaign among the target audience within specific media markets. Emery and colleagues (2005) found that exposure to at least one U.S. state-funded antismoking advertisement in the prior 4 months was associated with lower perceived rates of friends' smoking, greater perceived harm of smoking, stronger intentions not to smoke in the future, and lower likelihood of being a smoker. The variation in campaign exposure across different media markets in this study design provided natural comparison groups for examining the effects of campaigns and different intensities of exposure. These studies all used a comprehensive set of potential confounders, but only one (Terry-McElrath et al. 2007) also controlled for preexisting prevalence of youth smoking (in this case in 1995–1996) in different media markets to account for correlations between these rates and the frequency of antismoking advertisements aired in each market.

The findings from these and other cross-sectional, population-based evaluations of state and national antismoking campaigns developed by tobacco control programs can be more fully understood by examining the reported findings from 20 relevant papers cited in the three most recent comprehensive reviews (Richardson et al. 2007; Angus et al. 2008; NCI 2008). Of the 12 studies that examined attitudes or beliefs relating to smoking (Murray et al. 1994; Popham et al. 1994; Sly et al. 2001a, 2002; Farrelly et al. 2002; Hersey et al. 2003, 2005a,b; White et al. 2003; Niederdeppe et al. 2004; Emery et al. 2005; Terry-McElrath et al. 2007), all but 1 (Murray et al. 1994) found favorable changes associated with exposure to the campaign, and all 13 studies that examined intentions to smoke found favorable effects of such exposure (Popham et al. 1994; Seghers and Foland 1998; Bauer et al. 2000; Sly et al. 2001a,b, 2005; Farrelly et al. 2002; Niederdeppe et al. 2004; Emery et al. 2005; Hersey et al. 2005a,b; Johnston et al. 2005; Terry-McElrath et al. 2007; White et al. 2003). Fourteen of 16 cross-sectional population studies that examined smoking behavior (i.e., smoking prevalence, initiation of smoking, or quitting) associated with televised antismoking campaigns found a favorable change in the behavior (Lewit et al. 1981; Popham et al. 1994; Bauer et al. 2000; Siegel and Biener 2000; Sly at al. 2001a,b; White et al. 2003; Niederdeppe et al. 2004; Emery et al. 2005; Farrelly et al. 2005; Hersey et al. 2005a,b; Johnston et al. 2005; Terry-McElrath et al. 2007).

New studies published since these reviews further support these findings, indicating that well-funded state and national antismoking campaigns can reduce smoking among youth (Davis et al. 2007a; Evans et al. 2007; Tangari et al. 2007; Niederdeppe et al. 2008; White et al. 2008b; Farrelly et al. 2009). For example, Niederdeppe and colleagues (2008) surveyed 5,010 12- to 18-year-olds for their recall of Florida's "truth" campaign ads, anti-industry beliefs, and nonsmoking intentions from April 1998 to May 2000. Rates of change were examined using interrupted time series techniques before and after budget cuts by the Florida Tobacco Control Program that took place between May 1999 and September 1999. After controlling for demographics, smoking in the home, degree of parental smoking, and parental monitoring, the study found that upward trends in recall of the Florida "truth" campaign weakened and nonsmoking intentions became relatively less prevalent following the budget cuts to the campaign.

As outlined in a number of reviews (Pechmann 2001; Jepson et al. 2006; NCI 2008), there are methodological issues with cross-sectional population studies to consider in determining the relative strength of those findings that linked media campaigns with preventing smoking among youth. Some of the cross-sectional studies used post-only (White et al. 2003) or single pre-post surveys (Seghers and Foland 1998; Bauer et al. 2000); these designs make it difficult to gauge whether any changes found were due to the media campaign or to secular trends in the exposed community and/or other events and activities unrelated to the media exposure. Use of a comparison group (Murray et al. 1994; Sly et al. 2001a; Niederdeppe et al. 2004), along with a comprehensive set of controls for preexisting demographic characteristics and levels of smoking in the community, may help to increase confidence that the observed effects are due to campaign exposure rather than preexisting baseline factors or secular trends (Farrelly et al. 2002, 2005; Emery et al. 2005; Terry-McElrath et al. 2007). Studies that provide measures at multiple baselines (e.g., Farrelly et al. 2002) can also help establish prior secular trends. Use of multiple measures during and after the campaign (Popham et al. 1994; Bauer et al. 2000; Niederdeppe et al. 2004; Emery et al. 2005; Johnston et al. 2005) and observation of changes in factors thought to be mediators of the effect of campaigns, such as certain beliefs and attitudes (Sly et al. 2002; Hersey et al. 2003, 2005a,b; Evans et al. 2004a), can also help increase confidence that any observed changes in smoking behaviors are the result of campaign activity rather than alternate trends or concurrent events.

Still, a key difficulty in attempting to assess the specific media effects of statewide and national media campaigns is the fact that most were developed and run within the context of broader tobacco control programs and activities, such as tax increases (Friend and Levy 2002; Farrelly et al. 2003a). Regardless, some authorities suggest that integrating media campaigns within a broader tobacco control program is important to their effectiveness (Schar et al. 2006; Angus et al. 2008; NCI 2008), and thus, considerations of precisely determining the effects of the media campaigns, while important, perhaps need to be seen as less compelling than meeting the goal of offering a program that produces positive changes. Schar and colleagues (2006) point to the success of mass media campaigns in Finland as well as in California, Massachusetts, and a number of other states that have implemented youth tobacco campaigns that included other program elements (see "Comprehensive State-Level Tobacco Control Programs" later in this chapter for more detail); these included such initiatives as a school curriculum, cessation programs, and policy changes that increased cigarette taxes and smoke-free environments and strengthened laws restricting youth access. Schar and colleagues (2006) conclude that "a key contributor to successful mass media campaigns is the synergy resulting from the different program elements working together to change society's prevailing attitudes about tobacco use" (p. 5). Finally, Richardson and colleagues (2007) indicate that campaigns are likely to "work best when combined with broader tobacco control initiatives produced by tobacco control bodies" (p. 4).

The consistent positive findings across a variety of study designs provide convincing evidence that antismoking media campaigns can be effective in reducing youth smoking but that certain factors and conditions are required for their success. There is broad consensus that these factors include the use of formative research in the development of messages and, for campaign messages, sufficient intensity and duration of exposure (USDHHS 1994; Sowden 1998; Pechmann and Reibling 2000b; Siegel 2002; Farrelly et al. 2003a). Recent research and reviews have begun to focus more heavily on which message characteristics work best, what the ideal level of exposure is, and which types of youth are most or least affected by mass media campaigns against smoking.

Factors That May Optimize the Effectiveness of Mass Media Campaigns

Mass media campaigns against smoking, especially those with televised components, require considerable investment, making it particularly important to understand the factors and strategies that optimize their effectiveness. This section summarizes conclusions from various reviews and new research (Pechmann 2001; Siegel 2002; Farrelly et al. 2003a; Wakefield et al. 2003b,c; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008) on the effects of different types of messages, the optimum intensity and duration of exposure to messages, and how messages may influence different youth (i.e., classified by gender, age, race/ethnicity, socioeconomic status, risk status).

Theme, emotional tone, format, and characteristics of execution. Studies to assess differences in the responses of youth to various types of ads have usually used controlled exposures; less often, they have employed naturalistic exposures. In controlled-exposure studies, youth typically view a series of messages and then either discuss their reactions to them (often in focus groups) or complete an experimental study. In experimental studies youth may rate ads in terms of their emotional impact, liking, or other features thought to be associated with increased antismoking attitudes and behaviors, or are asked about these attitudes and behaviors directly. It is also possible that youth will complete cognitive processing tasks (Shen et al. 2009), have physiological data recorded such as heart rate (Leshner et al. 2011), or complete memory questions on viewed messages (Leshner et al. 2010) among many possible experimental approaches aimed at better understanding the processes behind mediated message effects for youth.

The limitations of these controlled-exposure methods are that the exposure does not mimic real-world viewing contexts and that one cannot examine the effects of multiple exposures occurring over months and years. The advantages of naturalistic studies are that the effects of different types of messages can be examined in a real-world setting: messages are viewed within a crowded media environment, often within a person's home; there are a myriad of distractions; and the effects of exposure over weeks, months, or years can be studied. The limitations of these naturalistic-exposure studies are that they rely on self-reported recall of messages, which may be correlated with smoking intentions and behaviors, and they cannot rule out other factors that may influence outcomes, such as policy changes and geographic or historic differences in exposure to different types of messages.

Pechmann's (2001) review highlighted the mixed findings from the early controlled-exposure studies that compared different ad themes (Goldman and Glantz 1998; Teenage Research Unlimited 1999). For example, one study that used 20 focus groups indicated that ads showing the serious physical consequences of smoking—portrayed either graphically, dramatically, or emotionally—performed well (Teenage Research Unlimited 1999), while another study, summarizing the findings of 186 focus groups, indicated that ads about secondhand smoke or about industry manipulation rated best (Goldman and Glantz 1998). And in a copy-test study (representative populations view ads and answer survey questions afterwards), Pechmann and colleagues (2003) found that ads depicting the impact of smoking on infants and children, those showing that smoking is socially unacceptable, and ads indicating that nonsmoking is the norm significantly decreased youth's reported intentions to smoke.

Siegel (2002) suggested that the mixed findings from early studies may be explained by the fact that the studies considered only differences in the messages' themes (Goldman and Glantz 1998; Pechmann et al. 2003) and not their emotional content. Subsequent reviews (Farrelly et al. 2003a; Wakefield et al. 2003b; Schar et al. 2006; NCI 2008) have considered both the theme and emotional tone of advertisements and have examined findings of more recent naturalistic studies as well as controlled-exposure studies. In support of theories of persuasion that emphasize emotion (Cohen 1990; Eagly and Chaiken 1993; Forgas 1995; Escalas et al. 2004; Baumeister et al. 2007), these reviews concluded that there is consistent evidence that ads eliciting strong emotional responses (such as disgust, loss, sadness, dread, and anger) through personal testimonials and visceral imagery of the health effects of smoking, or that portray deception on the part of the tobacco industry, can increase attention, generate greater recall and appeal, and affect young audiences' smoking-related beliefs and intentions to smoke. However, exposure to high levels of negative emotion may actually hinder persuasiveness and elicit undesirable negative consequences depending on the stimulus itself (Erceg-Hurn and Steed 2011). This makes message testing extremely important. Ads featuring harm to appearance, addiction, and decreased athletic performance are concluded to be less effective than those about health effects or the tobacco industry's deceptive practices (Goldman and Glantz 1998; Pechmann et al. 2003; Smith and Stutts 2006). The NCI review (2008) of the media and tobacco use noted that some themes (e.g., those on health effects) lend themselves to the elicitation of negative emotions more readily than others, while the "encouragement to quit" theme is often more upbeat and positive. Copy-test studies have shown that when the message's theme and executional style have been controlled, it is the negative emotional elements that are independently related to more encouraging appraisals of the message (Terry-McElrath et al. 2005; Wakefield et al. 2005a).

The American Legacy Foundation "truth" campaign used a mix of serious and sarcastic ads to get the overall message across to youth that tobacco companies are deceptive and misleading; the intent was to elicit outrage and spur young people to resist tobacco use. Recent population-based research on the effects of the first 3 years of the "truth" campaign (Davis et al. 2007a; Farrelly et al. 2009) indicated that confirmed exposure to the campaign was associated with stronger antitobacco attitudes and intentions not to smoke in the future. Reviews caution, however, that ads that use humor have been found to be less effective than those that evoke negative emotions (Schar et al. 2006; NCI 2008). It is not known whether "truth" ads that evoke negative emotions differ in effectiveness from those that use humorous techniques in terms of creating the observed effects. Also, reviews have suggested the need for repeated exposure over time to several different types of ads that deal with the industry's manipulations and deceptive practices to educate audiences about these topics, as the ads may be misunderstood at first (Wakefield et al. 2003b; Schar et al. 2006). The reviews also caution that research into the effectiveness of the counter-industry ads (typically those used in the "truth" campaign that highlight the deceptive practices of the industry) has been limited to the United States, and the findings may have limited transferability to countries where the tobacco industry has a lower profile. Indeed, a recent focus group conducted in the United Kingdom (Devlin et al. 2007) found that industry-manipulation ads provided new information that led to greater interest among adolescents, but comprehension was a barrier with many youth needing the ideas explained.

One review (Schar et al. 2006) summarized findings from controlled field trials, controlled-exposure studies, and focus groups and suggested that ads about the social consequences of smoking and about refusal skills can be effective (Flynn et al. 1992, 2007; Biglan et al. 2000a; Pechmann et al. 2003; Devlin et al. 2007). In addition, a recent longitudinal controlled field study conducted in four media markets within each of four states, detailed earlier in this chapter, provided some modest support for the ability of ads about social norms to influence smoking by youth (Solomon et al. 2009). A new series of controlled-exposure studies added to this literature (Zhao and Pechmann 2007) by examining four versions of the same basic social-disapproval antismoking message (depicting a gathering of young college students) that varied along two dimensions (positive vs. negative frame, promotion- vs. prevention-focused message) that were presented to adolescents categorized as either promotion focused (motivated by achievements and advancement) or prevention focused (motivated to avoid threats to security and safety). The study found that promotion-focused, positively framed messages were most effective at persuading promotion-focused adolescents not to smoke and that prevention-focused, negatively framed messages were most effective for prevention-focused adolescents. Most of these studies examining the influence of these types of themes have been conducted using controlled exposure to ads; one population-based study that specifically used these message themes found no effects on antismoking attitudes or smoking behavior (Murray et al. 1994). Therefore, the extent to which these messages would be effective at the level of a broad population-based mass media campaign is unclear.

As discussed in Chapter 5, ads developed by the tobacco industry that counsel youth not to smoke and emphasize personal choice, such as the "Think. Don't Smoke" ads developed by Phillip Morris, generally had the lowest ratings and effects on smoking intentions or behavior among all ads that were viewed (Teenage Research Unlimited 1999; Biener 2002; Niederdeppe et al. 2005; Wakefield et al. 2005a; Henriksen et al. 2006; Pechmann and Reibling 2006; Farrelly et al. 2008). Angus and colleagues (2008) reported that four of five studies reviewed found that industry campaigns performed poorly compared with tobacco control campaigns. One of these studies showed that youth who recalled the industry campaigns were significantly more likely than their unexposed peers to have intentions to smoke in the future (Farrelly et al. 2002). Another study (Wakefield et al. 2006) found that greater exposure to industry ads directed at youth was associated with stronger intentions to smoke among younger survey participants, and that exposure to industry ads directed at parents was associated with several undesirable outcomes, including stronger approval of smoking and stronger intentions to smoke, for older survey participants. Supporting this research, a new study by Farrelly and colleagues (2009) found that at 3-year follow-up, exposure to the Philip Morris campaign was associated with more favorable beliefs and attitudes toward tobacco companies and a trend for weaker intentions not to smoke.

The NCI review (2008) of the role of the media and tobacco use pointed out that structural features, such as pacing, use of loud music, and cuts or edits of advertisements, may be important in that they can increase the "message sensation value," which has been associated with greater processing of the message (Niederdeppe et. al 2007). Niederdeppe and colleagues (2007) examined 32,977 adolescents from seven cross-sectional waves of the American Legacy Foundation's Media Tracking Surveys, which assessed these youth for confirmed recall of television ads from the "truth" campaign and their need for sensation. After controlling for a comprehensive set of ad features, demographics, and "truth" campaign GRPs, the odds that the messages were recalled increased with more frequent edits and unrelated cuts, intense imagery, sound saturation, loud and fast music, and second-half punch (surprising or shocking ending).

Despite the common use of television, radio, and outdoor advertising in many state and national antismoking campaigns, few studies have examined the relative effectiveness of these different formats, although commercial information suggests that television has the broadest reach. In a cross-sectional study, Seghers and Foland (1998) found that television ads were associated with greater recall than were other formats, and in a controlled-exposure study, Flynn and colleagues (2007) found that televised messages generally received higher ratings than did radio messages. In a recent controlled field trial (Solomon et al. 2009), no differences in smoking outcomes were found by format for those in the exposed group who had heard at least one radio message, but those who had reported seeing at least one television message were less likely to have smoked in the past 30 days than were those who had not seen any messages (54% vs. 62.6%). In a longitudinal study (Siegel and Biener 2000), neither radio nor outdoor advertising was associated with reduced initiation of smoking at 4-year follow-up, but recall of a television message was associated with reduced initiation in 12- and 13-year-olds. It is unclear whether the lack of success of these radio campaigns was due to the format, the messages typically broadcast on the radio stations, or the lower population reached by radio.

In recent years, antismoking messages have increasingly been presented via antitobacco Web sites. A study of differences between design elements, persuasive strategies, and information content across the Web sites of youth antitobacco organizations (which also included the areas for prevention of youth smoking on tobacco industry Web sites) indicated that the industry sites provided the weakest persuasive messages; grassroots (costkids.org [2012]) and government sites provided the strongest messages; and medical sites provided mostly scientific information for specialists (Lin and Hullman 2005). Delivering a message through the Internet can encourage changes in smoking behavior through interactive communication; interactivity can range from quizzes, contests, and games to connecting to campaign Web sites and other users through sites such as Facebook and MySpace. Antismoking campaigns may be able to increase their reach and persuasive impact by using these social networking sites, given a survey indicating that over one-half of U.S. youth who use the Internet have accessed these sites (Lenhart and Madden 2007). For example, the American Legacy Foundation launched the truth profile pages (INFECT truth) on a range of social networking sites. Preliminary results indicate that the addition of these profile pages was associated with an estimated increase of 20,000 unique visitors a week to the truth Web site (2010) in a comparison with traffic during typical campaigns that do not involve social networking sites (Vallone 2007). The video-sharing Web site YouTube provides another modality through which youth may be exposed to both traditional and innovative antitobacco messages from antitobacco organizations and motivated individuals (e.g., "Thanks Tobacco: You Killed My Mom" posted on April 13, 2007 [YouTube 2007]). YouTube also allows viewers to post comments about videos and send links to others. Determining the impact of messages conveyed through this medium is a fertile area for new research. The effects of antismoking messages delivered via text messaging and the use of this technology as a way for smokers to seek help for quitting smoking after exposure to antismoking messages is another important area for research.

Intensity and duration. Despite the conclusion of most reviews that campaign funding and exposure need to be "sufficient" to ensure effects, there is little research as to what levels of intensity and duration might be "sufficient." Nevertheless, studies indicate that increased exposure to antismoking messages over time results in a greater likelihood of having beliefs consistent with the campaign against smoking, decreased youth smoking, a lower intent to smoke, and less initiation of smoking than in those not exposed (Emery et al. 2005; Farrelly et al. 2005; Johnston et al. 2005; Terry-McElrath et al. 2007).

Sly and colleagues (2002) found a dose-response effect of Florida's antismoking advertising in its "truth" campaign, with greater numbers of different ads recalled at follow-up (but not greater overall exposure) associated with greater odds of remaining a nonsmoker during a 22-month period. Later, Emery and colleagues (2005) reported that if the average exposure among youth was less than one state-sponsored antismoking ad over a 4-month period, there were no discernible effects. Exposure to one or more ads for the same period was associated with lower odds of being a smoker. Elsewhere, Farrelly and colleagues (2005) found dose-response effects of the American Legacy Foundation "truth" campaign for up to an average of four ads per month (average cumulative 10,000 GRPs over a 2-year period), after which there were diminishing returns. This suggests that in efforts to reduce youth smoking, there is a threshold of exposure below which antitobacco advertising may not have an influence, and effects increase with increasing exposure up to four ads per month (CDC 2007b). Terry-McElrath and colleagues (2007) used the same study design as Emery and colleagues (2005), but with more years of data from state antitobacco campaigns, and also found a dose-response effect with no point of diminishing returns. It should be noted, however, that state tobacco control campaigns that aired during the 1999–2003 period of this study may not have been broadcast at a level sufficient to detect the point of wear out (among 12- to 17-year-olds the average was just 1.08 target rating points [TRPs] per month) (Wakefield et al. 2005b). Only Arizona in 1999 and 2000, Florida in 1999, Minnesota in 2001, and Utah in 2001–2003 averaged more than four exposures per month to state antitobacco ads among 12- to 17-year-olds (Szczypka et al. 2005).

A more recent study by Biener and colleagues (2008) provides strong support for the relative utility of emotionally evocative advertising as well as an idea of how its effects relate to broadcast intensity (broadcast volume, i.e., media weight or rating points in reaching targeted audiences). The authors assessed confirmed recall of nine specific antitobacco ads in a sample of 3,332 12- to 17-year-old adolescents from January 2001 to June 2002. The intensity and duration of the broadcast of the nine ads were estimated from adolescent TRPs, and each ad was given an emotional intensity score based on a previous study of ad ratings with adolescents. The analyses controlled for demographics, household education level, TV-watching frequency, and smoking status; the findings indicated that the level of the ads' emotional intensity was a significant predictor of recall. As emotional intensity increased from the lowest to the highest level, the odds of recall rose by more than a factor of three. The authors also found that the broadcast volume (media weight) was a significant predictor of recall: as the TRPs increased from the lowest to the highest level, the odds of recall more than doubled. In addition, TRPs were a significantly stronger predictor of recall of the two ads low in emotional intensity (odds ratio [OR] = 2.68) than of the two ads high in emotional intensity (OR = 1.36). These findings indicate that for ads high in emotional intensity, less media weight is required to generate recall than for those that are low in emotional intensity.

Higher recall does not necessarily equate to the effectiveness of an ad and, ultimately, to changes in behavior. However, population-based research indicates that recall of campaign messages has been associated with reduced smoking behavior in youth (Siegel and Biener 2000; Sly et al. 2002). Other research indicates that emotionally evocative messages are perceived as more effective (Pechmann and Reibling 2006), even after controlling for recall (Biener et al. 2000; Biener 2002).

Research linking cuts in the funding for antitobacco campaigns to the halting of declines in youth smoking or even to increases in youth smoking (Sly et al. 2005; Niederdeppe et al. 2008; White et al. 2008b) indicates that optimal implementation for campaigns would involve ongoing exposure at regular intervals. This conclusion highlights the notion, widely acknowledged in advertising literature, that media campaigns influence behavior while they are on air but that their effect diminishes very quickly once they are removed from the air (Tellis 2004).

Context. There is a need not only to identify the characteristics of messages and the level of exposure most likely to change attitudes and behavior among youth about smoking, but also to understand the influence of the circumstances surrounding exposure to messages. Evidence from the broader public health and advertising domains indicates that the contexts in which ads are viewed (Goldberg and Gorn 1987; Sharma 2000) and the extent and type of discussion that ads generate (Morton and Duck 2001) can influence the processing and impact of the messages they impart. Research into the effect of these factors on the responses of adults to antismoking campaigns has shown that messages may be processed less effectively when they are aired during programs that transport viewers into the story (e.g., drama and soap operas [Durkin and Wakefield 2006, 2008]) rather than during lighter entertainment (e.g., comedy). Other research has found that engagement in ad-related discussions can enhance the impact of antismoking messages on both intentions to quit and attempts to quit by adolescents (Hafstad et al. 1996, 1997a; Hafstad and Aarø 1997) as well as adults (Durkin and Wakefield 2006; Dunlop et al. 2008). Several studies (Hafstad et al. 1996, 1997a; Hafstad and Aarø 1997) found that in adolescents the most important predictor of positive behavioral reactions was campaign-stimulated discussion with peers. In a more recent study, adults were most likely to discuss advertising that contained information about the negative health consequences of smoking presented through graphic images or simulations of bodily processes (Dunlop et al. 2008). This result is consistent with the observation that interpersonal discussion can bring antismoking messages into an immediate social environment that may lead to either the extension or reduction of a message's impact (Flay and Burton 1990; Southwell and Yzer 2008).

Audience segmentation. Tailoring the message's content to specific audience subgroups (defined, for example, by age, gender, race/ethnicity, a desire for sensation, or socioeconomic status) has the potential advantage of increasing a message's relevance and ability to persuade. However, tailoring the ad's message, settings, and actors to specific population subgroups requires funding multiple campaigns to convey a variety of messages or tailored versions of a key message rather than simply producing general campaigns to convey messages likely to resonate with all population groups. Also, given the finite resources of most public health campaigns, this type of tailoring may result in having a lower proportion of funds available to broadcast these ads, resulting in lower rates of exposure to the messages. The extent of tailoring and segmentation, therefore, needs to be weighed carefully against goals of maximizing campaign exposure.

Youth- versus adult-targeted campaigns. Although most of the reviewed studies examined campaigns that were specifically targeted to youth, it is a matter of debate whether these campaigns are the best choice for reducing youth smoking (Hill 1999). Beaudoin (2002) found that many youth-targeted campaigns presented the short-term, social consequences of smoking and used humor, while ads targeted to adults more often highlighted the long-term consequences and evoked fear. A study by Flynn and colleagues (2007) that examined ratings for a series of messages on social norms (many of which used humor) indicated that it may be particularly difficult to design messages that appeal to older youth and found strong differences in ratings between age groups. Evidence that younger youth may be more likely than older youth to decrease their intentions to smoke in response to counter industry mass media campaigns (Sly et al. 2001b; Wakefield et al. 2003b; Farrelly et al. 2005) was interpreted in one review (Schar et al. 2006) as indicating that older adolescents may be better addressed by campaigns targeted to a general audience.

Evidence from studies that compared responses from younger and older youth to a range of youth- and adult-targeted messages (e.g., on cessation, secondhand smoke, family guidance, health benefits, health effects, industry manipulation, and smoking being "uncool") found that youth responded as favorably to adult-targeted ads as to youth-targeted ads (Terry-McElrath et al. 2005; Wakefield et al. 2005a, 2006; NCI 2008). This finding is consistent with findings from adult-targeted mass media campaigns that have successfully reduced the initiation of smoking and of smoking behavior among youth (Lewit et al. 1981; Siegel and Biener 2000; White et al. 2003; Schar et al. 2006). In population studies of U.S. youth (Emery et al. 2005; Terry-McElrath et al. 2007), beneficial effects on youth smoking were found from exposure to the overall complement of state antitobacco campaign ads, not just youth-targeted campaigns, and a study by Emery and colleagues (2007) indicated that a majority of the state campaign GRPs came from adults rather than youth. The NCI review (2008) of the media and tobacco use proposed that the success of adult-targeted campaigns for adolescents may be due in part to changing the broader social norms about smoking. Further exploring this issue, Angus and colleagues (2008) suggested that using adult-focused campaigns for reducing smoking in youth may avoid the danger that "using youth targeted mass media campaigns in isolation may create the impression that, whilst children should avoid it, tobacco use is an acceptable adult behavior" (p. 16).

Gender, race/ethnicity, and socioeconomic status. The limited amount of research that has examined differences between youth subgroups in their appraisals of antitobacco ads has not yet found any systematic differences by gender, race/ethnicity, or nationality (Terry-McElrath et al. 2005, 2007; Wakefield et al. 2005a; Flynn et al. 2007). In fact, these studies indicate that the advertisement's characteristics are much more important than the characteristics of the audience. Consistent with this research and with studies of adult responses to advertising against smoking (Siahpush et al. 2007), White and colleagues (2008b) found that across socioeconomic groups, 12- to 15-year-old adolescents showed parallel reductions in smoking behavior during the period of the well-funded Australian National Tobacco Campaign, which included emotionally evocative messages about the health effects of smoking. However, during periods of low funding, when adolescents were exposed to sparse, sporadic campaigns, smoking among 12- to 15-year-olds increased, and those from the lower socioeconomic groups had the greatest monthly and weekly increases. This study suggests that when well-funded campaigns are not on the air, it is youth from lower socioeconomic groups who are most negatively affected. This is consistent with research that suggests disparities in health knowledge may widen when there are only low or moderate levels of publicity about these campaigns (Viswanath et al. 2006).

High-sensation seekers and high-risk youth. Despite early indications that media interventions may be especially effective for high-risk youth (Flynn et al. 1994, 1997), subsequent studies have provided mixed results on this issue. For example, population-based studies have shown that the impact of the American Legacy Foundation's national "truth" campaign on smoking by youth was similar among high- and low-sensation-seeking adolescents (Farrelly et al. 2005; Niederdeppe 2005; Thrasher et al. 2006). Niederdeppe and colleagues (2007) examined the structural elements of ads and found that results were nearly identical between youth with high needs to seek sensation and those with low needs, although the magnitude was somewhat higher among youth with a high need for sensation. Thrasher and colleagues (2006) also found that anti-industry attitudes were similar across sensation-seeking groups, but were lower among adolescents weakly bonded to social supports such as families, schools, and communities. However, the relationship between anti-industry attitudes and smoking was consistent across both risk groups (both sensation-seeking and weakly social-bonding risk groups).

In contrast to early predictions, Pechmann and Reibling (2006) found that youth with conduct disorders (who also are often high-sensation seekers) did not give a variety of antitobacco messages higher ratings than they gave to the control message, but for youth who did not have conduct disorders (81% of the sample), advertisements focusing on young victims suffering from serious smoking-related disease elicited disgust, enhanced anti-industry motivation, and reduced intentions to smoke. A study by Helme and colleagues (2007) randomly allocated middle school students to either a high- or low-sensation-value message. Students' level of need for sensation seeking (high vs. low) was also measured. The authors found no differences between high- and low-sensation-value messages in changing antismoking attitudes, future intentions to smoke, self-efficacy not to smoke, perceived effectiveness of the message, and perceived risk for self and others. The authors found, however, that high-sensation seekers were more likely to show changes than were low-sensation seekers in antismoking attitudes, intentions not to smoke, self-efficacy not to smoke, perceived effectiveness of the message, and perceived risk from smoking. In assessing the importance of the effects of these campaigns on high-risk youth, however, it is important that the proportion of youth who fall into these categories (of high- and low-sensation seeking) be considered. A greater population effect on the prevalence of smoking among youth is likely to be achieved by focusing on what is effective for the majority of youth, and the proportion of youth who have high needs for sensation might not be large enough in some cases to make them a specific target group for interventions to prevent smoking.

Theoretical implications. Some support for models of health behavior change is provided by studies finding that exposure to antismoking messages leads to changes in, or increased salience of, attitudes, beliefs, and intentions relative to smoking as well as reduced smoking behavior (e.g., Popham et al. 1994; Sly et al. 2001b, 2005; Farrelly et al. 2002; White et al. 2003; Meshack et al. 2004; Niederdeppe et al. 2004; Emery et al. 2005). These cross-sectional studies could not, however, examine whether the changes in attitudes and beliefs preceded the changes in intentions and behavior. Controlled and longitudinal studies are better for testing these pathways. Some longitudinal studies have found changes in smoking intentions and behavior without concurrent changes in attitudes and beliefs (Siegel and Biener 2000; Solomon et al. 2009), and others have found that changes in these proposed mediators have occurred before the change in smoking behavior. Flynn and colleagues (1992, 1994) found support for social-cognitive theory, with differences between intervention and control groups on mediating variables (such as smoking norms, attitudes toward smoking, refusal skills) occurring before differences in smoking behavior. Further support for the idea of changes in health behaviors resulting from exposure to antismoking messages is afforded by a series of cross-sectional, population-based studies that surveyed youth in states with relatively higher exposure to the American Legacy Foundation "truth" campaign and found them to have greater agreement with campaign-relevant beliefs and lower rates of smoking initiation than youth from states with relatively lower exposure (Hersey et al. 2005a). Finally, Evans and colleagues (2004a) found that the perceptions of positive social images for not smoking among nonsmokers targeted by the "truth" campaign mediated the relationship between exposure to the campaign and smoking status.

Summary of the Current Evidence Base Regarding the Use of Mass Media

The power of the mass media to influence public perceptions of tobacco was first documented in the aftermath of the 1967 Fairness Doctrine ruling, when considerable reductions in youth smoking were shown to be associated with government-sponsored antismoking television messages. Reviews of early field trials provided some support for the effectiveness of media interventions combined with school programs within communities, but since then, a host of population-based investigations on mass media campaigns have provided convincing evidence that these campaigns, by themselves, can decrease youth smoking. The NCI review (2008) of the media and tobacco use concludes that: "Evidence from controlled field experiments and population studies conducted by many investigators in many countries shows that antitobacco mass media campaigns can reduce tobacco use" (NCI 2008, p. 537). More recent studies (Davis et al. 2007a; Farrelly et al. 2009; Solomon et al. 2009) provide further support for the utility of mass media campaigns to reduce youth smoking.

In summary, the evidence is sufficient to infer a causal relationship between adequately funded antismoking media campaigns and a reduced prevalence of smoking among youth. Evidence has been consistently strong across a wide range of longitudinal-cohort and cross-sectional, population-based studies that have controlled for a variety of potential confounders, have compared effects of exposure with less or no exposure, and have shown diminishing effects when exposure is reduced.

Evidence also suggests a dose-response relationship between exposure to antismoking media messages and reduced smoking behavior among youth, which is further evidence of the effectiveness of these messages. Very few studies, however, have explored the optimum level and duration of exposure to these messages for exerting effects on youth smoking. The few studies to examine this question suggest that levels between one ad per 4-month period and four exposures of the target audience per month are needed to observe an impact, with dose-response findings indicating closer to four exposures per month are needed to be more effective and one study indicating that emotionally evocative messages need less exposure than less emotional messages.

The research reviewed in this section also provides consistent, strong evidence through controlled-exposure and population-wide studies that media ads designed for adults decrease the prevalence of smoking among youth. This effect may be the result of changing the social norms of youth about smoking by altering their perceptions of smoking prevalence among adults as well as reduced exposure to adult smoking (NCI 2008). In addition, a number of population-based and controlled-exposure studies provide evidence that the characteristics of advertising messages seem to be more influential than the characteristics of the audience in terms of the results obtained, suggesting that messages developed for specific target groups may in fact translate successfully to broader audiences and that the expense of developing and airing many different ads for specific target groups may be able to be alleviated.

It is clear that not all campaigns will be equally effective, and recent research has focused on the factors that differentiate influential campaigns and messages from those that are less successful. The research provides consistent evidence from controlled-exposure studies that ads evoking strong negative emotions (including those about the health effects of smoking and exposure to secondhand smoke as well as those about the deceptiveness of the tobacco industry) show greater recall and are rated higher on measures of appeal and smoking-related beliefs and intentions not to smoke than are ads that do not evoke these kinds of emotions.

This review, then, provides important evidence on the efficacy of antismoking mass media campaigns and considerable direction on how those campaigns should be developed in content, tone, and intensity.

Community Interventions

In the last two decades, growing recognition of the influence of social contextual factors on smoking among youth has led to the development and implementation of numerous community interventions. Schofield and colleagues (1991) have argued that the community approach to the prevention of smoking has several key elements: multidimensionality, coordination of activities to maximize the ability to reach all community members, and ongoing, widespread support for nonsmoking behavior. Interventions with multiple components, such as tobacco age-of-purchase laws, smoke-free public places, and the use of mass media and school programs, are often implemented to create community-wide initiatives to prevent the uptake of tobacco use among young people.

Prior Reviews

A Cochrane review of community-based interventions for preventing smoking in young people defined community interventions as coordinated, widespread programs in a particular geographic area or in groupings of people who share common interests or needs that support nonsmoking behavior (Sowden and Stead 2003). The review included 17 RCTs and non-RCTs published up to 2002 that assessed the effectiveness of multicomponent community interventions in comparisons with no intervention or with single-component interventions or school programs alone in young people under the age of 25 years. Four studies reported interventions aimed at preventing the uptake of smoking in the community among young people that were part of larger, community-wide programs to reduce cardiovascular disease in all age groups in specific areas: California (Winkleby et al. 1993); Minnesota (Perry et al. 1994); North Karelia, Finland (Vartiainen et al. 1998); and Rotherham, England (Baxter et al. 1997). One study evaluated an intervention targeted at cancer prevention in New South Wales, Australia (Hancock et al. 2001), and another examined a community-level intervention in Minnesota and Wisconsin that focused on deterring tobacco use via a public policy initiative (Murray et al. 1994). Five other interventions focused exclusively on preventing the uptake of smoking in young people in specific locations: Wensleydale, England (Davidson 1992); Chicago, Illinois (Kaufman et al. 1994); Cardiff, Wales (Gordon et al. 1997); Sydney, Australia (Tang et al. 1997); and Oregon (Biglan et al. 2000a). Six other interventions were aimed specifically at young people, with the focus on preventing or reducing the use of tobacco, alcohol, and drugs in certain locations: Kansas City, Kansas, and Kansas City, Missouri (Pentz et al. 1989b); Wisconsin (Piper et al. 2000); Boys & Girls Clubs of America across the United States (St. Pierre et al. 1992); New Jersey (Aguirre-Molina and Gorman 1995); California (Sussman et al. 1998); and American Indian reservations (Schinke et al. 2000).

All 17 studies in the Cochrane review used a controlled trial design, with 6 using random allocation of schools or communities. Of 12 studies that compared community interventions with no-intervention controls, 2 (both part of programs to prevent cardiovascular disease) reported a lower prevalence of smoking following the intervention (Perry et al. 1994; Vartiainen et al. 1998). Of four studies comparing community interventions with school-based programs, only one found differences in the reported prevalence of smoking (Biglan et al. 2000a), and samples of expired carbon monoxide detected no differences in smoking between groups. One study reported a lower rate of increase in the prevalence of smoking in a community receiving a multicomponent intervention than in a community exposed to a mass media campaign alone (Kaufman et al. 1994). Finally, one study reported a significantly lower prevalence of smoking among the group receiving media, school, and homework components than in the group receiving the media component only (Pentz et al. 1989b).

Overall, Sowden and Stead (2003) concluded that there was some support for the effectiveness of community interventions in preventing the uptake of smoking by young people. The reviewers found it was not possible to pool the results because the studies were heterogeneous in terms of interventions, communities, participants, and measurement of outcomes. Indeed, it could be argued that the very nature of a community intervention means that no two initiatives could ever be the same and, therefore, that their findings should not be aggregated. Furthermore, establishment of control groups in these kinds of studies is difficult and may require extensive negotiations or a "delayed" intervention condition. And because communities are assigned to intervention or control groups, the analysis of outcomes needs to be at the level of the community rather than the individual level. Furthermore, the large size of community interventions means that the measurement of their implementation can be difficult and expensive. Regardless, the studies included in the review represent the most methodologically rigorous set of studies available on the effectiveness of community interventions in influencing smoking among young people.

In their review, Sowden and Stead (2003) recommended several principles to be considered in planning future community interventions: building on the elements of existing programs shown to be effective rather than repeating methods with limited success, adapting program components to suit the community, pretesting and fine-tuning program messages and activities before full implementation, being guided by theoretical constructs of behavior change, and ensuring that activities reach the intended audience.

Newer Studies

Several studies published since the Cochrane review by Sowden and Stead (2003) also suggest modest support for community interventions. One such study involved an evaluation of the effects on youth of the NCI-funded Community Intervention Trial for Smoking Cessation (COMMIT), a multicomponent, community-based intervention designed to decrease the prevalence of smoking among adults and increase quitting among adult smokers (*Journal of the National Cancer Institute* 1991). In addition to its components for adults, COMMIT (Lichtenstein et al. 1994) included youth-oriented activities in four principal areas: school-based education programs, smoking policies in schools, legislative activities related to youth smoking, and participation by students and teachers in other COMMIT activities. The evaluation, which was reported by Bowen and colleagues (2003), involved a two-group pretest/posttest with matched communities randomly assigned to either control or intervention; the ninth-grade classroom (students 14 and 15 years of age) was the unit of assessment. Bowen and coworkers (2003) found no differences in changes in smoking over time between youth in the intervention and control communities.

Full Court Press (FCP), a multifaceted community intervention to change social norms about tobacco use, was intended to reduce the uptake of smoking among youth in Tucson, Arizona. The program included media advocacy, mobilization of youth to build a network of young people committed to reducing tobacco use and advocating for policy change, improvements in the enforcement of laws governing youth access, and development of cessation services (Ross et al. 2006). Results indicated that the prevalence of youth smoking declined 27% between 1996 and 2000 in Tucson during the FCP intervention period, which was larger than changes observed in national and statewide trends for prevalence after accounting for gender and racial/ethnic differences. A subsequent study of FCP that adjusted for other changes in the sociodemographic and economic environment (e.g., increases in cigarette prices) also found beneficial effects on the prevalence of smoking (Ross et al. 2006).

Summary Regarding Community-Level Programs

Coordinated, multicomponent community programs may be able to reduce smoking among young people, and they do so more effectively than can single strategies. Results are likely to depend upon the mix of strategies chosen and the reach of the program's efforts into communities. The most effective components should form the basis for future community interventions (Sowden and Stead 2003).

Comprehensive State-Level Tobacco Control Programs

Because comprehensive tobacco control programs in the United States evolved from community mobilization at the local or state levels, they were not funded research projects like the various community intervention trials, which had formal hypotheses and planned research designs (USDHHS 2000b). Comprehensive tobacco control programs have included a range of coordinated and complementary strategies designed to prevent the initiation of smoking among youth, promote quitting among adults and youth, eliminate exposure of youth and adults to secondhand smoke, and identify and eliminate disparities in the use of tobacco between population groups (USDHHS 2000b). Comprehensive programs include community interventions, countermarketing, program policy and regulation, and surveillance and evaluation (USDHHS 2000b). The idea that multiple education (including paid media), taxation, legislative, and regulatory approaches are needed to address the social, economic, and environmental influences on tobacco use is underpinned by established theories and principles of health promotion (Kickbusch 1989; Green and Richard 1993; Flay and Petraitis 1994; Mullan 2000; USDHHS 2000b; Flay et al. 2009).

Following the establishment of statewide programs in Minnesota in 1985 and California in 1989, comprehensive tobacco control programs began to develop during the 1990s (USDHHS 1994). NCI's American Stop Smoking Intervention Study (ASSIST) was established in 17 states in 1991 (NCI 2005), and the SmokeLess States coalitions, funded by the Robert Wood Johnson Foundation with a national program office at the American Medical Association, were established in 19 states during 1993–2004 (Gerlach and Larkin 2005; NCI 2005). In 1994, CDC funded 32 non-ASSIST states and the District of Columbia through its Initiatives to Mobilize for the Prevention and Control of Tobacco Use (IMPACT) program (USDHHS 2000b). Five years later, in 1999, CDC launched the National Tobacco Control Program, which provides financial support and technical assistance and training for tobacco control programs in all 50 states, the District of Columbia, eight U.S. territories, six national networks, and eight tribal support centers.

Some of the statewide comprehensive tobacco control programs have been funded by an increase in the excise tax on cigarettes that came from either voter initiatives or state-legislated increases in tobacco taxes. California's program was funded by voter initiatives (1989), as were programs in Massachusetts (from 1993), Arizona (from 1994), and Oregon (from 1996). In 1997, Florida began a comprehensive program paid for by a percentage of funding from the state's settlement with the tobacco industry rather than by a tax increase. Mississippi, Texas, and Minnesota used some of the money from their individual settlements with the tobacco industry for tobacco control programs, as did many of the 46 other states that signed the 1998 Master Settlement Agreement, although this was not specified in the agreement (Campaign for Tobacco-Free Kids 2011a). After 1998, many states began to invest in tobacco control, but the amount of funding fell far short of recommendations made by CDC (2007b). Table 6.4 shows the level of program funding allocated by states in fiscal year 2011 compared with the level recommended by CDC (Campaign for Tobacco-Free Kids 2011a). Analyses of factors determining the level of allocation of state master settlement funds to tobacco control indicate that tobacco-producing states tended to spend less than other states on this activity (Gross et al. 2002; Sloan et al. 2005). In addition, the analysis by Gross and colleagues (2002) indicated that the states' tobacco-related health burdens were unrelated to the proportion of master settlement funds allocated to funding tobacco control (Gross et al. 2002). State-level political factors (Sloan et al. 2005), competing claims on master settlement funds, and lobbying by the tobacco industry (Balbach and Glantz 1998; Balbach et. al 2000; Ibraham et. al 2004; Ibraham and Glantz 2006, 2007; NCI 2008) have all played a role in the extent to which tobacco taxes and master settlement funds have—or have not—been used for state efforts in tobacco control.

Prior Reviews

Several reviews have examined the effectiveness of statewide tobacco control programs on reducing smoking by youth. Wakefield and Chaloupka (2000), who reviewed published literature, reports of program evaluations, and working papers about the effects of state programs in Arizona, California, Florida, Massachusetts, and Oregon, found youth in these states to have high levels of recall of the state's mass media campaigns and generally positive improvements in tobacco-related beliefs and attitudes. In addition, the combination of program activity and increases in tobacco taxes was found to reduce cigarette consumption more than would be expected from price increases alone. Reviews of programs in California and Massachusetts documented beneficial effects on the prevalence of adolescent smoking compared with other states (Briton et al. 1997; CDC 1999a; Independent Evaluation Consortium 2002), and Florida had promising indications of reduced smoking when its program was reviewed (CDC 1999b). Siegel (2000) reviewed these three state programs, as well as those of Arizona and Oregon, commenting that the extent of the tobacco industry's attempts to undermine the programs was a good indicator of the programs'

Table 6.4 Budgeted state funding of tobacco control programs in fiscal year 2011 in relation to funding levels recommended by the Centers for Disease Control and Prevention (CDC)

Status of funding	States
States that have funded tobacco prevention programs at a level that meets CDC's minimum recommendation (2 states)	Alaska and North Dakota
States that have committed substantial funding to tobacco prevention programs (5 states); at least 50% of CDC's minimum recommendation	Delaware, Hawaii, Maine, Montana, Wyoming
States that have committed modest funding to tobacco prevention programs (10 states); 25–49% of CDC's minimum recommendation	Arizona, Arkansas, Florida, Minnesota, Mississippi, New Mexico, Oklahoma, South Dakota, Utah, Vermont
States that have committed minimal funding to tobacco prevention programs (30 states plus the District of Columbia); less than 25% of CDC's minimum recommendation	Alabama, California, Colorado, Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Washington, West Virginia, Wisconsin
States that have committed none of their tobacco settlement money for tobacco prevention programs (3 states)	New Hampshire, Nevada, Ohio

Source: Campaign for Tobacco-Free Kids 2011a.
Note: Federal funds come from CDC's National Tobacco Control Program. Sources of state-level funds differ greatly by state. Most states use funds from one or more of the following sources: general revenues, tobacco taxes, and Master Settlement Agreement payments.

effectiveness. Responses by the tobacco industry had been aggressive, including more intensive tobacco marketing; increased lobbying at the state and local levels; attempts to limit the tobacco control programs' funding, scope, and messages (Ibraham et. al. 2004; Ibraham and Glantz 2006, 2007); promotion of preemption legislation to allow state laws to override more stringent local laws; and funding of local groups to fight against ordinances mandating clean indoor air (Siegel 2000). A later review by Pierce (2007), with the benefit of more recent data from states, rated the evidence as strong that state programs reduced tobacco use, including among youth (Sly et al. 2001a; Rigotti et al. 2002; Soldz et al. 2002; Niederdeppe et al. 2004; Pierce et al. 2005). Similarly, Bonnie and colleagues (2007) found "compelling" evidence that comprehensive state tobacco control programs can achieve substantial reductions in tobacco use. Such reductions, however, could well rely on the extent to which strategies are comprehensive and integrated. To be effective, they must also be consistent, and budget cuts in many states' tobacco control programs have threatened that consistency. Thus, a report by the Institute of Medicine recommended that all states maintain funding for their tobacco control activities at the level suggested by CDC—about $15 to $20 per capita, depending on the state's population, demography, and smoking rate (Bonnie et al. 2007). The President's Cancer Panel's report made the same recommendation in 2007 (NCI 2007).

A challenge for evaluating these state programs is that, by definition, they have multiple components, making it difficult to assess the relative contribution of each one. Still, several studies have attempted to quantify the relative amounts of effort expended by state tobacco control programs. For example, Schmitt and colleagues (2007) surveyed partners in state tobacco control—including the state health department, voluntary health agencies, and tobacco control coalitions—to assess the strength of tobacco control in various states by determining the proportion of partners working on interventions recommended by the Task Force on Community Preventive Services (2001). In addition, the community guide recommended a standardized approach, but this study found great variation between states in their overall levels of effort and in the relative degree of effort apportioned to media campaigns, tax increases, legislation on clean indoor air, supporting cessation assistance for smokers wanting to quit, and quitline services. Regardless, the strength of state-based tobacco control measures has not been the subject of studies to determine whether it is related to change in youth smoking.

Several studies, however, have focused on the overall level of tobacco control efforts within the states in an attempt to determine their impact on youth (and adult) smoking (Farrelly et al. 2003b, 2008; Tauras et al. 2005a). For example, Tauras and colleagues (2005a) related annual inflation-adjusted per capita expenditures on tobacco control to annual survey data for 8th-, 10th-, and 12th-grade students completing Monitoring the Future (MTF) surveys from 1991 to 2000. State expenditures were summed from (1) real per capita state-specific excise tax funding and other state-appropriated funds earmarked for tobacco control programs; (2) real per capita nongovernmental state-level expenditures on tobacco control; and (3) per capita tobacco control expenditures from ASSIST, IMPACT, SmokeLess States, and the National Tobacco Control Program (Tauras et al. 2005a). After adjusting for cigarette prices; the strength of laws on clean indoor air; laws on youth access; possession, use, and purchase (PUP) laws; and a range of individual characteristics associated with smoking, real per capita tobacco control expenditures had a statistically significant negative relationship with the prevalence of student smoking and the amount smoked by students. If states had spent the minimum amount of funding recommended by CDC, the relative prevalence of student smoking would have been between 3.3% and 13.5% lower than was observed over this period (Tauras et al. 2005a). Reduced prevalence was not observed in all states, however, as documented by Alesci and colleagues (2009) in Minnesota.

Fichtenberg and Glantz (2000) investigated the effects of the California Tobacco Control Program, implemented in 1989, on cigarette consumption and age-adjusted death rates from heart disease. Between 1989 and 1992, the rates of decline in per capita cigarette consumption and mortality from heart disease in California, relative to the rest of the United States, were significantly greater than the pre-1989 rates ($p < 0.001$). These rates of decline were reduced significantly when the program was cut back beginning in 1992. The researchers estimated that the program was associated with 59,000 fewer deaths from heart disease between 1989 and 1997 than would have been expected if the earlier trend in heart disease mortality had continued.

Lightwood and colleagues (2008) modeled the dynamic relationships between per capita tobacco control expenditures, per capita cigarette consumption, and health care expenditures in California, showing $86 billion in reduced personal health care expenditures between 1989 and 2004 than would have been expected absent the state's tobacco control program. Lightwood and Glantz (2011) used a similar approach to investigate the relationship between per capita tobacco control expenditures, cigarette consumption, and health care expenditures in Arizona, which employed a youth-focused tobacco control program. The state's tobacco control expenditures were associated with reduced cigarette consumption and with reductions in health care expenditures amounting to about 10 times the cost of the program through 2004.

Previous reports have reviewed the programmatic components and outcomes of state tobacco control programs, especially states that adopted these programs during the 1990s (USDHHS 1994, 2000b; Siegel 2000; Wakefield and Chaloupka 2000; Bonnie et al. 2007; NCI 2008). The next section outlines the comprehensive tobacco control program in New York state that began in 2000, with information provided as well on separate programmatic efforts in New York City from 2002, and the positive effects of these efforts on smoking among youth. Taken together, results from statewide comprehensive tobacco control programs provide strong evidence that they reduce the prevalence of smoking by youth. To maintain their effectiveness, such programs need to be funded according to CDC recommendations in a sustained manner and include policy change, such as creation of smoke-free environments that reinforce a nonsmoking norm.

Case Study: New York Statewide Program

In 2000, New York state began implementing a comprehensive tobacco control program with funds from the Master Settlement Agreement and revenue from the state's cigarette tax. The New York Tobacco Control Program (NYTCP) implements three key strategies: taking community action, producing and disseminating public health communications, and carrying out interventions to promote cessation. The program, whose components are supported by surveillance, evaluation, and statewide coordination, has attempted to reduce smoking among youth by working to change adult smoking norms and behaviors. From 2000 to 2005, funding for the program was one-half of what CDC recommended as a minimum (RTI International 2004), and in the first independent evaluation, which covered 2000–2003, NYTCP was found not to have expended all available funds in any year since the program had begun and thus did not have a fully implemented program (RTI International 2004). Bureaucratic procedures prevented NYTCP from fully implementing its strategic plan, especially a countermarketing campaign, and from establishing contracts with partners and contractors in a timely fashion (RTI International 2004). However, in 2002, New York increased its tobacco tax, and this produced reductions in smoking (RTI International 2004). Unfortunately, the program missed an opportunity to have a large impact on its intended outcomes by failing to implement media campaigns consistently with messages that elicited strong emotional responses among the target audiences and by not timing its media to coincide with the implementation of the *Clean Indoor Air Act* (2003) (RTI International 2004).

During 2004–2005, NYTCP began to broadcast more ads with high emotional impact, but there was a 6-month period when no media messages at all were broadcast. The program also established 19 centers focused on increasing the number of health care organizations with systems in place that supported smoking cessation, more actively promoted a fax-based quitline referral system to health care providers, distributed free starter kits of nicotine replacement therapy to eligible quitline callers, and implemented a new statewide initiative to combat the influence of tobacco advertising, sponsorships, and promotions. In 2004, the *Fire Safety Standards for Cigarettes Act* was implemented, requiring manufacturers to certify that all cigarettes offered for sale in New York met a specific standard for propensity to ignite. Cigarette-caused fires and deaths caused by cigarette fires both declined following implementation of the law (New York State Department of Health 2009). A 2005 evaluation by RTI International found that the program was having an impact on tobacco use and that rates of decline in New York had outpaced rates of decline in the rest of the country (RTI International 2005). However, tax evasion (i.e., purchasing cigarettes from low-tax or untaxed sources) reduced the effect of the increases in cigarette excise taxes by negatively affecting outcomes for smoking cessation (RTI International 2005).

The *Clean Indoor Air Act* (2003) noted above was associated with reductions in exposure to secondhand smoking among both youth and adults in New York state (RTI International 2005). During 2004–2005, the budget for NYTCP doubled from $44 million to $85 million (the latter around 90% of CDC's minimum recommended level), and by 2007, the program had significantly expanded its media campaign efforts, promotion of quitlines, and partnerships. In 2006, the prevalence of smoking among youth and adults declined faster in New York than in the United States as a whole, and the use of other tobacco products by youth and adults also declined (RTI International 2007). Between 2000 and 2006, smoking among middle school students in the state declined from 10.5% to 4.1% (RI = 61%); among high school students it declined from 27.1% to 16.3% (relative improvement [RI] = 40%) (RTI International 2007).

Alongside efforts at the state level, New York City began implementing its own five-point tobacco control program in 2002 with increased taxation to a level greater than the New York state tax, then continued in 2003 with the establishment of smoke-free workplaces (including restaurants and bars), education of the public and of health care providers, cessation services, and rigorous evaluation of its program. The latter included annual, cross-sectional, citywide telephone surveys using the same measures as CDC's state-based Behavioral Risk Factor Surveillance System (CDC 2007c). Starting in 2006, New York City implemented an extensive, television-based, antitobacco media campaign using graphic images of the health effects of smoking, a campaign that was aired simultaneously with the New York state antitobacco media campaign. Declines in the prevalence of adult smoking were observed during 2002–2004 (Frieden et al. 2005; CDC 2007c), coinciding with the tax increase and smoke-free laws, and in 2006 among men and Hispanics, coinciding with the first year of the city's media campaign (CDC 2007c). From 2003 to 2005, smoking among high school youth in New York City decreased substantially, from 14.8% to 11.2% (RI = 24%), while the rate nationally remained unchanged at approximately 23% (CDC 2007c).

Summary Regarding State-Level Programs

The total weight of evidence from the consistent findings of cross-sectional studies that have controlled for differences between exposed and unexposed populations, combined with high theoretical plausibility and coherence, is sufficient to infer a causal relationship between exposure to comprehensive state-level tobacco control programs and reduced prevalence of smoking among youth.

Legislative and Regulatory Approaches

This section, which examines the effectiveness of regulatory approaches to prevent tobacco use among young people, focuses in particular on the impact of various governmental interventions on reducing cigarette consumption among youth and young adults, including policies related to minors' access to tobacco products, labeling of tobacco products, clean indoor air, advertising restrictions, and taxation of tobacco. In 2009, federal legislation was passed that regulates the manufacturing, marketing, and distribution of tobacco products (*Family Smoking Prevention and Tobacco Control Act* 2009); one of the law's provisions restricts tobacco companies from using "light," "mild," or "low", or similar descriptions for their products without an order from FDA (*Family Smoking Prevention and Tobacco Control Act* 2009).

Taxation of Tobacco

In the United States, the federal government, all 50 states, the District of Columbia, and many local

Table 6.5 Federal cigarette excise taxes, selected dates, 1993–2009

Effective date	Tax per pack of 20 cigarettes (in cents)
January 1, 1993	$0.24
January 1, 2000	$0.34
January 1, 2002	$0.39
April 1, 2009	$1.01

Source: Orzechowski and Walker 2010 and U.S. Department of the Treasury 2009.

governments tax tobacco products. Although many factors affect the final price of cigarettes and other tobacco products, the most important policy-related determinants of tobacco prices are excise taxes on tobacco products.

Taxes on tobacco provide revenue to governments at a relatively low administrative cost, making these taxes especially appealing during periods of shortfalls in the budget. Moreover, taxes on tobacco have the ability to decrease its consumption and thereby improve public health. This combination of increasing revenues and improving public health has made tobacco taxation a popular policy lever in recent decades.

The sections below briefly review the current status of tobacco excise taxes at the federal, state, and local levels, focusing on the period since the publication of the last Surgeon General's report on tobacco use among youth in 1994 (USDHHS 1994). In addition, these sections examine the relationship between increases in tobacco prices and consumption of tobacco by young people, focusing on the period since the most recent comprehensive Surgeon General's review on reducing tobacco use was written in 2000 (USDHHS 2000b).

Federal Taxes

As part of the *Balanced Budget Act of 1997*, Congress passed a two-stage increase in the federal tax: the first stage increased the federal excise tax from $0.24 per pack to $0.34 per pack on January 1, 2000, and the second increased it from $0.34 to $0.39 per pack on January 1, 2002. These were the first changes to federal excise taxes on cigarettes since January 1, 1993 (Table 6.5). Moreover, the *Balanced Budget Act of 1997* increased the excise tax rates on all other tobacco products in two stages and established an excise tax rate for roll-your-own tobacco (Table 6.6). On April 1, 2009, the federal excise tax on cigarettes was increased from $0.39 to $1.01 per pack (Table 6.5), and federal excise taxes on other tobacco products were also increased. Revenue generated from the 2009 tobacco

Table 6.6 Federal tax rates on other tobacco products, selected dates, 1993–2009

Tobacco product	January 1, 1993 tax rate (in dollars)	January 1, 2000 tax rate (in dollars)	January 1, 2002 tax rate (in dollars)	April 1, 2009 tax rate (in dollars)
Snuff (per pound)	0.36	0.51	0.585	1.51
Chewing tobacco (per pound)	0.12	0.17	0.195	0.50
Pipe tobacco (per pound)	0.675	0.9567	1.0969	2.83
Roll your own (per pound)		0.9567	1.0969	24.78
Small cigars (per 1,000)	1.125	1.594	1.828	50.33
Large cigars (per 1,000)	12.75% of wholesale price (but not more than $30/1,000)	18.063% of wholesale price (but not more than $42.50/1,000)	20.719% of wholesale price (but not more than $48.75/1,000)	52.75% (but not more than $402.60/1,000)

Source: Tax data from Orzechowski and Walker 2010 and U.S. Department of the Treasury 2009.

excise tax hikes was used to fund an expansion of the Children's Health Insurance Program.

State and Local Taxes

All 50 states and the District of Columbia currently impose an excise tax on cigarettes. As of August 1, 2011, the rates ranged from $0.17 per pack in Missouri to $4.35 per pack in New York (Table 6.7). State excise taxes have increased considerably in recent years. Since January 1, 2002, 47 states, the District of Columbia, and several U.S. territories have increased their cigarette excise taxes 105 times. Even Kentucky, North Carolina, and Tennessee—tobacco-producing states that have traditionally resisted raising tobacco taxes—have increased their tax rates on cigarettes. Moreover, hundreds of municipalities impose taxes on cigarettes, but the rates are generally relatively small when compared with state taxes. However, in recent years, several cities and counties have implemented large increases. For example, in 2002, New York City increased its tax on cigarettes from $0.08 per pack to $1.50 per pack. Similarly, both the city of Chicago and Cook County, Illinois (Cook County includes Chicago as well as many other jurisdictions), raised taxes on cigarettes. Combining federal, state, and local taxes, individuals purchasing cigarettes in New York City and Anchorage, Alaska, pay the highest cigarette excise taxes in the country at $5.85 and $4.20 per pack, respectively, as of October 7, 2011 (Campaign for Tobacco-Free Kids 2011b).

Another kind of tax, the general sales tax, is also quite common. In 2010, 45 states and the District of Columbia imposed general sales taxes on cigarettes (Table 6.7; Orzechowski and Walker 2010); as of November 1, 2010, these taxes added between $0.14 and $0.43 to the price of a pack of cigarettes. In addition, 49 states currently apply excise taxes on tobacco products other than cigarettes; these taxes are predominantly ad valorem. Finally, in most states the general sales tax is applied to other tobacco products as well as to cigarettes.

Cigarette Taxes and Cigarette Prices

Increases in taxes on cigarettes and other tobacco products increase their purchase price. Excise taxes are per unit taxes, but unless they are increased regularly, the inflation-adjusted value of the tax will fall over time. Given the importance of taxes in determining the price of cigarettes, increasing them only infrequently will likely result in declines in the inflation-adjusted price for cigarettes.

The years 1997–2002 witnessed some of the most dramatic increases in the inflation-adjusted retail price of cigarettes in the United States; during this period the inflation-adjusted price increased by 71.1% (Figure 6.2). This large increase was partly the result of the two federal tax increases mentioned earlier and the numerous increases in state excise taxes, and it also reflected the significant increases in the wholesale price of cigarettes. In fact, between 1998 and 2003, wholesale prices for cigarettes increased 122% (Capehart 2004), largely as a result of increased costs associated with expenses for individual state tobacco settlements and expenses related to the Master Settlement Agreement.

Effects of Price on the Demand for Tobacco Products

One of the fundamental principles of economics is that as the real price of a good increases, consumption of that good falls (the downward slope of demand). Some researchers once believed that because of the addictive properties of nicotine, tobacco products might be an exception to this fundamental principle, but numerous econometric studies conducted over the past four decades, including several studies that explicitly modeled the addictive nature of cigarettes, have confirmed that an inverse relationship indeed exists between the prices of cigarettes and their consumption. Because increases in tobacco taxes have the potential to increase the real price of tobacco, increasing those taxes can be an effective policy lever for decreasing tobacco consumption.

Economists measure how responsive tobacco consumption is to changes in the real price of tobacco with a concept known as the "price elasticity of demand." Formally, this is the percentage change in the amount of tobacco consumed that results from a 1% increase in the price of tobacco. For example, a price elasticity of -0.4 implies that a 10% increase in price will decrease consumption by 4%.

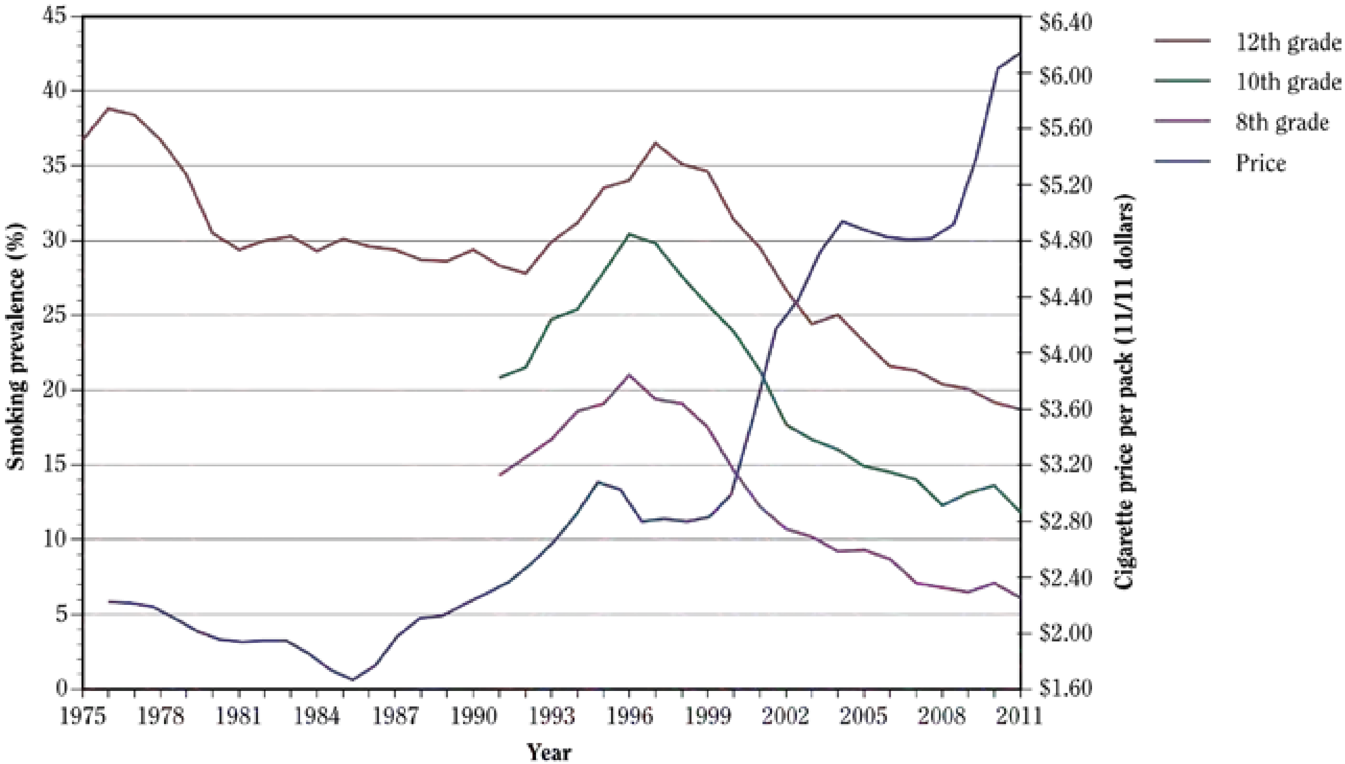
The two most recent comprehensive reviews of the literature on the impact of price on tobacco consumption include the International Agency for Research on Cancer (IARC) *Handbooks of Cancer Prevention in Tobacco Control Volume 14* (IARC 2011) and a summary of key findings by Chaloupka and colleagues (2011). A few conclusions can be drawn from these reviews. First, increases in cigarette prices lead to substantial reductions in cigarette smoking. The consensus estimate from the two reviews is that a 10% increase in cigarette price will result in a 3–5% reduction in overall cigarettes consumed. Second, increases in cigarette prices will decrease not only the prevalence of smoking but also the average number of cigarettes smoked by smokers. Third, a majority of the previous research on cigarette consumption among youth suggests that both youth and young adults are more responsive than adults to changes in cigarette prices, with several studies finding youth and young adults to be two to three times as responsive to changes in price as adults.

Table 6.7 State cigarette excise taxes (dollars per pack) and sales tax rate applied to cigarettes

State	Excise tax, September 30, 2011 (in dollars)	Sales tax rate November 1, 2010 (%)	State	Excise tax, September 30, 2011 (in dollars)	Sales tax rate November 1, 2010 (%)
Alabama	0.425	4	Montana	1.70	0
Alaska	2.00	0	Nebraska	0.64	5.5
Arizona	2.00	6.6	Nevada	0.80	6.85
Arkansas	1.15	6	New Hampshire	1.68	0
California	0.87	7.25	New Jersey	2.70	7
Colorado	0.84	2.9	New Mexico	1.66	5.125
Connecticut	3.40	6	New York	4.35	4
Delaware	1.60	0	North Carolina	0.45	5.75
District of Columbia	2.50	6	North Dakota	0.44	5
Florida	1.339	6	Ohio	1.25	5.5
Georgia	0.37	4	Oklahoma	1.03	4.5
Hawaii	3.20	4	Oregon	1.18	0
Idaho	0.57	6	Pennsylvania	1.60	6
Illinois	0.98	6.25	Rhode Island	3.46	7
Indiana	0.995	7	South Carolina	0.57	6
Iowa	1.36	6	South Dakota	1.53	4
Kansas	0.79	6.3	Tennessee	0.62	7
Kentucky	0.60	6	Texas	1.41	6.25
Louisiana	0.36	4	Utah	1.70	4.65
Maine	2.00	5	Vermont	2.62	6
Maryland	2.00	6	Virginia	0.30	5
Massachusetts	2.51	6.25	Washington	3.025	6.5
Michigan	2.00	6	West Virginia	0.55	6
Minnesota	1.23	6.875	Wisconsin	2.52	5
Mississippi	0.68	7	Wyoming	0.60	4
Missouri	0.17	4.225			
Mean state excise tax: $1.46		Mean sales tax rate: 5.06%			
Median state excise tax: $1.25		Median sales tax rate: 6%			

Source: Sales tax data from Orzechowski and Walker 2010. Excise tax data from Centers for Disease Control and Prevention, Office on Smoking and Health, State Tobacco Activities Tracking and Evaluation (STATE) System (CDC 2011b).

Figure 6.2 Cigarette prices and prevalence of smoking among youth, 1975–2011



Source: Cigarette prices from Orzechowski and Walker 2011; 30-day smoking prevalence data for students in grades 8, 10, and 12 from Monitoring the Future 2011, University of Michigan News Service; author's calculations.

Finally, mixed results have been found in the relatively few studies that have examined the impact of cigarette prices on the initiation of smoking among adolescents.

Most of the research published since 2000 supports the conclusion of previous reviews that an inverse relationship exists between age and responsiveness to changes in cigarette prices. Drawing the conclusion that youth will be the most responsive to price, however, does not settle things in terms of calculating demand among younger people. For example, a central issue when estimating equations for cigarette demand among youth (or any other sector of the population) is how to account for antitobacco sentiment in different states. This is important because during a particular period it may be sentiment against tobacco that is driving both changes in cigarette smoking and changes in cigarette excise taxes. Not controlling for antitobacco sentiment may result in bias from omitting a variable, thereby producing a spurious negative relationship between price and smoking and resulting in estimated price elasticities biased away from zero. Several strategies have been suggested to account for antismoking sentiment in equations on youth smoking, including controlling for state tobacco control policies that affect primarily adults and controlling for whether the respondent resides in a tobacco-producing state. To the extent that the enactment of tobacco control policies that affect adults (and have little impact on smoking by adolescents, such as worksite restrictions on smoking) and residing in a tobacco-producing state can serve as proxies for antismoking sentiment, the inclusion of these variables in the regression model will mitigate some of the bias from omitted variables on the price estimates (Tauras et al. 2005a).

Another approach is to approximate the magnitude of antitobacco sentiment within states by using the attitudes of individuals toward smoking and beliefs about tobacco policies obtained from survey data. Still another approach is to eliminate state-level heterogeneity that is time invariant (such as types of housing) and unobserved through the use of state-level fixed effects. To the extent that sentiment toward tobacco within states is time invariant during the period under investigation, the inclusion of state-level fixed effects will eliminate the bias from an omitted variable on the price estimates. The use of state-level fixed effects relies on within-state variation in cigarette prices or taxes over time (as opposed to interstate differences in prices and taxes) to quantify the effect of price on consumption. In essence, the use of state-level fixed effects in conjunction with year-level fixed effects compares the effect of tax (or price) on smoking for individuals who reside in states in which taxes (or prices) changed with the effects of tax (or price) on smoking for individuals who reside in states that did not observe a change in tax (or price) in that year. For the state-level fixed-effects approach to be viable, researchers must use multiple years of state data; 1 year of cross-sectional data would result in perfect multicollinearity between the state-specific taxes (or prices) and the dichotomous state indicators. Moreover, even if multiple years of state data are used, there must be reasonable variation in tax (or price) over time within states to avoid collinearity issues with the tax (or price) variable.

Prevalence of smoking and average smoking among youth. As can be seen in Figure 6.2, an inverse relationship exists between prevalence rates for smoking among young people and the inflation-adjusted price of cigarettes in the United States. Most of the research conducted during the past decade that has controlled for a host of other factors thought likely to affect youth smoking, including antitobacco sentiment in the state, supports the conclusion of previous reviews that an inverse relationship exists between smoking among youth and cigarette prices.

For example, using 1 year of cross-sectional data collected in 1996 for the Study of Smoking and Tobacco Use Among Young People, Ross and Chaloupka (2003) examined the effect of cigarette prices on smoking among high school students in the United States. Although they controlled for both state-level laws on smoke-free air and youth-access laws, the authors assessed the use of several alternative measures of cigarette prices in their analysis, including average state prices and perceived prices among the students. In their preferred specifications, they estimated total price elasticities of demand of -0.67 and -1.02 when using average state prices and perceived prices among youth, respectively. The price elasticity estimates were confirmed in a subsequent analysis by Ross and Chaloupka (2004) that also explicitly controlled for compliance with youth-access laws. The estimates from these studies suggest that adolescents are considerably more responsive to price changes than are adults on the basis of the consensus estimate for the latter population (Chaloupka and Warner 2000).

Using the same cross-sectional data as Ross and Chaloupka (2003), Powell and colleagues (2005) reexamined the determinants of smoking prevalence among high school students, incorporating the importance of peer effects in their analyses. Specifically, Powell and colleagues allowed cigarette prices to have both a direct and an indirect effect, via a social multiplier effect (i.e., the influence of peer interactions), on the prevalence of smoking among youth. They estimated the price elasticity of smoking prevalence among youth to be -0.50, with the peer effect playing a significant role in the prevalence of smoking by high school students. Specifically, the aforementioned price elasticity comprised a direct-prevalence price elasticity of -0.32 and an indirect-prevalence price elasticity (measuring the social multiplier effect) of -0.18. These estimates are consistent with Ross and Chaloupka (2003) and suggest a rather large social multiplier effect with respect to price changes and participation among youth in smoking.

Katzman and associates (2007) extracted data from the 1995–2001 national Youth Risk Behavior Surveys (YRBSs) to estimate equations for cigarette demand among individuals in grades 9–12. In this study, the authors took into account the manner in which the adolescents acquired their cigarettes, distinguishing between those who primarily bought their own and those who primarily "borrowed" them. In their analyses, the researchers controlled for whether the adolescents resided in tobacco-producing states, for laws banning smoking in private worksites, and for PUP laws. Although they allowed changes in cigarette prices to affect both the probability of being a buyer and borrower and the quantity smoked, given group membership, the authors concluded that the total price elasticity of cigarette demand among adolescents ranged from -0.556 to -0.857. Again, these results imply that high school students respond more to price changes than do adults.

Earlier, Gruber and Zinman (2001) controlled for both state and year fixed effects in their analyses of smoking by youth. These researchers used three data sets from the 1990s in their analyses: MTF surveys of 8th-, 10th-, and 12th-grade students, YRBSs of 9th- to 12th-grade students, and the Vital Statistics Natality detail files of mothers during pregnancy. The authors concluded that price had a sizable and significant impact on smoking by high school seniors, with prevalence-price elasticities ranging from -0.38 in the Natality data to -1.5 in the YRBS data, with the most reliable estimate of -0.66 coming from the MTF data. Moreover, they concluded that younger adolescents are less responsive to price changes than are high school seniors.

Tauras and colleagues (2005b) investigated the impact of cigarette prices and tobacco control policies on propensity to smoke and intensity of smoking among youth and young adults during the late 1990s through the early 2000s, a period characterized by dramatic increases in cigarette prices and taxes. These investigators used the first five waves of data (1997–2001) from the National Longitudinal Survey of Youth 1997 cohort (NLSY97). Using a two-way fixed-effects technique that controls for unobserved individual-level heterogeneity and individual-invariant year-specific unobserved heterogeneity, they found a strong negative impact of cigarette prices and taxes on propensity to smoke and intensity of smoking among youth and young adults and estimated the total price elasticity of cigarette demand to be -0.827. These authors separately considered the impact of price and tax on the probability of smoking and on the average number of cigarettes smoked by smokers, estimating smoking prevalence-price elasticity of demand and the conditional price elasticity of demand to be -0.311 and -0.516, respectively. These estimates imply that a 10% increase in the real price of cigarettes would decrease the number of adolescent and young adult smokers by approximately 3.1% and reduce the average number of cigarettes smoked by adolescent and young adult smokers by 5.2%. The estimated total price elasticity was twice as large (in absolute value) as the consensus estimate for adults (0.4) and is consistent with the notion that an inverse relationship exists between age and the price elasticity of cigarette demand (USDHHS 2000b; Chaloupka and Warner 2000).

Sloan and Trogdon (2004) used Behavioral Risk Factor Surveillance data from the 1990s and early 2000s to estimate equations for smoking prevalence among young adults (18–20 years of age) and older adults (21 years of age and older). Using both state and year fixed effects, the authors concluded that propensity to smoke among young adults was the most responsive to cigarette prices, with an estimated smoking prevalence elasticity of demand of -0.27. In addition, the authors found evidence that the absolute value of the price elasticity of smoking participation declined monotonically with age until 65 years of age.

More recently, DeCicca and colleagues (2008a) developed a direct measure of state-specific antismoking sentiment with a factor analysis technique using data extracted from the Tobacco Use Supplements to the Current Population Surveys during the 1990s. Employing data from the 1992 and 2000 waves of the National Education Longitudinal Study (NELS), they found that price had a strong negative (and significant) impact on the prevalence of smoking and on average consumption for youth and young adult smokers. The estimated price elasticities of smoking prevalence and average consumption by smokers ranged from -0.59 to -0.76 and from -0.3 to -0.66, respectively. Moreover, price was found to have a strong negative influence on average smoking by youth smokers in the 2000 cross-section even after controlling for the new measure of antismoking sentiment. However, when smoking sentiment was included in equations for smoking prevalence, the price effects lost statistical significance. Using the 2000 wave of data, the authors tested models that employed the newly developed direct measure of antismoking sentiment and compared it with models using alternative approaches to dealing with such sentiment. The strong negative impact of price on average smoking was robust to all the methods of dealing with unobserved state-level sentiment toward tobacco. Moreover, in all the models except the model that included the new measure of sentiment, price was found to have a significant negative impact, reducing smoking prevalence among youth. Given the findings when the direct measure of antismoking sentiment was included in the models, DeCicca and colleagues questioned the adequacy of using proxies to control for antismoking sentiment. However, some caution should be used in interpreting models that include a direct measure of antismoking sentiment in that reverse causality is likely in this type of estimation strategy. That is, the amount of smoking within a state is likely to have an impact on the level of antismoking sentiment within that state, resulting in simultaneity bias.

Carpenter and Cook (2008) addressed the concerns of DeCicca and colleagues (2008a) in a recent paper that used national, state, and local YRBSs from 1991 to 2005; they tested three alternative methods of dealing with antismoking sentiment. First, they estimated a cross-sectional model that relied on intrastate variation in cigarette taxes to identify the impact of price on youth smoking. Second, they estimated a two-way fixed-effects model that controlled for area and year fixed effects. Finally, they employed the same direct measure of antismoking sentiment used by DeCicca and colleagues (2008a). Carpenter and Cook found consistent evidence of a significant negative effect of cigarette taxes on smoking prevalence in the cross-sectional and fixed-effects approaches. Moreover, using the new direct measure of antismoking sentiment, they found a strong negative effect of taxes on the prevalence of smoking among youth, alleviating the concerns raised by DeCicca and colleagues. Using the tax effects from the national and state samples, Carpenter and Cook estimated price elasticities for the prevalence of smoking among youth of -0.56 and -0.25, respectively.

Effects of cigarette prices on smoking transitions. Many researchers examining the influence of price on the prevalence of smoking among youth have assumed that much of the effect of price reflects its impact on the initiation of smoking, while the effects of price on young adults and adults are thought to be dominated by its effects on escalation of smoking and on cessation. Whether these judgments are true or not, several recent studies have attempted to directly quantify the impact of price on initiation among youth and the effects of price on escalation and cessation among young adults. Most of the recent studies have used longitudinal data on smoking behavior and other determinants of smoking over time.

Initiation of smoking. Tauras and colleagues (2001) were the first to examine the impact of price on initiation of smoking among youth by using longitudinal data, in this case from three cohorts of students enrolled in the 8th and 10th grades in 1991–1993 who were part of the longitudinal component of the MTF. The authors examined three alternative measures of the smoking process over time, including a transition from not smoking to smoking any amount; daily smoking, defined as smoking at least one to five cigarettes per day on average; and heavy daily smoking, defined as smoking at least one-half pack per day on average. After controlling for youth-access laws and regional fixed effects, the average price elasticity estimates for smoking cigarettes for (1) any smoking, (2) smoking at least one to five cigarettes per day on average, and (3) smoking at least one-half pack per day on average were -0.271, -0.811, and 0.955, respectively. These estimates imply that the process of smoking uptake among youth responds to changes in cigarette prices.

Cawley and associates (2004), who investigated the determinants of smoking initiation among youth by using more recent data from the first four waves (1997–2000) of NLSY97, looked at two alternative measures of smoking initiation. The first was a transition from nonsmoker to smoking any quantity of cigarettes (termed "less stringent initiation"), and the second ("more stringent initiation") was the transition from nonsmoker to frequent smoker, as measured by having smoked on at least 15 of the past 30 days. Although they controlled for smoke-free air laws, youth-access laws, and residence in tobacco-producing states, the authors concluded that initiation of smoking among male adolescents was very responsive to changes in cigarette prices, with the average price elasticities estimated to be -0.86 for less stringent initiation and -1.49 for more stringent initiation. Initiation of smoking among female adolescents was not significantly related to cigarette prices but was very responsive to concerns about body weight.

A follow-up paper on the initiation of smoking among youth by Cawley and associates (2006) found results very similar to the earlier paper by Cawley and colleagues (2004) despite the use of a longitudinal data set that spanned a longer period: the data were from 1988 to 2000 and were taken from the children's cohort of NLSY79. After controlling for smoke-free air laws and youth-access laws, researchers found cigarette prices to have a negative impact on the initiation of smoking in all the models that were estimated; however, the price coefficients differed significantly from zero in only the male equations. Specifically, the price elasticity of smoking initiation among males on the basis of any cigarettes consumed was estimated to be -1.20.

In a series of papers, DeCicca and colleagues (2000, 2008a,b) examined the influence of price and tax on the initiation of smoking among youth and young adults. In one of the papers, DeCicca and associates (2008a) used data from the 1988, 1990, 1992, and 2000 waves of NELS to examine the influence of cigarette prices on decisions about smoking among adolescents and young adults. The authors found price to have a strong and significant negative influence on initiation when state fixed effects were omitted from the model. However, when state fixed effects were included in the regression analyses, price failed to reach significance at conventional levels. These researchers concluded that unobserved state-level heterogeneity (possibly in the form of differential antismoking sentiment), not price, drives decisions to smoke among youth and young adults. In a different paper, DeCicca and colleagues (2008b) used data from the 1992 and 2000 waves of NELS to examine the influence of cigarette excise taxes on initiation of smoking among young adults (18–26 years of age). These authors used three identification strategies in their equations: First, they used intrastate variation in cigarette excise taxes to identify the impact of price on initiation of smoking. Second, they included the direct measure of antismoking sentiment developed by DeCicca and colleagues (2008a) in their equations for initiation. Finally, they used variation in cigarette taxes faced by young adults who moved across state lines between 1992 and 2000 versus young adults who remained in the same state in these two specific years.

In this paper (DeCicca et al. 2008b), cigarette taxes were found to have a significant negative impact on the initiation of smoking among young adults for only those who remained in the same state (the third identification strategy). The authors concluded that cigarette prices have little impact on the initiation of smoking, but these results should be viewed with caution. First, the study was conducted on a sample of individuals who initiated smoking later in life (they were nonsmokers in high school but smokers by a modal age of 26 years). Most adults who have ever smoked initiate smoking before the age range investigated by DeCicca and colleagues, and the decisions on initiation of an older cohort may be quite different from those of younger individuals. Second, as discussed above, antismoking sentiment may be an endogenous variable that is determined simultaneously with smoking. Third, in the models that relied solely on intrastate variation in taxes, the authors found only weak evidence of a negative effect of taxes on the prevalence of smoking (the price effect failed to reach 5% significance levels in a two-tailed test). Finally, in an earlier study, DeCicca and colleagues

(2000) examined the determinants of initiation among individuals of different races and ethnicities with data extracted from the 1988–1992 NELS. After controlling for state and year fixed effects, they found price to have a dramatic negative impact on decisions to initiate smoking among Hispanics and African Americans, but price had no influence on decisions to initiate smoking by Whites. The authors estimated that a price increase of $1.50 would decrease rates of initiation among Hispanics and African Americans to approximately 1%. However, the authors cautioned that the prediction for African Americans was based on a statistically insignificant estimate of the price coefficient. Regardless, the results of this earlier study (DeCicca et al. 2000) indicate that conclusions about the relationship between initiation and cigarette taxes may well need to consider race or ethnicity rather than being simply drawn for the population as a whole.

Dinno and Glantz (2009) used the February 2002 panel of the Tobacco Use Supplement of the Current Population Survey (54,024 individuals representing the U.S. population aged 15–80 years) to study the independent association of cigarette prices and state or local strong clean indoor air laws with current smoker status and consumption in a multilevel framework, including interactions with educational attainment, household income, and race/ethnicity. They found nonlinear relationships between price and smoking status and per smoker consumption, with no effect at higher prices. Below $3.28 per pack (in 2002), the OR for smoking, given a 10-cent increase in price, was 0.95 (95% confidence interval [CI] 0.93–0.97); this relationship ended above that price. The association of cigarette price with smoker status did not change with educational attainment, household income, or race/ethnicity. There was no interaction between clean indoor air coverage and cigarette price. There was no interaction between cigarette price (or strong clean indoor air laws) and educational attainment, household income, or race/ethnicity. Price increases (and clean indoor air laws) appear to benefit all socioeconomic and racial/ethnic groups in the study equally in terms of reducing smoking participation and consumption.

Smoking cessation. A few studies have examined the impact of price on the decisions of adolescents and young adults to quit smoking. Tauras and Chaloupka (2001) were the first to model decisions on cessation with longitudinal data that tracked individuals' smoking behavior over time. In particular, these researchers used the longitudinal component of MTF surveys and a semiparametric Cox regression to assess the probability that smokers would make a transition from smoking to nonsmoking. The authors concluded that the likelihood of making an attempt to quit among both men and women increases significantly as cigarette prices rise. Their estimated price elasticities for smoking cessation ranged between 0.27 and 0.92 for men and 0.34 to 0.71 for women, implying that a 10% increase in price raises the probability of making a cessation attempt by as much as 10% for men.

Expanding on the original study, Tauras (2004) used the longitudinal component of MTF surveys and employed a stratified Cox regression to model multiple attempts to quit among young adults. His findings confirmed a positive relationship between cigarette prices and smoking cessation, with a 10% increase in the price of cigarettes increasing successful cessation by young adults by an estimated 3.5%.

DeCicca and colleagues (2008b), in their study using data from the 1992 and 2000 waves of NELS, examined the influence of cigarette excise taxes on the decisions of young adults to quit smoking. When these authors used intrastate variation in cigarette excise taxes to identify the impact of taxes on smoking cessation, they found young adults to be very responsive to tax changes; indeed, the price elasticity of cessation was estimated to be 0.93. In a different specification, these investigators added the direct measure of antismoking sentiment developed by DeCicca and associates (2008a) and estimated the price elasticity of cessation to be 0.47, but here the parameter estimate for price was insignificant, indicating that the elasticity was substantially driven by variation in cigarette excise taxes and antismoking sentiment. Finally, as discussed within "*Initiation of smoking*" earlier in this section, they used variation in cigarette taxes faced by young adults who moved across state lines between 1992 and 2000 versus young adults who remained in the same state in 1992 and 2000. In this specification, cigarette taxes were found to have a positive impact on smoking cessation among young adults only for those who moved to a different state in those 2 years. The price elasticity of cessation among those who moved was relatively large (1.49), and the authors concluded that despite the lack of significance of price in this specification, most likely owing to the small sample (n = 321), price is likely to play a strong role in decisions to quit smoking among young adults.

Finally, using an experimental framework, Ross and colleagues (2005) examined the expected reaction to a future price increase among smokers in high school. The authors used cross-sectional data collected in 1996 for the Study of Smoking and Tobacco Use Among Young People, which contained information on individuals' current smoking status and expected smoking behavior after a hypothetical change in cigarette price. After controlling for smoke-free air laws and youth access laws, the authors found increases in cigarette prices to have a strong positive impact on decisions by youth to quit smoking: the estimated price elasticity of cessation ranged from 0.895 to 0.930.

Other smoking transitions. In a study that looked at smoking transitions other than initiation or cessation, Tauras (2005) examined the impact of cigarette prices on such transitions among youth and young adults in the United States. This author examined the transition from nondaily to daily smoking and the transitions from light smoking intensity (defined as 1–5 cigarettes per day) and moderate smoking intensity (defined as 10 cigarettes per day on average) to higher intensities. Tauras (2005) employed baseline surveys from the 1976–1993 longitudinal component of MTF data along with follow-up surveys through 1995 in the analyses and controlled for antismoking sentiment with a variety of techniques. These included having separate indicators for whether the individual resided in a tobacco-producing state or resided in Utah, using U.S. Census Bureau division fixed effects to capture differences between these divisions in smoking sentiment, and estimating the smoking progression equations on a subsample of the respondents who did not reside in either a tobacco-producing state or in Utah during the time the survey was conducted. Cigarette prices were found to have a strong negative impact on all of the estimated smoking transitions. In particular, the estimated mean price elasticities of daily uptake, moderate uptake, and heavy uptake were -0.646, -0.576, and -0.412, respectively. These results indicate that a 10% increase in cigarette prices will decrease daily uptake, moderate uptake, and heavy uptake by an estimated 6.46%, 5.76%, and 4.12%, respectively. These findings clearly indicate that increases in cigarette prices will prevent many young adults from progressing into higher intensities of smoking.

Other tobacco products. Numerous studies on the economic determinants of demand for cigarettes among youth have been published during the past decade, but very few recent econometric studies have been published on the impact of taxes on other tobacco products.

In one such study, Tauras and colleagues (2007) used data extracted from the 1995–2001 national YRBSs to examine the impact of taxes on smokeless tobacco on use of this product among male high school students. The estimates developed clearly indicate that higher taxes on smokeless tobacco would significantly reduce the number of male students who use this product and the number of days they would use it. The estimated tax elasticities of the prevalence of smokeless tobacco ranged from -0.197 to -0.121, and the estimated tax elasticities of days using smokeless tobacco ranged from -0.085 to -0.044. The study also found that cigarette prices had a significant negative impact on both the prevalence of smokeless tobacco and the number of days that male high school students used smokeless tobacco. The estimated cross-price elasticity of the prevalence of smokeless tobacco was -0.715, and the cross-price elasticity of the number of days of use of smokeless tobacco was -0.413. These estimates indicate that a 10% increase in the price of cigarettes would decrease the prevalence of smokeless tobacco by an estimated 7% and would lower the number of days using smokeless tobacco by an estimated 4% among male high school students. Thus, the estimates indicate that smokeless tobacco products and cigarettes are economic complements in consumption for young males. These findings are particularly important in light of the fact that the cigarette companies have purchased smokeless tobacco companies and are now actively promoting dual use of cigarettes and smokeless tobacco with the same branding (e.g., Marlboro Snus and Camel Snus) (Mejia et al. 2010). (More data on the use of multiple tobacco products by young males can be found in Chapter 3.)

Finally, Ringel and colleagues (2005) used data from the 1999 and 2000 waves of the National Youth Tobacco Survey to estimate the impact of cigar prices on demand for cigars among adolescents in grades 6–12. After controlling for laws on smoke-free air and on youth access, the researchers found the price of cigars to be inversely related to the prevalence of cigar use among youth. Specifically, the price elasticity of the prevalence of cigar smoking among youth was estimated to be -0.34.

Tax Avoidance

A preponderance of the aforementioned studies on the effects of price on the demand for tobacco products among adolescents used individual-level survey data and state-level price data. Aside from the problem of intrastate variation in prices, using average prices within a state does not account for an individual's opportunities to avoid taxes. For example, some individuals living near American Indian reservations or close to the border of a state with lower taxes on cigarettes will be able to pay less than the average price for cigarettes in their own state. Thus, when using individual-level data, this type of measurement error in the independent variable (i.e., price) will likely result in an underestimate of the true price elasticity of demand. There will be an underestimate of the response to price because some smokers will maintain their consumption after a tax increase by turning to cheaper (tax-avoided) cigarettes, making it look as though the tax increase had little or no impact on their consumption. Future studies on demand that account for a person's opportunities for tax avoidance are warranted.

Summary Regarding Taxation and Pricing

A few general conclusions can be drawn from recent studies on the effects of taxes and prices on tobacco consumption among youth and young adults:

1. Most of the research over the past decade has concluded that increases in cigarette prices lead to reductions in the prevalence of smoking and its intensity among youth and young adults.

2. A majority of the existing research suggests that the effects of price on smoking prevalence involve both a decrease in initiation of smoking among youth and an increase in cessation among young adults.

3. Most of the recent research has concluded that adolescents and young adults are more responsive than adults to changes in cigarette prices.

4. Limited evidence suggests that higher cigarette prices will prevent young adults from progressing into higher intensities of smoking.

5. A few recent studies have found an inverse relationship among adolescents between product-specific tobacco taxes (or prices) and the propensity to use smokeless tobacco, the intensity of its use, and the prevalence of cigar smoking.

6. The magnitude of the impact of taxes (or prices) on the demand for cigarettes seems to depend on how the model controls for antismoking sentiment.

Future research that uses a large number of waves of longitudinal data on adolescents and young adults during a period of significant changes in tobacco taxes and prices should be helpful in obtaining the most precise estimates for the impact of price on the intensity, prevalence, initiation, and cessation of smoking, smokeless tobacco use, and on other tobacco use transitions.

Policies on Clean Indoor Air

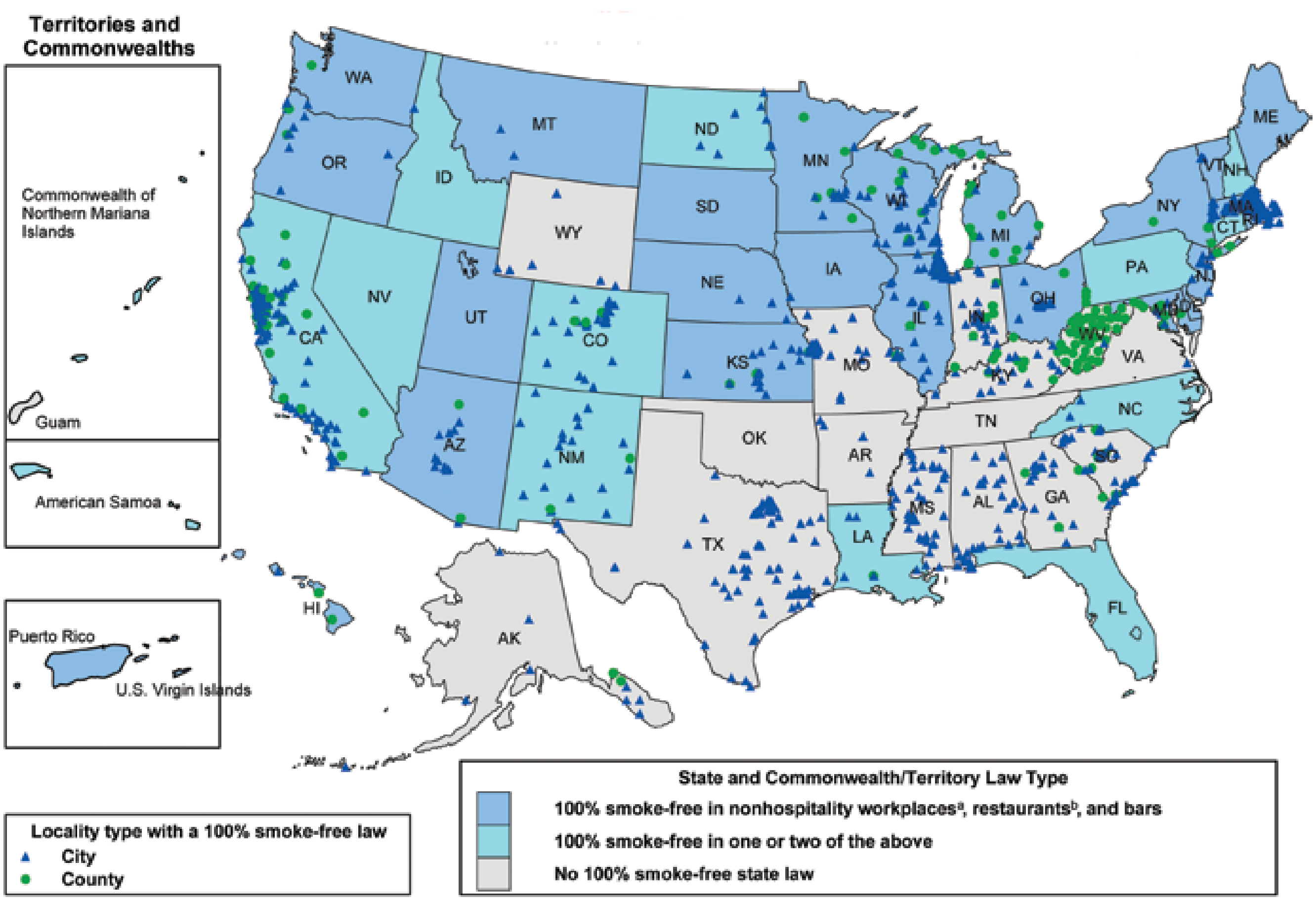
Policies on clean indoor air take the form of legislation and/or regulations at the federal, state, local, and institutional levels that prohibit smoking in specified locations, such as workplaces, public places, restaurants, bars and casinos, schools, day care centers, and health care facilities (USDHHS 1989, 2000b). Although there have been laws on clean indoor air for more than 30 years, their coverage has expanded dramatically in recent years. As of July 1, 2011, 23 states, the District of Columbia, and Puerto Rico have laws that prohibit smoking in all workplaces, including bars and restaurants (American Nonsmokers' Rights Foundation 2011b). The movement for laws on clean indoor air largely began at the local level, and many of the states without comprehensive laws have cities or counties with such laws. The American Nonsmokers' Rights Foundation estimated that as of July 1, 2011, comprehensive local and/or state laws on clean indoor air covered 48.0% of the U.S. population (American Nonsmokers' Rights Foundation 2011a). Figure 6.3 provides a map of the implementation of these laws, (American Nonsmokers' Rights Foundation [2011a]).

Many locations are smoke-free, because of their potential effects on youth. According to the CDC School Health Policies and Programs Study from 2006, in that year 70% of states as well as 95% of school districts included in a nationally representative sample prohibited smoking by students in school buildings, grounds, vehicles, and off-campus school-sponsored events (Jones et al. 2007). However, only 47% of the states but 78% of the school districts had smoke-free schools in which the same restrictions applied to staff (Jones et al. 2007). At least 466 U.S. colleges and universities are completely smoke-free, which includes having 100% smoke-free residential housing policies (American Nonsmokers' Rights Foundation 2011d). On the basis of data from the Tobacco Use Supplement of the Current Population Survey (CDC 2008c), CDC reported that in 2007 the median proportion (by state) of households with smoke-free policies for everyone living in or entering the home was 66%. Finally, smoking has been prohibited in vehicles when children are present in nine U.S. cities or counties, four states, Puerto Rico, eight Canadian provinces/territories, and five Australian states (Blumenfeld 2008; Global Advisors Smokefree Policy 2011).

To this point, little evidence is available about sociodemographic disparities in the coverage of smoke-free policies in public and private locations. In one study, Skeer and coworkers (2004) examined differences in community characteristics in relation to the strength of their local policies on clean indoor air in public places; they found that towns with higher education levels and greater per capita income were more likely to have the most restrictive policies. A recent CDC report using 1999–2004 National Health and Nutrition Examination Survey (NHANES) data found that youth were three to four times as likely as adults to be exposed to secondhand smoke in the home (CDC 2008a). In this study, Black non-Hispanic persons were the most likely and Mexican Americans the least likely to be exposed to secondhand smoke at home, and low-income families were three times as likely to be exposed as their counterparts in the highest income group.

The primary purpose of laws and policies on clean indoor air is to protect smokers and nonsmokers alike from exposure to the toxic effects of secondhand smoke. However, a growing body of evidence suggests that these policies may have the additional benefit of producing lower

Figure 6.3 Map of 100% smoke-free air laws, United States, July 1, 2011



Source: American Nonsmokers' Rights Foundation 2011a.
Note: American Indian and Alaska Native sovereign tribal laws are not reflected on this map.
[a]Includes both public and private nonhospitality workplaces, including, but not limited to, offices, factories, and warehouses.
[b]Includes any attached bar in the restaurant.

smoking rates among youth and young adults. Although the mechanism for this effect is not clear, these laws could result in lower visibility of role models who smoke, fewer opportunities to smoke alone or with others, and diminished social acceptability and social advantage for smoking (Alesci et al. 2003; Eisenberg and Forster 2003; Wakefield and Forster 2005). Dinno and Glantz (2009) showed that, while smoking prevalence and cigarette consumption were higher in people with low education and income (using the 2002 Tobacco Use Supplement to the Current Population Survey), this population exhibited the same reductions in smoking associated with the presence of clean indoor air laws and tax increases on tobacco products as did people in higher education and income groups.

Effects of Clean Indoor Air Laws on Smoking by Youth

The first evidence that laws and policies on clean indoor air could reduce adolescent smoking came from cross-sectional studies. Liang and colleagues (2003), who reviewed studies on the effects of tobacco control policies, including the effects of clean indoor air laws on youth smoking rates, found that restrictive laws and workplace policies were an effective tool for reducing smoking among youth. They also reviewed the evidence concerning smoking policies in households and found several studies showing a strong inverse relationship between the presence of such policies and the chances of trying smoking as well as experimentation (Liang et al. 2003). Since that review, McMullen and colleagues (2005) used data from both the YRBS and the National Survey on Drug Use and Health (NSDUH) to examine the relationship between the prevalence of youth smoking at the state level and the "state clean indoor air law score" as reported by the State Cancer Legislative Database. For both sets of data, the strength of laws on clean indoor air was inversely related to the prevalence of smoking among youth.

Using the longitudinal data on young adults from MTF, Tauras (2004) found that stronger restrictions on smoking in private worksites and public places increased the probability of smoking cessation among young adults. Later, Siegel and colleagues (2005, 2008) published two papers from a longitudinal study of adolescents (n = 3,834) in Massachusetts; comparing baseline figures and the 2-year follow-up surveys they reported that youth who lived in a town with a strong smoke-free ordinance for local restaurants were significantly less likely to progress to regular smoking than were youth in towns where such restrictions were either weak or of medium strength (Siegel et al. 2005). These researchers reported that at the 4-year follow-up, youth in the group with a strong ordinance on smoking in restaurants had reduced odds for both overall progress to established smoking and transition from experimentation to regular smoking (Siegel et al. 2008). More recently, Klein and colleagues (2009) reported a much smaller effect in a report from the Minnesota Adolescent Community Cohort Study, which included 4,233 Minnesota youth who were 11–16 years of age at baseline. Participants were interviewed every 6 months from 2000 to 2006. The authors found a 6% lower likelihood of monthly smoking and a 13% lower likelihood of weekly smoking if youth lived in areas with a strong policy on clean indoor air. The study also found a strong association between a household smoking ban and reduction in the likelihood of smoking by youth.

Prohibitions by colleges on smoking may have characteristics of worksite, school, and household smoking bans because they can affect one or more aspects of the students' lives. As discussed in "School-Based Programs to Prevent Smoking" later in this chapter, the amount of research on the role of school policy in preventing youth smoking is surprisingly small and, similarly, there are few published reports on college policies regarding students' smoking behavior. Using data from the 1999 survey of the Harvard School of Public Health College Alcohol Study, Wechsler and associates (2001) found that current smoking prevalence was lower among students living in smoke-free campus residences than among those living in unrestricted residences. In addition, smokers who started smoking in college reported smoking fewer cigarettes if they lived in smoke-free residences. Czart and associates (2001), who used 1997 survey data from the Harvard School of Public Health College Alcohol Study, found that complete smoke-free policies lowered the intensity of smoking and strong enforcement decreased participation in smoking, but both findings were of only marginal significance statistically.

Effects of Home Smoking Policies on Youth Smoking

Restrictions in the home may be a powerful tool to reduce smoking by youth. In a report on 1996 survey data for high school students across the United States, from the Study of Smoking and Tobacco Use Among Young People, Wakefield and colleagues (2000) found that a 100% smoke-free policy for everyone in the home was associated with a reduced likelihood that youth would advance from their current smoking stage for every stage from susceptible to established smoker. In addition, in a study of youth 15–17 years of age from the Current Population Surveys of 1992–1993 and 1995–1996, those who lived in smoke-free households were only 74% as likely to be smokers as those who lived in households with unrestricted smoking (Farkas et al. 2000), independent of the smoking status of individuals in the household. Furthermore, youth already smoking were more likely to quit. However, partial restrictions showed no effect on smoking. Later, analysis of the 1998–1999 Current Population Survey produced the same results and extended them to young adults living with parents (Clark et al. 2006). In both adolescents and young adults, complete bans on smoking were associated with never having been a regular smoker, not being a current smoker, and having quit smoking. The adjusted odds of being a current smoker (using never smoking as the referent) were about 50% lower in households with strict smoking rules than in those without rules on smoking.

At this point, more information is needed on how home smoking policies vary by sociodemographic characteristics. Some information is available, however, on American Indian youth. In a recent study of a convenience sample of 336 urban youth who were American Indian, 43% reported living in a household that banned smoking for everyone (Forster et al. 2008). Lifetime nonsmokers to date were significantly more likely to live in a completely restrictive household than those who had ever smoked, and bans on smoking were associated with level of smoking among these youth. There is also a positive effect of smokefree legislation that applies to workplaces and public places on the prevalence of voluntary home smokefree policies (Cheng et al. 2011; Mills et al. 2011; Hovell et al. 2011). Cheng and colleagues (2011) found that living in a county fully covered by a 100% clean indoor air law in workplaces, restaurants, or bars is associated with an increased likelihood of having a voluntary 100% smoke-free home policy both for people living with smokers (OR = 7.76; 95% CI, 5.27–11.43) and not living with smokers (OR = 4.12; 95% CI, 3.28–5.16).

Effects of Home Smoking Policies on Exposure of Youth to Secondhand Smoke

In addition to reducing youth smoking, bans on smoking in the household have the potential to reduce youth's exposure to secondhand smoke. Youth who reside in multiunit housing are particularly at risk of exposure, even if they do not live with a smoker, as smoke can travel through walls, air ducts, windows, and ventilation systems (Wilson et al. 2011). An analysis of NHANES data from 2001 to 2006 found that young people living in an apartment in which no one smoked had significantly higher cotinine levels (a biological measure of smoke exposure) than those living in a detached home in which no one smoked (Wilson et al. 2011). In 2009, the U.S. Department of Housing and Urban Development issued a memorandum strongly encouraging public housing authorities to implement nonsmoking policies in some or all of their public housing units (Winickoff et al. 2010).

Summary Regarding Policies on Clean Indoor Air

Laws and policies on clean indoor air support multilevel efforts that can be effective in reducing exposure to secondhand smoke and potentially youth smoking. This argues for a comprehensive approach to reducing smoking among youth.

Regulations on Youth Access

One component in a comprehensive strategy to prevent smoking among youth is restricting the supply of cigarettes to minors. Youth can obtain cigarettes in two ways: commercially (from a store or vending machine) and socially (borrowing, buying, or stealing them from other youth or adults). A variety of strategies aim at restricting commercial access, and these strategies in turn can limit social access by reducing the total number of cigarettes accessible to youth.

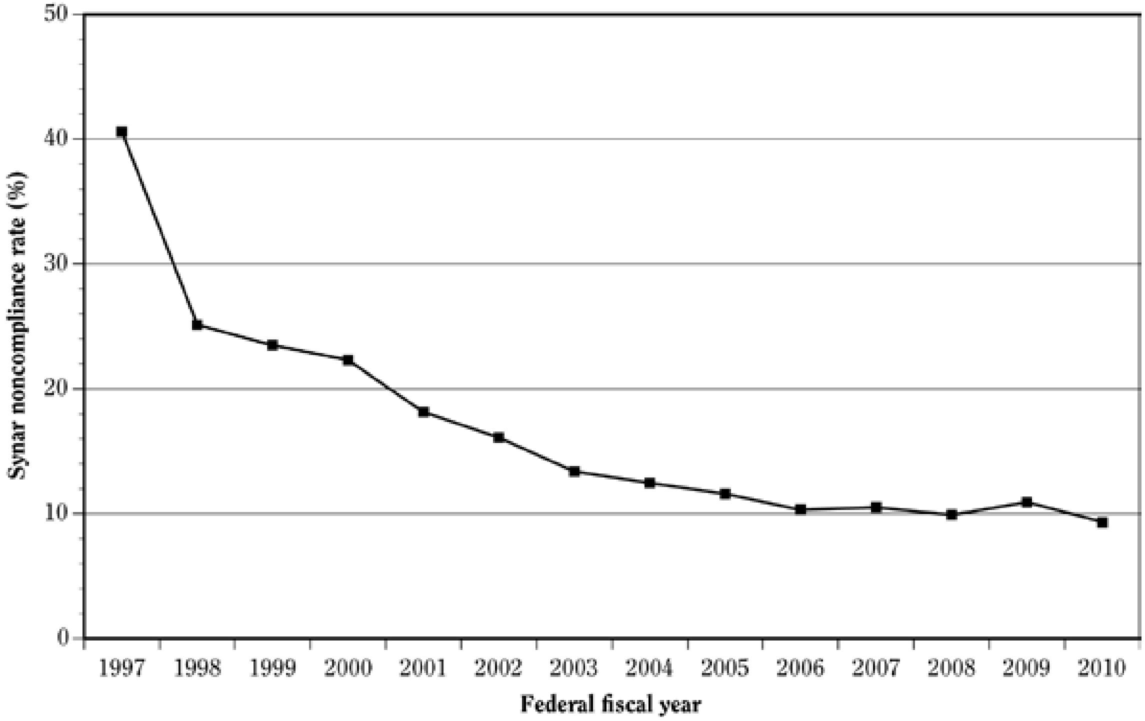
Laws restricting youth access became widespread after the 1992 Synar Amendment (*ADAMHA Reorganization Act* [1992]) mandated that all states and territories legally prohibit the sale of tobacco to minors by the middle of 1995. Before this amendment, youth obtained cigarettes from commercial sources with relative ease (DiFranza and Brown 1992; CDC 1993, 2002; USDHHS 1994; Naum et al. 1995). In the 1994 Surgeon General's report (USDHHS 1994), the average over-the-counter success rate for purchase attempts by minors was reported to be 67% (based on 13 studies conducted between 1987 and 1993). The Synar Amendment called for the states to enforce laws on youth access through compliance checks and to report progress in this area to the Secretary of USDHHS. The annual goal as stated by the federal government is to reach the minimum percentage of sales to underage decoys in compliance checks. States noncompliant with the amendment's annual goals can have their monies from the Substance Abuse Prevention and Treatment block grant reduced (USDHHS 1995). Figure 6.4 shows that since the passage of the amendment, the noncompliance rate (as measured by the states' mandated test purchases under that law) has dropped substantially.

Local jurisdictions—including states, counties, and cities—also have several policy options that address the access of youth to retail purchases, including requiring the licensure of tobacco retailers and banning self-service sales of tobacco if the authority of these jurisdictions has not been preempted by prior legislation. Another option for local jurisdictions is penalizing youth for possession, purchase, and use of tobacco products. Possible penalties include citations, fines, and ordering the youth to attend cessation classes.

Possible Strategies

The three possible strategies for encouraging compliance to age-of-sale laws are taking appropriate steps in the retail environment, educating merchants, and actively enforcing the laws. Taking appropriate steps in the retail environment includes requiring that tobacco products be located behind the counter, posting signage informing customers that it is illegal for minors to purchase tobacco, and banning vending machines and self-service sales (Forster and Wolfson 1998). Taking these steps reduces the likelihood that youth will obtain cigarettes even if the store's clerk is inattentive. Education of merchants is an attempt to inform retailers of the laws; it is assumed that educated retailers would be less likely to sell cigarettes to minors (Rigotti 1999). "Self-enforcement" and education of merchants are not enough, however, to prevent minors from purchasing tobacco from commercial establishments (Feighery et al. 1991; DiFranza and Brown 1992; Landrine et al. 1996; Gemson et al. 1998; Altman et al. 1999; Rigotti 1999); penalties are needed. Penalties for selling tobacco to minors include revoking store licenses and fining merchants and clerks who sell to youth, both of which are usually done after a random compliance check.

Figure 6.4 Synar noncompliance rate by year: average of 50 states and the District of Columbia weighted by state population



Source: Substance Abuse and Mental Health Services Administration 2011.
Note: With the Synar Amendment (Section 1926 of Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act, Public Law 102-321), Congress mandated that all states and territories must legally prohibit sale of tobacco to minors by the middle of 1995. In 1997, Arkansas, Kentucky, Montana, Nevada, North Dakota, Oregon, and Texas did not report rates. In 1998, Delaware and Rhode Island did not report rates.

The 1992 Synar Amendment can be seen as a supply-side strategy for limiting and controlling the supply of cigarettes. Its premise is that if youth-access policies are well enforced, they will lead to less youth smoking. This sentiment is echoed by CDC, which includes control of youth access in its *Best Practices for Comprehensive Tobacco Control Programs Guide* (CDC 2007b) as well as in *Healthy People 2010*, which specifies policy goals on youth access (USDHHS 2000a).

Another strategy is penalizing youth for possessing, using, or purchasing tobacco. The underlying theory behind PUP strategies is that these consequences will reduce demand among youth for tobacco. One potential downside of this approach, as discussed in Chapter 5 (Wakefield and Giovino 2003), is that punitive legal measures directed at youth may distract from focusing on the role of the tobacco industry or retailers.

Criteria for Evidence of Prevention

Of the two key criteria for evidence that strategies to limit access are effective, the first is that the supply of cigarettes available to youth is actually reduced; the second is that strategies affect the prevalence, intensity, initiation, and/or cessation of youth smoking. Rigorous evaluation of available strategies presents challenges, but such evaluations are necessary to determine whether these strategies meet the goals of prevention.

Effects of Interventions to Limit Youth Access: Prior Reviews

Several English-language systematic analyses have been conducted of interventions to limit the access of youth to tobacco, with the key paper a Cochrane review conducted by Stead and Lancaster (2005). These authors concluded that policies to limit youth access and enforcement of these policies can improve the compliance of retailers, and the prevalence of smoking will be affected if the commercial supply is sufficiently restricted through these means. The authors also concluded that enforcement had a greater effect than did the education of merchants, but as with all interventions, they noted that sustained compliance is a challenge.

The second review in this area was a meta-analysis of policy on youth access based on data from nine studies; the authors found no effect on smoking at any threshold of access control (Fichtenberg and Glantz 2002; Ling et al. 2002), although there have been some concerns about the methods used in this meta-analysis (DiFranza 2002; Jason et al. 2003). Levy and Friend (2002) also examined the empirical studies of policies on youth access and concluded that a comprehensive approach that includes active enforcement of laws, community mobilization, and training of merchants is the most promising way to control access. Even so, these reviewers found that past studies showed the effects of these policies on the prevalence of smoking among youth to be inconclusive (Levy and Friend 2002; Task Force on Community Preventive Services 2005). More recently, a 2009 study by DiFranza and colleagues examined the association between the compliance of merchants with youth access laws and current daily smoking while controlling for cigarette prices, restaurant smoking bans, media campaigns, and demographic variables. The study showed that the odds of daily smoking were reduced by 2% for each 1% increase in merchant compliance (DiFranza et al. 2009).

Wakefield and Giovino (2003) reviewed the empirical evidence for PUP laws and their enforcement and concluded that these laws were associated with reduced smoking among youth only for those young people who were unlikely to initiate smoking. Notably, both the existence of PUP laws and their enforcement have become extremely common in the United States.

Effects of Interventions to Limit Youth Access: Current Evidence Base

Critics of strategies that promote policies to limit youth access have argued that even if the commercial supply of cigarettes could be successfully reduced, the social supply of cigarettes would grow to fill the gap (Ling et al. 2002). Indeed, in communities where cigarettes have become relatively difficult for underage youth to purchase from commercial sources, adolescent smokers have increasingly relied on social sources (Forster et al. 1998; Altman et al. 1999; DiFranza and Coleman 2001). But this trend from relying on commercial sources to using social sources appears to be associated with less consumption of cigarettes among youth (DiFranza et al. 2009). Another finding of interest is that among adolescents who smoke, the heavier smokers are less likely to use social sources as their only source of cigarettes, although they are more likely to be a social source for other adolescents (Wolfson et al. 1997; Harrison et al. 2000; Forster et al. 2003). Finally, Widome and colleagues (2007) have demonstrated a trend in which a greater proportion of youth become heavy smokers in communities where more adolescent smokers exclusively use commercial sources, thus reinforcing the need for strong policies to restrict commercial access for young people.

The impact of the Synar Amendment appears to have varied by sociodemographic characteristics, and there has been some research on how restrictions on access differentially affect youth from various demographic groups. In a Florida study, there was evidence that retailers in Hispanic neighborhoods in Miami (although not in the other cities studied) were more likely to sell tobacco to minors (Asumda and Jordan 2009). In contrast, stores in neighborhoods with a high percentage of Black residents were not more likely to sell tobacco to minors (Asumda and Jordan 2009). For individual youth, race/ethnicity may be associated with their chances of successfully purchasing tobacco. For example, a recently published study examined compliance checks in California from 1999 to 2003 and found more sales to Black and Asian underage decoys than to their White counterparts (Landrine et al. 2008). Earlier, Chaloupka and Pacula (1999) found that although restrictions on youth access had no impact on smoking rates among White youth, they were associated with a lower prevalence of smoking among Black youth.

Discussion Regarding Youth Access

Data on whether interventions to restrict access can lead to a reduction in the number of retailers selling tobacco to minors are mixed, although the Community Preventive Task Force concluded that community mobilization combined with additional interventions, such as stronger local laws directed at retailers, active enforcement of retailer sales laws, and retailer education with reinforcement are recommended (Task Force on Community Preventive Services 2005). A recent comprehensive review also supports the efficacy of enforced reductions in the sales of cigarettes to minors (DiFranza 2011).

Bans on Advertising

In discussing advertising it is important to clarify what it is and what it is not (see Richards and Curran 2002). Advertising is a type of marketing that uses media to create positive product imagery or positive product associations or to connect the product with desirable personal traits, activities, or outcomes (Richards and Curran 2002). Marketing can be defined as the mix of all activities designed to increase sales (including both advertising and promotional activities). Advertising, for example, could take the form of ads in print; such an ad might show attractive couples smoking cigarettes in an appealing environment. Promotional activities usually do not rely on advertising and can take a variety of forms, including reducing the price paid by consumers. Price promotion may take the form of coupons, merchandise add-ons, and free samples. Another form would be allowances paid to retailers to increase their profit margins; in return, the retailer places the tobacco products in favorable places within the store. The retailer could pass the promotional allowance on to consumers in the form of lower prices. Other types of promotion include sponsorship of events, sale or distribution of branded items, and contests that encourage user participation in exchange for prizes.

Statistical Issues in Tobacco Advertising

Many empirical studies on the effects of cigarette advertising can be found in the academic literature that have used a variety of methodologies. Some have relied on small samples of data to address a specific question; for example, some small surveys have measured smoking behavior, exposure to advertising, receptivity or attitudes to tobacco advertising, or brand awareness during a baseline period and again during follow-up. Other studies have relied on large-scale data sets developed for public use, while some studies have used aggregated data at the national or international level. Advertising studies also can be divided into those using self-reported data on advertising, such as exposure or impact, and those containing market-level data. Studies have also addressed the impact of bans on advertising.

Regardless of the type of study, each raises statistical issues that researchers must consider carefully. These issues include the problems of dealing with measurement error, of properly adjusting for the effects of time by using a weighted average of current and past-period advertising, and the needs to specify an estimation equation, address the problem of uncontrolled individual heterogeneity, and deal with endogeneity, or reverse causality.

Measurement error is common in studies that rely on expenditures for advertising or on measurements of exposure to ads. The data here are either self-reported or are market-level data purchased from a firm specializing in advertising data. Measurement error will generally result in bias toward a finding of no effect of advertising. Self-reported advertising data contain measurement error because individuals who are considering use of a product, or who are current users, will generally be more aware of advertising for that product than other individuals will be. In the case of cigarettes, for example, individuals who are considering smoking, or who smoke, will usually report awareness of more tobacco ads than will other individuals. Thus, controlling for awareness levels will likely result in underestimating the impact of those most likely to smoke. Market-level data can be interpreted erroneously because everyone in the market is assigned the same value for assumed exposure to advertising, but not everyone in the market will actually have the same exposure. Thus, market-level data should preferably be evaluated by using a probability measure of exposure, since those most exposed are likely to be more strongly influenced by advertising and using a probability measure increases variability and the ability to detect a relationship between advertising and behavior.

The second issue, dealing with the effects of time, can also be challenging. For example, advertising in the current (present) period will have a lingering although smaller effect in the next period, but how much the effect declines over time remains unclear. In the case of cigarettes, research such as that by Boyd and Seldon (1990), found that the effects of advertising depreciate fully within a year. And yet, advertising has lingering effects as noted, and knowledge of these effects is the basis for a widely used technique known as "pulsing." A pulse is a burst of advertising, in a specific market, that lasts for only a short time; after a period of time with no or minimal advertising, the market is exposed to another pulse. These pulses create variability in the amount of actual advertising from one period to the next, but because of lingering effects, a stock of advertising is created. To account for this stock of advertising, researchers should measure advertising as a weighted average of current and past-period advertising.

The third issue, specification of the estimation equation, is important because advertising has a diminishing marginal product. In brief, increments in advertising result in ever smaller increments in sales. That there is diminishing outcomes is a well-established tenet of economics and advertising; the important implication of this principle is that the functional relationship between advertising and sales should be specified as nonlinear.

The fourth issue, addressing the problem of not controlling for individual heterogeneity, can also be a vexing one. The ideal method for estimating the effects of advertising on smoking is a randomized trial, but ethical considerations prohibit experimentation with cigarette advertising. Without random selection, all individual characteristics that might influence smoking behavior must be controlled to ensure that the variation in advertising is the factor that causes the variation in smoking. This is not easily accomplished in standard regression models, however, and thus bias induced by heterogeneity is common. Fortunately, data sets from panels of individuals can be used to control for time-invariant individual characteristics, such as gender or race/ethnicity, and reduce this type of bias.

The fifth and final issue—endogeneity, known also as reverse causality—also creates bias; this is a problem in any study of advertising. Here, for example, rather than advertising driving revenues, revenues drive amounts of advertising; this may be particularly true for mature products. Thus, if smoking decreases, there may be less sales revenue to use for advertising, and advertising may decrease. The problem in this case is that lower advertising might be misunderstood as responsible for lower sales. This may also be a problem in studying the effects of advertising bans: a high level of smoking can lead to public pressure to legislate such bans and, for example, give the impression that such high levels are associated with bans. Endogeneity can be addressed with a well-identified structural model or a natural experiment that examines already existing data.

A partial ban on advertising may not reduce the total level of advertising but should reduce the effectiveness of the remaining media that are not banned (a ban on one or more media will generally result in substitution into the remaining media). This apparently counterintuitive phenomenon should be seen because each medium is subject to diminishing marginal product; the increased use of the nonbanned media will result in a lower average product for these media. Firms may try to compensate with more advertising, or they might increase the use of other marketing techniques, such as promotional allowances to retailers. From the research perspective, because bans on particular media result in cessation of advertising in those media, there are fewer issues overall with measurement error, diminishing marginal product, or lingering effects. Heterogeneity and reverse causality could still create problems for the investigator, however, depending on the nature of the data. In addition, researchers should be aware that there must be comprehensive bans in place to avoid substitution into other media. Finally, the researcher must control for other marketing activities. Data from a single country could reduce some problems caused by reverse causality in studies on bans, and longitudinal or aggregate data could reduce problems with heterogeneity.

Effects of Advertising Bans: A Prior Review

Lancaster and Lancaster (2003) reviewed 21 studies of advertising bans and found that 10 of these reported significant negative coefficients indicating that the bans on advertising were associated with decreased smoking or consumption. Of the 199 reported coefficients, 29.1% were negative and significant, 5.5% were positive and significant, and 65.3% were insignificant. Some of the coefficients may have been nonsignificant because the bans were limited to a few media, allowing substitution into other media. None of these studies accounted for the possibility of endogeneity (reverse causality).

Effects of Advertising Bans: Current Evidence Base

In a study of bans on advertising, Saffer and Chaloupka (2000) used an international data set from 22 countries that covered 1970 to 1992. Bans were considered weak if they were nonexistent or only one or two kinds of media, such as television and radio advertising, were banned; limited, if three or four media were banned; or comprehensive, if five, six, or seven media were banned. In an analysis limited to 1984 to 1992, they found that limited bans were not effective but that comprehensive bans were effective. Their results suggest that moving from a limited to a comprehensive set of bans can have a compounding effect, which is consistent with the theory that limited bans allow substitution of other media. The problem of endogeneity was not considered.

Iwasaki and colleagues (2006) found that advertising restrictions required by the 1998 Master Settlement Agreement decreased consumption of cigarettes in the United States. These restrictions included a ban on outdoor advertising and restrictions on youth-targeted advertising; in addition, the agreement provided funds for counteradvertising. Earlier, Chung and colleagues (2002) reported that the agreement's restrictions on advertising to youth were easily avoided; they also noted that counter-advertising took a few years to initiate.

Iwasaki and associates (2006) constructed a time series data set from 1955 to 2002 for the United States in which the regression equations included interactions of advertising expenditures with dichotomous variables for four progressively more restrictive periods for advertising during the timeframe in question. These periods were 1955 to 1967, 1968 to 1971, 1971 to 1997, and 1998 to 2002. A break was seen between 1967 and 1968 because the first Surgeon General's report on smoking was in 1964 (and related news on smoking causing lung cancer began in the 1950s and had substantial impact up to 1967). The 1971 break reflects the elimination of broadcast advertising, and the 1998 break reflects the Master Settlement Agreement. The coefficients from the first three periods were insignificant, perhaps because the United States did not have enough restrictions in place to prevent the substitution of television and radio advertising with other types of advertising and marketing activities. The coefficient from the final time period was both negative and significant, indicating that the agreement had reduced smoking. Thus, these data suggest that the most restrictive rules, including the ban on outdoor advertising, reduced smoking. Endogeneity was a problem, however, because, over time, sentiment against tobacco was increasing, and this sentiment would affect cigarette use as well as the passage of the Master Settlement Agreement. On the other hand, problems with controlling for heterogeneity of the population were reduced because aggregate data were used, but it should also be noted that there was no control for other forms of marketing. Data from the U.S. Federal Trade Commission (FTC 2011) indicated that other marketing expenditures increased dramatically after the Master Settlement Agreement.

Discussion Regarding Advertising Bans

According to FTC (2011), in 2008 more than $190 million was spent on cigarette advertising in the United States, but this represented only 1.9% of total monies spent for cigarette promotion (see Chapter 5, Table 5.3). Regardless, this amount of advertising constitutes a public health problem if it increases overall smoking or encourages youth to begin to smoke. The tobacco industry and associated researchers (e.g., Heckman et al., 2008) contend that there is no definitive research showing that advertising increases smoking, but this has now been countered with longitudinal research (see Chapter 5). Also, from a cost-benefit point of view, the potential public health advantage (such as in long-term worker productivity) of banning cigarette advertising is far greater than the private costs to tobacco companies and advertisers, and so a ban on such advertising makes sense from an economic perspective. As concluded in NCI Monograph 19: "The studies of tobacco advertising bans in various countries show that comprehensive bans reduce tobacco consumption. Noncomprehensive restrictions generally induce an increase in expenditures for advertising in 'nonbanned' media and for other marketing activities, which offset the effect of the partial ban so that any net change in consumption is minimal or undetectable" (NCI 2008, p. 281).

Product Labeling

Health warnings on cigarette packages are a direct, cost-effective means of communicating information on health risks of smoking to consumers. At present, packages in most countries carry a health warning, but the position, size, and general strength of these warnings vary considerably across jurisdictions. In the United States, health warnings first appeared on cigarette packages in 1966 and in cigarette advertisements in 1972. Since 1984, U.S. cigarette packages have carried one of four government-mandated text warnings on the side panels of packages (Figure 6.5 shows the four warnings and an example). In some other countries, however, large pictorial warnings cover 50% or more of the package (Aftab et al. 1999).

Given their reach and frequency of exposure to users, tobacco packages are an excellent medium for communicating health information. A pack-a-day smoker, for example, is potentially exposed to the warnings more than 7,000 times per year in the process of getting a cigarette from the pack. These warnings are also unique among tobacco control initiatives in that they are delivered directly to smokers at both the point of sale and the time of smoking. As a result, warnings on cigarette packages are among the most prominent sources of health information for smokers in many countries. Indeed, smokers in Western countries report getting more information about the risks of smoking from packages than from any other source except television (Hammond et al. 2006). However, as the following sections discuss, the extent to which smokers, including youth, read, think about, and act upon the warnings depends heavily on the size, position, and design of these messages.

Effects on Youth of Current U.S. Health Warnings

A number of research studies indicate that the current U.S. text warnings have relatively little impact on youth smokers. Indeed, several studies of U.S. warnings suggest they are rarely noticed and suffer from low recall among youth, as illustrated by two studies that used eye-tracking equipment to examine attention paid to U.S. tobacco ads and recall of these warnings (Fischer et al. 1989; Krugman et al. 1994). The first study compared two existing U.S. health warnings in magazine ads with two "new" warnings and found that the "new" warnings were associated with more reading and attracted attention more quickly. However, relatively few respondents could accurately recall the wording or the general concepts of any of the four warnings. In the second study, adolescents were asked to view five tobacco ads that included a health warning. The average viewing time of the health warning was only 8% of the total time spent viewing the ads, and participants subsequently demonstrated a low recall of the warnings.

Brubaker and Mitby (1990), who conducted one of the few studies to examine U.S. text-based warnings on

Figure 6.5 Health warnings on cigarette packages in the United States

(1) SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy.
(2) SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.
(3) SURGEON GENERAL'S WARNING: Smoking By Pregnant Women May Result in Fetal Injury, Premature Birth, and Low Birth Weight.
(4) SURGEON GENERAL'S WARNING: Cigarette Smoke Contains Carbon Monoxide.

Example of warning label on U.S. cigarette package:

Source: Comprehensive Smoking Education Act (1984); Tobacco Labelling Resource Centre 2011b.

smokeless tobacco products, found results similar to those for Krugman and colleagues (1994): less than one-half of the persons (43%) exposed to the warnings recalled seeing them, and only one-third of those who recalled seeing them remembered the content of the message. Overall, the warning labels had no significant effect on whether adolescents would use the product.

More recent research suggests that although most youth report the U.S. cigarette health warnings to be "believable" (Cecil et al. 1996), few find them to be informative or relevant (Crawford et al. 2002). For example, in a series of focus groups conducted in 2001 among adolescents, most considered the warnings to be personally irrelevant and described the warnings as "vague," "stale," and "worn-out" (Crawford et al. 2002, p. 16).

In one of the few longitudinal studies of health warnings among youth, Robinson and Killen (1997) examined the association between adolescents' knowledge of U.S. cigarette warning labels and subsequent smoking behavior by surveying 1,747 youth. At baseline, adolescent smokers were more familiar with the health warnings than were nonsmokers. When cigarette packages serve as the medium for health warnings, however, one would expect that consumption levels at baseline would be associated with knowledge of the warning labels.

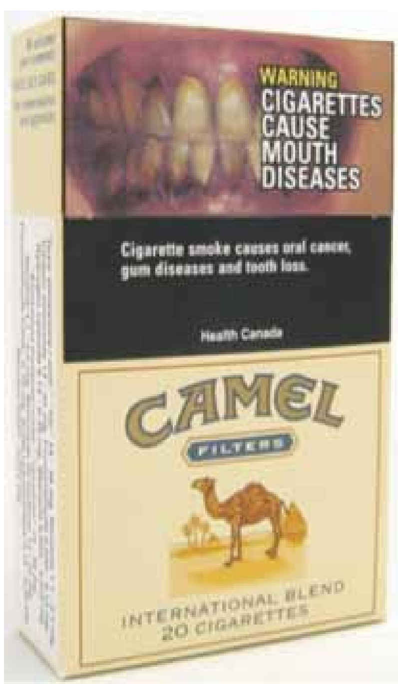
Effects on Youth of the Size and Position of Health Warnings

Several studies demonstrate that an increase in the size of text warnings increases their impact (Environics Research Group 1999). For example, in studies in which Canadian youth were asked to rate the effectiveness of different health warnings, the largest warnings were most likely to be rated as effective (Environics Research Group 1999; Les Études de Marché Créatec 2008). These findings are consistent with research conducted among adults showing that smokers were more likely to recall larger warnings and often equated the size of the warning with the magnitude of the risk (*Health Education Journal* 1985; AGB Spectrum Research 1987; Cragg Ross and Dawson 1990; Centre for Behavioural Research in Cancer 1992; Action on Smoking and Health 1998; Strahan et al. 2002). Warnings that appear on the "front" or principal display area of packages are also likely to have greater impact. In one study, Rootman and Flay (1995) compared the effectiveness of U.S. and Canadian health warnings in 1995 among a youth sample. At the time, Canadian packages carried one of eight black-and-white text warnings on the front and back of packages, covering 25% of the display area on the package. Students were shown a package for 1 minute and then asked to recall everything they could about it. The most notable finding was that 83% of Canadian students mentioned the health warning on Canadian packs, a larger percentage than those who could recall the brand name. In contrast, health warnings on U.S. packs were recalled by only 6% of the U.S. students. A survey conducted with youth in The Netherlands also suggests that more prominent text warnings on the principal display area have relatively greater impact (Teeboom 2002). In addition, recent experimental research in Canada found that increasing the size of warnings from 50% to 75%, 90%, or 100% of the principal display area enhanced their impact among youth smokers and “vulnerable” youth nonsmokers (Les Études de Marché Créatec 2008).

Effects on Youth of Pictorial Health Warnings

In 2000, Canada became the first country in the world to introduce pictorial warnings on tobacco packages (Figure 6.6 provides an example). A series of focus groups and population-based surveys conducted among Canadian youth around this time suggested that large pictorial warnings were considerably more legible and credible and more likely to be noticed than were text warnings (Environics Research Group 1999, 2000; Nilsson 1999). A survey taken in 1999 in Canada, the year before the large pictorial health warnings on cigarette packages were introduced, found that youth in that country—both smokers and nonsmokers—supported the use of pictorial health warnings on cigarette packages (Environics Research Group 1999). When shown health messages with and without pictures, 80% of youth reported that the message with the picture was more noticeable. Three years later, in a national survey of more than 19,000 Canadian youth between 11 and 15 years of age, the majority found the pictorial health warnings on cigarette packages to be believable and agreed that health-warning messages should be on cigarette packages (Chaiton et al. 2002). In a large national study conducted following implementation of the pictorial warnings, about 95% of Canadian youth reported that pictorial health warnings communicated the risks of smoking better than text-only warning labels (Bonnie et al. 2007, p. 294). Overall, the believability of the health warnings and the degree of endorsement were either similar to, or above, levels measured in 1994, 6 years before introduction of the large pictorial warnings. This research demonstrates that introducing large pictorial warnings does not decrease support or credibility among youth for messages about the health risks of cigarettes.

Figure 6.6 Pictorial warning on cigarette package in Canada



Source: Tobacco Labelling Resource Centre 2011a.

In addition, a series of 12 cross-sectional surveys were conducted with Canadian youth before and after the implementation of the large pictorial health warnings in 2000; these surveys showed significant increases in the frequency with which youth noticed, read, and thought about the health warnings after the pictorial messages were introduced. The most recent survey, in 2006, found that 86% of youth smokers reported the messages as effective in informing them about the health effects of smoking; 70% said that the messages had been effective in getting them to try to quit smoking; 66% reported that the messages had increased their desire to quit; and 56% said they smoked less around others as a result of the messages (Environics Research Group 2006).

Evidence from focus groups in Australia supports these findings. For example, although many Australian youth expressed a general lack of concern about the effects of smoking, they nevertheless reported being influenced by the health warnings (Elliott & Shanahan Research 2002). In particular, descriptive or emotive messages in the pictorial warnings had considerable impact, particularly those images portraying the external effects of smoking. Follow-up studies among Australian youth came to similar conclusions on the effectiveness of pictorial warnings (Elliott & Shanahan Research 2003; BRC Marketing & Social Research 2004). Evaluations have been conducted on pictorial warnings implemented in Australia (see Figure 6.7 for an example). A school-based study in

Figure 6.7 Pictorial warning on cigarette package in Australia

Source: Tobacco Labelling Resource Centre 2011c.

western Australia found that students were more likely to report they had read, attended to, thought about, or talked about health warnings after the pictorial warnings were implemented in 2006 (White et al. 2008a). In addition, experimental and established smokers were more likely to have thought about quitting and forgoing cigarettes, and intention to smoke was lower among those students who had talked about the warning labels and had forgone cigarettes (White et al. 2008a).

In addition to increasing perceptions of risk, pictorial health warnings have been found to undermine the brand appeal of packages (Clemenger BBDO 2004; Thrasher et al. 2007; Les Études de Marché Créatec 2008; Stark et al. 2008). In addition, more than 80% of Canadian youth in a 2006 survey indicated that large pictorial health warning messages made smoking seem less attractive (Environics Research Group 2006). Overall, findings on the effectiveness of large pictorial warnings among youth are consistent with research conducted among adults, which has found associations between larger pictorial warnings and greater health knowledge, increased motivation to quit smoking, and greater attempts to quit (Hill 1988; Tandemar Research 1996; Borland and Hill 1997a,b; Liefeld 1999; Environics Research Group 2001; Portillo and Antoñanzas 2002; Willemsen et al. 2002; Cavalcante 2003; Hammond et al. 2003, 2004, 2006, 2007; Koval et al. 2005; Willemsen 2005; O'Hegarty et al. 2006; Ramesh 2006; UK Department of Health 2006; Quit Victoria 2007; Thrasher et al. 2007).

Evidence from numerous studies of adult populations indicates that health warnings are more likely to be effective if they elicit stong emotions, are larger and more visible (CDC 2011a). Although fewer studies examining the effects of pictorial warning labels have been conducted with youth than with adults, findings across countries show that the pictorial warnings better communicate the risks of smoking to young people than do text-only warnings.

Effects of "New" and Rotating Health Messages

Health warnings that are new or periodically updated are likely to have greater impact among youth than will "older" warnings, even in the absence of changes in the size and position of the messages. Indeed, youth commonly report on the stale or ineffective nature of "old" warnings that remain unchanged for more than several years (Environics Research Group 1999, 2000; Crawford et al. 2002). According to research findings from adults, health warnings have their greatest impact shortly after implementation and decline in effectiveness over time (Borland and Hill 1997b; Hammond et al. 2007). This is consistent with the basic principles of advertising and health communications, which suggest that the salience of a communication is greatest upon initial exposure and erodes thereafter (Bornstein 1989; Blair 2000).

Discussion Regarding Warning Labels

Research conducted to date demonstrates that the effectiveness of health warnings among youth increases with their size and placement as well as with the use of pictures. Small text-only warnings located in nonprominent locations, such as the side of the package in the United States, have relatively little impact. Furthermore, pictorial warnings that cover a significant proportion (e.g., 50% or more) of the package are associated with increases in health knowledge and motivation to quit smoking. Pictorial warnings also have the potential to reduce sociodemographic disparities in health knowledge and tobacco use among youth (CRÉATEC + Market Studies 2003). The existing text warnings in the United States require a college reading level, but pictorial warnings are easily understood by those with low literacy skills, including young children, youth with lower levels of education, and youth who may be literate but not in the language of the text warnings, such as young people in some immigrant families (Malouff et al. 1992).

The significant evidence base that has been developed since several countries implemented pictorial warning labels on cigarette packs clearly demonstrates that pictorial warning labels are an important component of tobacco control (Fong et al. 2009). The 2007 Institute of Medicine Report, "Ending the tobacco problem: A blueprint for the nation," concluded that based on the available evidence, large, graphic warnings like those implemented in Canada, Brazil, and Thailand "…would promote greater public understanding of the risks of using tobacco products or reduce consumption" (Bonnie et al. 2007, p. 16). The report also recommended that FDA require pictorial and text-based warnings that cover 50% of the cigarette package (Bonnie et al. 2007). This requirement is currently subject to legal challenges. In June 2011, FDA announced it will require pictorial graphic warning labels on all packs of cigarettes sold in the United States (Figure 6.8) (USFDA 2011). One of nine pictures paired with one of nine text-based messages will be displayed on the top 50% of the front and back panels of each pack of cigarettes (USFDA 2011). These FDA requirements and related provisions of the *Family Smoking Prevention and Tobacco Act* are currently under judicial review. The evidence base is expected to increase in parallel with regulatory developments in tobacco labeling, which are rapidly progressing in response to the issuance of international standards through the World Health Organization's (WHO's) Framework Convention on Tobacco Control (FCTC) (WHO 2003). FCTC *recommends* warnings that cover 50% of the front and back panels but only *requires* warnings to cover 30%. Also, the treaty permits the use of pictures or graphics. More than 30 countries have either implemented or have committed to implementing large pictorial warnings that meet the recommended guidelines of FCTC.

Small Social Environments

The small social environments within which social or behavioral interventions can be conducted to prevent youth tobacco use or addiction include families, medical clinics, and schools. Families have an obvious influence on the likelihood that a child or adolescent will take up smoking or become a regular tobacco user, and they exert their effects from birth (even prenatally) through young adulthood. Health-service clinics, together with pedia-

Figure 6.8 Proposed pictorial warnings on cigarette packages in the United States

Source: U.S. Food and Drug Administration 2011.

tricians and family physicians, are potentially of critical importance to preventing tobacco use among youth and for providing cessation advice and treatment. In addition, because young people are exposed to other youth and adults when they attend school, peer influences and school policies have an important impact on the development of behavioral patterns, including tobacco use. For these reasons, this report reviews the application of opportunities for prevention in all three of the small social environments.

The Family

According to the responses of youth in grades 6–12 on the Pride Surveys (2006), which are local surveys of problem behaviors and associated risk factors, parental disapproval is the major reason for young people not to use tobacco and other drugs. In addition, per these surveys, almost three-fourths of parents believe that they are the most effective "anti-drug." However, parents underestimate the percentage of youth who use tobacco. For instance, the Pride Surveys indicate that less than 1% of parents of 7th graders and just 5% of parents of 12th graders believe that their kids have used tobacco in the past year, when in fact, the surveys indicate that 12.2% of 7th graders and 38.8% of 12th graders had used cigarettes in the past year (Pride Surveys 2006). In addition, according to the Pride Surveys, 18.7% of these 12th graders use tobacco at home.

Two systematic Cochrane Collaboration reviews of family interventions for preventing tobacco use in adolescents (Thomas et al. 2003; Thomas and Perera 2006; Petrie et al. 2007) suggest that family interventions implemented with high quality are likely to reduce rates of tobacco use in youth. The present report summarizes these reviews, adds an analysis of the types of family interventions likely to be most successful, and discusses the added benefit of combining family-focused and youth-only interventions.

Types of Parenting and Family-Focused Approaches

Several investigators have tried to classify the different types of family-focused approaches for prevention, but researchers in this field have not agreed on the definitions of the classifications. The review by the Center for Substance Abuse Prevention (CSAP 1998) of family-focused approaches defined eight approaches, but at that time, only four had sufficient validity to be considered evidence based: (1) cognitive-behavioral training for parents; (2) family skills training, including training of the parents, skills training of the children, and family practice time together; (3) family therapy (structural, functional, or behavioral); and (4) in-home family support or case management programs. Since the 1998 CSAP review, the very-low-cost strategy of involving parents with their children in homework assignments on the prevention of substance abuse has also shown promise as a cost-effective approach (Williams et al., 1995). In addition, cost-effective video, CD (compact disc), interactive DVD (digital video disc), and online versions of family programs have shown positive results (Gordon 2000; Schinke et al. 2000, 2004).

Theories Underlying the Strategy

The general logic of the family-based approach is that if parents learn and practice skills to become more effective at parenting and improve the parent-child relationship, learn how to be more effective in disciplining their children, and become better monitors, their children will have better developmental outcomes of all types, including those that relate to tobacco use. In addition, attention to the mechanisms of change has been identified as a crucial component for advancing theory in family-based treatment for substance use and ultimately for developing more effective prevention programs. For most family interventions, the underlying psychological theories are cognitive-behavioral, social learning, and/or family systems theory (Liddle et al. 2002). A key concept of many evidence-based programs is to reduce particular parent-child interactions that give rise to antisocial behavior and tobacco use, a process well documented by Patterson (1986) at the Oregon Social Learning Center. In general, the family systems approach uses reframing and cognitive restructuring methods to foster behavior change. Evidence-based interventions involve the whole family (rather than just the parents or the children) in processes that involve interaction, the building of skills, or behavior change rather than providing didactic educational lessons. These programs stress the importance of the engagement process and reducing barriers to attendance at program sessions, often through building relationships; extending personal invitations; providing meals, child care, and transportation; and sometimes by paying families for their time. Most begin with sessions designed to improve positive feelings in the family through positive reframing or through skills exercises that stress family strengths. Structured methods for communication and disciplinary techniques are also practiced once positive family feelings are established.

Systematic Reviews

For this Surgeon General's report, two systematic Cochrane reviews of family-focused interventions in preventing tobacco use were identified (Thomas et al. 2003, 2007; Petrie et al. 2007); these reviews suggest that such interventions are effective.

In one of the Cochrane reviews, Thomas and associates (2007) assessed 20 RCTs of family-based interventions that included children or youth (5–18 years of age) plus family members and met their criteria for inclusion. Fourteen of the RCTs were conducted in the United States, two in Norway, and one each in Australia, Finland, India, and the United Kingdom. The studies reported on smoking status of children from baseline to at least 6 months from the start of the intervention; all 20 included at least a 1-year follow-up: 8 with 1 year; 1 with 20 months; 2 studies with 24 months; 6 with 36 months; and 1 each with 7, 15, 27, and 29 years, respectively, of follow-up data.

Of the 20 RCTs identified, 6 were classified by the Cochrane criteria for assessment of bias or quality of study (selection, performance, attrition, and detection) as Category 1, or of high quality with minimal risk of biased results (Bauman et al. 2001; Spoth et al. 2001, 2002; Storr et al. 2002; Curry et al. 2003; Schinke et al. 2004), 9 as Category 2, or medium risk of bias (Biglan et al. 1987; Ary et al. 1990; Nutbeam et al. 1993; Cullen and Cullen 1996; Elder et al. 1996; Jøsendal et al. 1998; Stevens et al. 2002; Wu et al. 2003; Jackson and Dickinson 2006), and 5 as Category 3, or high risk of bias. Studies in the last group were not included in the analysis.

Overall, the review by Thomas and colleagues (2007) found statistically significant results in 50% (three of six) of the Category 1 studies (Spoth et al. 2001; Storr et al. 2002; Schinke et al. 2004). In contrast, only 33% (three of nine) of the Category 2 studies (Jøsendal et al. 1998; Wu et al. 2003; Jackson and Dickinson 2006) found significant results for the interventions. The reviewers suggested potentially positive results for the family interventions when they were implemented with high-quality training and fidelity as was found in category 1 studies. In their review, the authors did not examine differential effectiveness by the major types of family interventions; many of the family interventions tested were minimal-contact, homework-based programs.

The second Cochrane review (Petrie et al. 2007) assessed 46 articles on 20 studies that met the authors' review criteria for an RCT or were carried out as controlled before-and-after studies that focused on improving parenting skills. Although not mentioned as a criterion for inclusion, all the studies had at least 1 year of follow-up, with up to 6 years of follow-up for two studies. Of the 20 studies, 13 measured tobacco outcomes, of which 9 (representing 11 programs) resulted in significant positive reductions in tobacco use. Seven of the studies focused on the prevention of substance use in general (not tobacco specifically). Four of the nine programs found effective in this review were previously identified as effective by Thomas and colleagues (2003) in the protocol for the first Cochrane review of family-based smoking prevention programs.

The relative improvement (RI) rates calculated for the 11 effective programs are reported in the program descriptions below, and other details of the studies are shown in Table 6.8 (the programs that were not effective are discussed in Petrie et al. 2007). RI is the posttest difference between intervention (I) and control (C) groups minus the pretest difference between groups, divided by the control group posttest level: $[(I_{\%\text{ or mean}} - C_{\%\text{ or mean}})_{\text{post}} - (I_{\%\text{ or mean}} - C_{\%\text{ or mean}})_{\text{pre}}]/\,C_{\%\text{ or mean post}}$, expressed as a percentage. RI is similar to an effect size (ES) when the latter is defined as the posttest difference between groups divided by the pooled standard deviation (SD) at posttest: $(I_{\%\text{ or mean}} - C_{\%\text{ or mean}})_{\text{post}}/SD_{(I + C)\text{ post}}$.

The Family-School Partnership intervention incorporated the Parents on Your Side program, which in this intervention included nine workshops for parents. In a 3-day workshop, teachers were trained to communicate better to parents. The parents also completed weekly parent-child homework assignments. Results for this family intervention (RI = 20.3%, relative risk [RR] = 0.69) were positive but almost the same as for a comparison group that received the classroom-based Good Behavior Game (RI = 22.2%, RR = 0.57) instead of the Parents on Your Side intervention (Storr et al. 2002).

Smoke-free Kids consisted of newsletters, six mailed tips on parenting, and gifts for participation. This program reduced initiation of smoking after 3 years to 11.9% of students, compared with 19.3% of minimal-contact controls, who had received five tobacco fact sheets (RI = 38%, RR = 8.4%, OR for not starting = 2.16) (Jackson and Dickinson 2003, 2006).

BE smokeFREE, a Norwegian school-based program reported by Jøsendal and associates (1998, 2005), found significant differences in number of cigarettes smoked per week (10 vs. 17 for controls, OR = 0.48, RI = 41%) at 6-month follow-up. A 3-year follow-up for 10th graders found reductions in lifetime (ever) use (31.5% vs. 41.7%, RI = 24%), weekly smoking (4.1% vs. 6.2% for controls, RI = 47%), and daily smoking (15.5% vs. 23.0%, RI = 28%) for the three-component intervention (a classroom program, involvement of parents, and teacher courses). The family component was not tested separately, but when the parenting intervention was dropped from the total intervention, the percentage of never smokers dropped 4.4 percentage points, from 41.7% to 37.3%, and RI dropped 6 percentage points, from 24% to 18%. However, the percentage of weekly smokers increased from 4.1% to 5.4%, and RI dropped 18 percentage points, from 47% to 29%. The percentage of daily smokers 3 years later among a group of 10th graders was 23% for controls, 15.5% for the

Table 6.8 Descriptions and effect sizes (expressed as relative improvements) of parenting and family interventions for preventing use of tobacco among adolescents

								Effect size as relative improvement at last follow-up			
Investigator	**Program name**	**Design**	**Number of students**	**Length of evaluation**	**Dosage/ type of intervention**	**Grade**	**Grade at follow-up**	**Life**	**Month**	**Week**	**Average ES**
Universal prevention: family-skills training, school-based programs											
Spoth et al. 2001	Iowa Strengthening Families Program (ISFP) 10–14 Project Family	R-S	283 (141 E, 142 C)	4 years	7-FST/SB	6	10	34.8			34.8
Spoth et al. 2001	Preparing for the Drug Free Years Project Family	R-S	270 (128 E, 142 C)	4 years	5-FST/SB	6	10	12.5			12.5
Spoth et al. 2002	ISFP 10–14 years + LifeSkills Training (LST)	R-S	869 (453 E, 416 C)	1 year	7-FST/SB	7	8	27.5			27.5
Means for family-skills training, school-based programs								**24.9**			**24.9**
Universal prevention: mailing out homework assignments to the family, community-based programs											
Bauman et al. 2001, 2002	Family Matters	R-F	1,135 (531 E, 604 C)	3 months and 1 year	4-FH	6–8	7–9	7.3			7.3

Table 6.8 Continued

Investigator	Program name	Design	Number of students	Length of evaluation	Dosage/ type of intervention	Grade	Grade at follow-up	Effect size as relative improvement at last follow-up: Life	Month	Week	Average ES
Means for approach of mailing out homework assignments to the family, community-based programs								**7.3**			**7.3**

Investigator	Program name	Design	Number of students	Length of evaluation	Dosage/ type of intervention	Grade	Grade at follow-up	Effect size as relative improvement at last follow-up: Life	Month	Week	Average ES
Universal prevention: family homework assignments plus youth groups, school based											
Pentz et al. 1989d	Midwestern Prevention Program	PR-S	15+	2 years	S+C	6–7/ 7–8	9–10		18.0		18.0
Perry et al. 1989, 1992	Minnesota Class of 89	NR-C	17+		S+C	6–10	12			39.4	39.4
Jøsendal et al. 1998, 2005	Be Smoke Free	R-S	4,215	6 months 18 months 3 years	8-YST + 2 FH + 2-day TT/SB	7	10	24 total 18 if no FH		47 total 29 if no FH	35.5
Storr et al. 2002	Parents on Your Side in Family-School Partnership	R-C	448 (229 E, 219 C)	7 years	9-FST + Weekly FH + SB	1	8	20.3			20.3
Means for family homework plus youth groups								**22.2**	**18.0**	**43.2**	**28.3**

Table 6.8 Continued

Investigator	Program name	Design	Number of students	Length of evaluation	Dosage/ type of intervention	Grade	Grade at follow-up	Effect size as relative improvement at last follow-up			
								Life	Month	Week	Average ES
Selective prevention for high-risk youth											
Jackson and Dickinson 2003, 2006	Smoke-Free Kids	R-F	776 (371 E, 405 C children of smokers)	3 years	6 FH-CB	3	6	38			38
Schinke et al. 2004	CD-ROM LST	R-F	469	3 years	10 YST + 2 FST + 1 video + 2 FH	4–6	7–9		31		31
Means for selective prevention interventions for high-risk youth								**38.0**	**31**		**32.7**
Overall means for family programs								**23.6**	**24.5**	**43.2**	**26.4**

Note: All studies took place in the United States, except Jøsendal and associates (1998, 2005), Be Smoke Free, which took place in Norway. **C** = classroom; **CB** = community-based; **E** = education group; **F** = family; **FH** = family homework assignments; **FST** = family skills training; **NR** = nonrandom; **PR** = partial random; **R** = random; **S** = school; **SB** = school based; **TT** = teacher training; **YST** = youth skills training.

model program, and 21.1% for the intervention minus the parenting component, for an RI of 13%, compared with an RI of 28% for the full intervention. Hence, the contribution of the parenting component appeared to be greater in the longer term for preventing daily smoking.

The Iowa Strengthening Families Program (ISFP) for youth aged 10–14 years (Kumpfer et al. 1996) is a seven-session family skills training program that was implemented during evenings for all sixth-grade students in randomly selected schools in an RCT in Iowa. Each session of ISFP involves parents and students in 1 hour of separate classes on parenting skills and on skills training for children followed by 1 hour of family practice time. The 4-year follow-up ITT analysis found a 32.6% rate of smoking initiation in the group receiving ISFP compared with 50% for the minimal-contact control group (RI = 34.8%) (Spoth et al. 2001).

Preparing for the Drug Free Years (PFDY), now called Guiding Good Choices, was tested in the same RCT as ISFP. PFDY is a five-session intervention that involves parents in five 1-hour parenting classes; the sixth-grade students had one session on peer-resistance skills. The same 4-year follow-up ITT analysis found a 44% rate of smoking initiation for the experimental group compared with 50% for the control group (RI = 12.5%). This comparative research suggests that ISFP was about three times as effective as PFDY in reducing the rate of initiation of cigarette use (Spoth et al. 2001).

Another study conducted in the Midwest (this time involving seventh graders) combined the seven-session ISFP and LifeSkills Training (LST), a school-based, youth-centered intervention that does not involve parents. Those who went through the combined program had a 12.1% rate for new use of cigarettes, compared with 16.7% for controls (RI = 27.5% reduction) and 13.9% for LST only (RI = 16.8% reduction) (Spoth et al. 2002). When the ISFP family program was replicated in a multicommunity RCT and combined with one of three youth-only programs (LST, All Stars, or Project ALERT), the percentage of new tobacco users dropped from 32% to 17% after 18 months (RI = 47%, Cohen's d = 0.29) (Spoth et al. 2007).

Project STAR (Students Taught Awareness and Resistance), also known as the Midwestern Prevention Project (MPP) (Pentz et al. 1989b,c; Johnson et al. 1990), included homework assignments for the parents of youth who were engaged in a comprehensive prevention program that also featured a classroom curriculum and a mass media campaign. The family component (the homework assignments) was not tested separately. The 1-year RI was 41%, and the 3-year RI was 18% for reduction in tobacco use during a 30-day period.

Family Matters consisted of four brochures on parenting that were mailed to recruited parents and followed up by a call from a health educator. This minimal intervention was found by Bauman and colleagues (2001) to reduce the percentage of smokers from 55% to 48% at one-year follow-up, but at baseline the percentage of smokers was lower in the experimental group (24.5%) than in the control group (27.5%). The RI was 7.3%; the OR of 1.30 in the original analysis became 1.27 when Petrie and colleagues (2007) corrected for the design effect, producing a nonsignificant difference from the control group (p = 0.0595). This corrected result may explain why the Cochrane review conducted by Thomas and colleagues (2007) concluded that this program was not effective.

Another program reviewed by Thomas and colleagues (2007) was the intervention reported by Schinke and associates (2004), the CD-ROM (compact disc read-only memory) Youth and Parent program, a CD-ROM version of a youth and parenting program that was tested in an RCT. This program produced an RI of 31%.

Wu and associates (2003) tested Focus on Kids (FOK), an eight-session, small-group intervention providing training in social skills that is led by two older peers, both with and without a program called Informed Parents and Children Together (ImPACT), a 2-hour video on parenting skills plus two home visits by an instructor for practice sessions. The authors compared these two conditions with a third condition of both interventions plus two booster sessions. The study involved 817 high-risk Black youth 12–16 years of age in low-income communities in Baltimore, Maryland. At the 6-month follow-up, youth in families assigned to FOK plus ImPACT reported significantly lower rates of cigarette use than youth in families assigned to FOK only (RI = 20%). The booster sessions delivered at 7 and 10 months made no significant difference.

Elsewhere, a review of the D.A.R.E. (Drug Abuse Resistance Education) and D.A.R.E. Plus (Play and Learn Under Supervision) programs found significant reductions in smoking, alcohol use, and violence among boys but not among girls or for the total population when the D.A.R.E. Plus components (parent, peer, and extracurricular activities) were added to the junior high D.A.R.E. program (Perry et al. 2003).

A combined examination of the programs included in the two Cochrane reviews shows that the most effective family-focused program for preventing tobacco use by adolescents was a selective prevention program, Smokefree Kids, that was targeted to high-risk children of smokers (RI = 38%). This program (Jackson and Dickinson 2003, 2006) was unusual in that it was a minimal-contact intervention. The next-best single intervention in terms of ES was ISFP, a purely family-focused intervention developed by Kumpfer and colleagues (1996). This program is of significantly greater dosage than others in its category because it involves the whole family in seven sessions of 2 hours of skills training (RI = 34.8%) (Spoth et al. 2001). Lowering the dosage and not including the children in the sessions seems to result in a lower ES. Generally, with higher-risk families, a higher dosage (or more time) is needed to produce effective behavioral changes. The CD-ROM version of Schinke and associates' (2004) youth and parenting program also had a large RI (31%).

As a group, the family-involved programs targeting high-risk youth and their families had the largest ES, with a mean RI of 32.7%. The limited research reported here suggests that targeted selective prevention programs are likely to produce the largest ES in reducing tobacco use among adolescents. In the same RCT that included ISFP, the five-session PFDY parenting program (youth came for one session) had an RI of only 12.5% (Spoth et al. 2001). Adding the LST program to ISFP resulted in a lower RI (27.5%) than for the ISFP alone, but participants were in seventh grade rather than sixth, making a direct comparison difficult (Spoth et al. 2002).

Another group, not specifically targeting parents, the multicomponent school-based programs that consisted primarily of training in youth life skills with the added involvement of parents in homework assignments, averaged an RI of 28.3%. The largest ES in this category was for the Minnesota Heart Health Program and Class of 1989 Study, which indicated positive immediate and intermediate effects on smoking levels for youth smoking, with a large RI of 39.4% (Vartiainen et al. 1986; Perry et al. 1992).

The least effective type of family intervention, with an RI of 7.3%, was the universal application of a minimal intervention relying on mailings to parents followed up by calls from a health educator: the Family Matters program (Bauman et al. 2001). The base rates of smoking may have been too low in this universal sample, however, for a minimal-contact intervention like this one to produce significant changes compared with the no-treatment controls.

Ineffective Adolescent Tobacco Programs That Included Family Components

According to the Cochrane reviews, ineffective programs included (1) Kickbutts (Tang et al. 1997); (2) the South Carolina COPE program (Forman et al. 1990); (3) Biglan and colleagues' (1987) training program in refusal skills; (4) Steering Clear clinical trial (Curry et al. 2003); (5) the Busselton Health Study (Cullen and Cullen 1996); and (6) one test of PFDY (Hawkins et al. 1999).

The ineffective programs were generally shorter (two to five sessions) than the effective ones, which were usually five to eight sessions plus two boosters or at least seven sessions. In their systematic review, Thomas and colleagues (2003) concluded that the ineffective programs had fewer training requirements for program delivery staff than the more effective programs. Also, fidelity to the implementation was higher in the more effective programs. Thus, it is not enough to have an effective structured intervention with good content; it is also necessary to develop an effective training and quality control system for the program's dissemination.

Thomas and colleagues' (2003) analysis looked at other questions in comparing the research, including whether family interventions were as effective as school interventions. From their analysis, family interventions seem to be as effective as school interventions: five of the RCTs that tested both a family intervention and a school intervention showed significant positive effects for both. However, these authors found that none of the six studies that compared a family program plus a school program with a school program alone showed significant positive effects from adding the family program to the school program. In the one trial that tested a more general risk-reduction intervention (not specific to tobacco) but measured tobacco outcomes, the combined parent-and-adolescent intervention resulted in less smoking than the youth-only intervention.

Limitations of the Studies Reviewed

Most of the RCT studies reviewed here relied on self-reported measures by the students or their parents. A second limitation of those programs that included family components is that for many of the school-based or community-based interventions, the family programming was merely a minimal dose added to a more substantial program for youth. The one exception was the totally family-focused ISFP (Spoth et al. 2001).

A major weakness of the studies reviewed is that few of them tested the family or parenting intervention separately from the youth intervention to determine the unique contribution of the family or parenting intervention. Another limitation is that of all the family studies, only ISFP was replicated by someone other than the program developer. This was, however, a semi-independent replication; Karol L. Kumpfer, the original developer, was a coprincipal investigator on the grant that conducted the replication.

In addition, of all the interventions, only one was either culturally adapted or gender specific, the BE smoke-FREE program designed specifically for Norwegian youth and parents (Jøsendal et al. 1998, 2005). Although cultural adaptations of evidence-based interventions are likely to improve outcomes to get to "deep" structure (Resnicow et al. 1999), even those with "surface" structure cultural adaptations have shown few improvements in outcomes over the generic versions (Botvin et al. 1995b). One exception is that the involvement of parents and families in terms of attendance and retention was found to improve results by about 40% if the evidence-based intervention was culturally adapted (based on a comparison across five studies of the 14-session ISFP in culturally adapted form with the multiethnic version) (Kumpfer et al. 2002).

It is not known whether the programs reviewed in this section are equally effective for girls and boys because analyses for subgroups are rarely reported (Kumpfer et al. 2008). One exception was the D.A.R.E. Plus program, which resulted in significant reductions in smoking, alcohol use, and violence for boys but not for girls or the total population (Perry et al. 2003).

Discussion and Recommendations

Several different programs that involve parenting or families may be effective in reducing tobacco use. Most of the tested programs were interventions added to school-based programs in which the parents were sent materials or homework assignments to complete with their children. The most effective programs in terms of ES or percentage of reduction in smokers had one or more of the following characteristics:

1. Targeted high-risk adolescents with selective interventions;

2. Combined skills training among youth with homework assignments for parents on parenting;

3. Focused specifically on the family, with skills training for the family that included more sessions or included time with the families to learn together;

4. Provided longer periods to train the staff in the intervention methods;

5. Conducted checks on the fidelity of implementation or on quality;

6. Used interventions for skills training among families that were based on behavior change theory; and

7. Stressed active parental involvement and parenting skills and developed social competencies and self-regulation among youth.

Thus, it appears that some well-executed family interventions with sufficient dosage may help to prevent smoking among adolescents, but the reports in the literature on RCTs of family interventions that were less well executed have had mostly limited results. There may, therefore, be a need for more well-designed and properly executed RCTs in the area of family-focused tobacco prevention, particularly those testing the family component separately from the youth component. Studies of disseminating effective family interventions are also needed.

Clinical Interventions: The Role of Health Care Providers in Preventing and Reducing Smoking Among Youth

Primary health care providers are potentially well positioned to help prevent tobacco use among children and adolescents; indeed, there is evidence that adolescents view physicians as a preferred source of information about smoking in general and about smoking cessation specifically (Ackard and Neumark-Sztainer 2001; Marcell and Halpern-Felsher 2007). A health care visit represents an excellent opportunity for health care professionals to provide clinical services aimed at reducing tobacco use.

Several national guidelines have been developed to guide physicians (American Medical Association [AMA] 1997; USDHHS 1998; Bonnie et al. 2007; Hagan et al. 2008); in general, they recommend that all children and adolescents have an annual visit in which they receive confidential preventive services. These services should include screening, education, and counseling in several areas, including health risk behaviors such as tobacco use. Guidelines, including those from the American Academy of Pediatrics, also recommend that pediatricians discuss substance use as part of routine health care during the prenatal visit, as part of a home assessment, and for youth seen during ambulatory visits (NCI 1994; Kulig and American Academy of Pediatrics Committee on Substance Abuse 2005).

The U.S. Preventive Services Task Force (USPSTF 2003), however, has concluded that the empirical evidence is insufficient to recommend regular screening for tobacco use among youth or interventions for those young people who smoke. An updated recommendation is being prepared by USPSTF. Guidelines from many other national groups also address the prevention of tobacco use among adolescents: these guidelines typically recommend that physicians inquire about tobacco use in general and query those youth who use tobacco about the extent of their use; the settings in which they use tobacco; and whether tobacco use has had a negative impact on their social, educational, or vocational activities (Kulig and American Academy of Pediatrics Committee on Substance

Abuse 2005). The American Academy of Pediatrics (Hagan et al. 2008) also recommends screening for the tobacco use of friends, given that smoking behavior among peers is a powerful determinant of smoking behavior for youth (Forrester et al. 2007).

The primary recommended method of delivering direct, brief, tobacco-related prevention and cessation services is known as the "5 A's" model, originally developed for use in adult populations. The model's five steps include *Asking* the patient about tobacco use; *Advising* patients who smoke to quit; *Assessing* the patient's willingness to quit; *Assisting* the patient to attempt quitting by providing brief counseling, pharmacotherapy, and appropriate referrals; and *Arranging* a follow-up visit or telephone call, preferably 1 week after an established quit date (USPSTF 2009; Prokhorov et al. 2010).

Practice guidelines also recommend that health care providers inquire about tobacco use in the child's home (including use by parents, siblings, and other family members), encourage tobacco-free homes, and provide guidance and assistance to parents and youth on tobacco cessation (USDHHS 1998; Kulig and American Academy of Pediatrics Committee on Substance Abuse 2005; Committee on Environmental Health 2009). Finally, emerging recommendations state that providers should maintain an office that supports a tobacco-free norm by employing a tobacco-free staff, displaying antitobacco messages, making educational materials readily available, terminating subscriptions to waiting-room magazines that contain tobacco advertisements, and establishing policies for routinely charting tobacco use (Feinson and Chidekel 2006).

Rates of Delivery of Tobacco Prevention Services to Youth in Health Care Settings

In 2006, 84.2% of adolescents (aged 10–17 years) and 72.0% of young adults (aged 18–24 years) had visited a doctor's office in the past year, not including hospitalizations, emergency room visits, or surgeries (Mulye et al. 2009). Female young adults were much more likely to have visited a doctor than male young adults (84.7% vs. 59.3%), but the difference by gender was less pronounced among adolescents (85.5% for females vs. 83.0% for males). White adolescents and young adults were more likely to have seen a doctor than were their Black counterparts, with Hispanics having lower rates than Blacks. The rates varied greatly by insurance status, with 87.2% of insured adolescents and 80.1% of insured young adults visiting a doctor compared with 54.9% of uninsured adolescents and 46.2% of uninsured young adults.

National guidelines support providing tobacco prevention services to youth and promote brief tobacco-screening questionnaires under the presumption that they are effective (Benuck et al. 2001). Still, delivery rates of these services have been insufficient among physicians in private practices, community-based practices, and managed care settings. Studies have shown that less than 60% of adolescents were provided guidance about smoking (Marks at al. 1990), and only 1% of office visits by adolescents included advice about smoking cessation (Igra and Millstein 1993). In a large survey of family practitioners, pediatricians, internists, and obstetrician-gynecologists, Ewing and colleagues (1999) found that less than one-half of these physicians routinely inquired about smoking. In a survey of pediatricians and family physicians, Klein and colleagues (2001b) found that these physicians asked more than 90% of their adolescent patients about smoking but discussed tobacco-related health risks with only about 75%. Inquiries about parental smoking, peer smoking, and use of smokeless tobacco were less common, ranging from 32% to 54% of patients. Although more than 80% of the physicians promoted abstinence from smoking among their nonsmoking patients and assessed motivation to quit among those who smoked, less than one-half followed up with cessation materials or referrals.

Halpern-Felsher and colleagues (2000) reported that 77% of adolescents in a managed care setting were screened for tobacco use. Among those patients who reported tobacco use, however, only three-quarters were screened further about the amount they smoked and only 84% were counseled on the risks of smoking. This same study also found that no more than 43% of the patients' parents were told about the need to monitor youths for risk behaviors, including substance use. Galuska and colleagues (2002) found that less than one-half of pediatricians counseled adolescents about tobacco use by others in the home.

In general, the provision of tobacco prevention services remain low, even for particularly vulnerable adolescent populations, such as low-income, asthmatic, or chronically ill youth (Fairbrother et al. 2005; Rand et al. 2005; Tercyak et al. 2007). In addition, physicians are more likely to ask older adolescents about their smoking status than to deliver preventive advice to preadolescents who might benefit more from prevention messages because they are less likely to have started smoking (Makni et al. 2002). A study of almost 1,000 pediatricians randomly selected from a national sample in 1998–1999 found that only 29% always counseled younger children (6–12 years of age) about tobacco use, but 69% always counseled their 13- to 18-year-old patients about using tobacco (Galuska et al. 2002).

The rates at which adolescents are screened for tobacco use and other risk behaviors vary by physicians' characteristics, including age, gender, year of graduation, practice setting, and subspecialty. Two studies found that rates of counseling for tobacco use and other preventive services were greater among female providers and among pediatricians who were able to spend relatively more time with their patients (Klein et al. 2001a,b; Galuska et al. 2002). More recently, Perry and Kenney (2007) found that pediatricians were more likely than physician subspecialists, as well as nonphysician providers, to advise patients that smoking in the home is harmful. Earlier, Ewing and colleagues (1999) found that physicians under the age of 50 years were more likely than older physicians to provide tobacco-related clinical preventive services. Still earlier, Blum and colleagues (1996) found that the provision of clinical services was lowest in nonadolescent-focused practice settings, independent of patient age or gender. Halpern-Felsher and colleagues (2000) found greater provision of clinical preventive services among female physicians, recent graduates from medical school, and physicians with a greater number of older adolescent patients. Similarly, Klein and colleagues (2001b) found that rates of delivery for tobacco-related preventive services varied by provider characteristics, with women being more likely than men to ask about smoking behaviors and smoking by parents and peers and men more likely to ask about the use of smokeless tobacco.

Relatively little is known about how to improve the rates at which services to prevent tobacco use are delivered to children and adolescents. Ozer and colleagues (2005) showed that training physicians could increase the rates at which health care providers screen and counsel youth about risk behaviors, including tobacco use. Providers' self-efficacy to provide preventive services was found to be linked to the actual delivery of services (Ozer et al. 2005) and can be enhanced through trainings (Buckelew et al. 2008). Studies from the literature on adult patients indicate that the use of paper-based, computer-generated, or computerized reminders in patient charts is particularly effective at increasing the delivery rates of smoking cessation services (Dexheimer et al. 2008). In addition, the literature on adolescents suggests that providing charting tools can improve the rates at which services are delivered to younger patients (Ozer et al. 2001, 2005). Electronic health care record systems that require documentation of service delivery may also increase the rates at which preventive services are delivered. More research is needed to determine the extent to which the implementation of provider training, electronic systems, or other charting tools increases the delivery of tobacco-related preventive services to children and youth.

Hymowitz and colleagues (2004, 2007, 2008) focused on increasing the provision of tobacco-related preventive services (and self-efficacy to deliver them) by adding a training program in tobacco to residencies in pediatrics. As Hymowitz and associates (2004) pointed out, few pediatric residents receive any training in addressing the use of tobacco by patients or their parents, and many pediatricians question the efficacy of counseling. In a randomized study, pediatric residents were assigned to either standard training or a new training, Solutions for Smoking (SOS), which used a combination of CD-ROM and Web site programming to provide information on interviewing skills, the use of the "5 A's," and behavioral and pharmacologic methods for reducing tobacco use. The researchers found that from baseline to 4 years after the program, residents in the SOS training were more likely to inquire about secondhand smoke in the home and to provide specific advice and materials to help parents stop smoking; those in the SOS program also reported feeling more efficacious for addressing tobacco issues. These studies do not, however, directly address the effects of the intervention on whether the pediatricians trained in the program had any effect on tobacco use by children or adolescents.

Rather than focus directly on health care providers, Christakis and colleagues (2006) demonstrated the effectiveness of using a Web-based intervention to encourage the parents of younger children (0–11 years of age) to discuss health topics, including tobacco use, with their pediatricians. The authors found that parents were more likely to discuss topics with their pediatrician during a well-child visit if the parents participated in an interactive Web site, thus, in turn, changing the physician's behavior in a way that produced greater levels of preventive services. Future studies are needed to test the effectiveness of this intervention with parents of older children and adolescents.

Research Support for Tobacco Prevention Strategies Involving Health Care Providers

Unfortunately, there has been little research on whether increased rates of preventive screening, counseling, and education by health care providers actually lower the rates of tobacco use among youth. Nor have studies determined the mechanisms by which these interventions might be most effective (Christakis et al. 2003; Krowchuk 2005). In fact, there is no research at all demonstrating the effectiveness of the "5 A's" in preventing tobacco use among children and adolescents, although the Prokhorov and colleagues (2010) study did involve pediatricians and demonstrated some success. It also remains unclear how many providers adhere to antitobacco policies in their offices or how effective such policies are in changing smoking norms or preventing smoking initiation among youth.

The first RCT to test the effectiveness of a program for preventing tobacco use among youth involved training orthodontists to deliver eight "prescriptions" to their patients over time (Hovell et al. 1996, 2001). These prescriptions included providing advice on eight tobacco-related topics, such as "tobacco and sports" and "nicotine and tobacco addiction." Rates of smoking initiation did not differ between the prevention and control groups over a 2-year follow-up, but higher rates of delivering the prescriptions by orthodontists predicted lower rates of smoking initiation. Later, Hollis and colleagues (2005) conducted an RCT to examine the long-term effects of brief counseling, physician advice, and computer-based intervention on prevention of smoking and on cessation among adolescents 14–17 years of age. Compared with controls participating in a dietary intervention, adolescents in the tobacco intervention were significantly less likely to report smoking 1 and 2 years after that intervention than those in the control group. These effects were even stronger for those reporting smoking at baseline. Among that group, 24% indicated at the 2-year follow-up that they had quit. However, this brief intervention had less of an effect on preventing the onset of smoking.

Three other studies that used RCTs of interventions to prevent smoking in medical settings found that preventive services had little or no effect on smoking among youth. In one, screening for smoking behavior and providing pictures of tooth discoloration at annual dental visits did not reduce the prevalence of smoking (Kentala et al. 1999). In a second, mailing age-appropriate information about the advantages of remaining a nonsmoker to primary care patients at 3-month intervals produced a significant but still small difference in smoking rates between youth in the intervention and control groups (Fidler and Lambert 2001). In the third study, Curry and colleagues (2003) implemented and evaluated an RCT of a family-based smoking prevention program in a managed care setting. The intervention included a smoking prevention kit mailed to parents, newsletters for the parents, follow-up telephone calls by health educators, materials for the children, and information placed in medical records and charts as reminders to the physician to deliver prevention messages. Although the intervention had small but significant effects on increasing parent-child communication about tobacco, no differences between the intervention and control groups were found in rates of susceptibility to smoking, experimentation with smoking, or monthly smoking rates.

Another study investigated whether implementing an office-systems approach would prevent or delay adolescents' drinking and smoking behaviors (Stevens et al. 2002). The idea of the approach in question, as expressed by Klein and Camenga (2004), is that the primary care physician provides anticipatory guidance and screening, the entire office staff endorses the prevention messages, and prevention materials are provided in the office. Stevens and associates (2002) found that despite evidence that their intervention was implemented successfully, it did not significantly affect adolescents' tobacco use. The authors suggested that their program might have been ineffective in part because it focused on increasing parent-child communication rather than on targeting adolescents' behaviors.

Ozer and colleagues (2004) presented preliminary results of a study indicating that adolescents who received clinical preventive services in managed care settings were less likely to increase the regular use of tobacco over a 1-year period, but they did not report the effects on initiation of tobacco use. More recently, Brown and associates (2007) examined the impact of a single-lesson course in tobacco cessation given to fourth and fifth graders at a health education center. The lesson focused on improving knowledge of tobacco, the identification of refusal techniques, and lowering intent to smoke. General knowledge about tobacco and refusal techniques significantly increased, but rates of intent to smoke did not decrease, perhaps because the rate was low before the intervention.

In summary, the few studies that have examined the efficacy of provider-based interventions suggest that the strategies they have employed may not be effective. However, the results must be interpreted with caution. Only a limited number of strategies have been assessed, and none of the studies on a specific prevention strategy have been replicated. This problem is complicated by the fact that most youth and many young adults are low-volume, intermittent smokers who often do not think of themselves as smokers. Furthermore, efforts directed at youth have been investigated in just a few health care settings, such as physicians' and orthodontists' offices and specialty clinics. Additionally, little is known about the impact of youth-focused efforts to prevent tobacco use that are conducted in specialty services such as asthma clinics, urgent care facilities, or emergency rooms.

Barriers to the Provision of Clinical Preventive Services to Youth

Physicians cite numerous barriers to providing clinical preventive services, including (1) having a large number of patients, which limits their time per patient; (2) competing health care demands during preventive visits; (3) insufficient education and training; (4) lack of information about how to access referral and treatment resources; (5) lack of dissemination to physicians of research that supports positive treatment outcomes and the negative effects of failure to intervene; (6) fear of alienating patients and families; and (7) inadequate reimbursement relative to the time and effort required to provide such services (Cheng et al. 1999; Kulig and American Academy of Pediatrics Committee on Substance Abuse 2005; Oscós-Sánchez et al. 2008; Sanders and Colson 2008). Research also suggests that physicians' confidence in their ability to screen and advise adolescents about tobacco use is related to how frequently they deliver preventive services (Cheng et al. 1999; Ozer et al. 2004). Education and training of health care professionals can reduce the impact of several of these barriers; indeed, studies have shown that even a few hours of training on tobacco use can significantly improve medical students' and physicians' knowledge about this behavior as well as their confidence in delivering preventive services and the likelihood that they do so (Pederson et al. 2006; Fiore et al. 2008).

Summary Regarding Clinical Interventions with Young People

As primary sources of health information and potential role models, health care providers are well suited to address the prevention of tobacco use among youth. National guidelines for the provision of preventive services recognize the pivotal role that health care providers can play in preventing tobacco use and stipulate that prevention be addressed at least once per year throughout adolescence (AMA 1997; USDHHS 1998; USPSTF 2003; Bonnie et al. 2007; Hagan et al. 2008). The available literature indicates that adherence to recommended screening and prevention activities for patients who are children or adolescents, such as implementing the "5 A's," is low (Galuska et al. 2002). Studies suggest that tobacco-training programs and paper- and computer-based reminders for health care professionals to deliver services may be viable options for increasing the rates at which services to prevent tobacco use are delivered to children and adolescents (Ozer et al. 2005; Pederson et al. 2006; Dexheimer et al. 2008). Finally, little is known about the effectiveness of tobacco prevention services delivered to children and adolescents in health care settings, although a recent meta-analysis suggests that counseling may be effective in reducing adolescent smoking (Fiore et al. 2008). As a result, there is currently no clear evidence to suggest that any prevention strategies delivered in health care settings are effective in preventing the initiation of smoking in this population, but clinicians may be important in encouraging young smokers to quit.

School-Based Programs to Prevent Smoking

During the past 30 years, numerous school-based programs to prevent tobacco use have been developed. As reviewed in the 1994 Surgeon General's report on preventing tobacco use among young people (USDHHS 1994), approaches to the prevention of smoking have gone through several phases: informational, affective/motivational, and psychosocial (normative). As early as the late 1970s, Thompson (1978), in a review of all English-language papers on smoking prevention between 1960 and 1976, concluded that most methods used up to that point (i.e., informational and affective approaches) were not effective, and this view was later echoed by Beattie (1984). Informational approaches stressed the harmful consequences of smoking; affective approaches used fear-based messages and values clarification as strategies. Many programs can effectively change knowledge, which in itself is important, but such change is not enough to alter behavior (Goodstadt 1978) and, in any case, the effects of knowledge acquisition decay quickly (Hwang et al. 2004). Sometimes, information can make behavior worse (Goodstadt 1978, 1980), as can some programs that address affective issues (Petrosino et al. 2000). During the late 1980s and early 1990s, U.S. government agencies concluded that traditional school-based approaches (informational and affective) were largely ineffective at prevention and that approaches based on social-psychological models (McGuire 1964; Evans 1976) were modestly effective across a variety of settings, times, and populations (Glynn 1989; NCI 1991; Lynch and Bonnie 1994; USDHHS 1994). For example, the 1994 Surgeon General's report (USDHHS 1994) concluded that (1) school-based programs that identified social influences on tobacco use and taught resistance skills had shown significant reductions in youth smoking, and (2) those programs were enhanced and sustained by comprehensive school health education and community-wide programs.

Multiple reviews of approaches to the control of tobacco use or preventing substance abuse published after 1990 have examined school-based smoking prevention (NCI 1991, 2001; Burns 1992; Hansen 1992; Lynch and Bonnie 1994; USDHHS 1994, 2000b; Stead et al. 1996; Pentz 1999; Sussman et al. 1999; Lantz et al. 2000; Sussman 2001; Vickers et al. 2002; Buttross and Kastner 2003; Skara and Sussman 2003; Tingle et al. 2003; Warner et al. 2003; Lober Aquilino and Lowe 2004; Krowchuk 2005; La Torre et al. 2005; Park 2006; Ranney et al. 2006; Thomas and Perera 2006; Bonnie et al. 2007; Davis et al. 2007b; Flay 2007; Dobbins et al. 2008) as well as meta-analyses on the subject (Bruvold 1993; Rooney and Murray 1996; Tobler and Stratton 1997; Black et al. 1998; Tobler et al. 2000; Tingle et al. 2003; Hwang et al. 2004; Wiehe et al. 2005). These reviews and meta-analyses have repeatedly reinforced the conclusion that informational and affective programs do not by themselves change behavior. However, the meta-analyses have established that some psychosocial programs and strategies, particularly those that are interactive (i.e., that offer chances for communication among participants and provide an opportunity for the exchange of ideas, role playing, and the practice of new social skills) and are based on the social influences approach (educating youth about social norms and influences and providing skills for resisting such influences) can be effective in preventing the onset of smoking.

Regardless, assessing findings in the field is sometimes confusing because some of the early or short psychosocial programs reported promising short-term effects that were not sustained over time (Flay et al. 1989; Murray et al. 1989b; Ellickson et al. 1993; Shean et al. 1994; Shope et al. 1998; Hawkins et al. 1999). In addition, some tested programs simply were not effective (Peterson et al. 2000). D.A.R.E. is an example of a program that seems similar to many successful programs in numerous ways and yet has been proven ineffective in multiple studies and two meta-analyses (Ennett et al. 1994a,b; West and O'Neal 2004). These mixed results for school-based programs have led some to question the overall value of such programs (Glantz and Mandel 2005). In the most recent review of school-based prevention, however, Dobbins and colleagues (2008) concluded that "there is reason for optimism regarding the effectiveness of prevention programs on smoking behavior and initiation, albeit in the short term" (p. 296).

CDC continues to recommend providing school-based prevention (CDC 2003, 2007a,b, 2008b). More specifically, CDC suggests offering a curriculum that focuses on tobacco use prevention from kindergarten to 12th grade, with increased intensity in junior high or middle school (CDC 2007a), the stage of life with the most acceleration of onset rates. The agency (2007b) suggests implementing school-based prevention in combination with mass media and other community-wide approaches.

The following sections provide a more detailed review of findings from meta-analyses and previous reviews and a systematic review of the potential for long-term effectiveness of school-based programs to prevent smoking.

Review of Meta-Analyses and a Cochrane Review

Flay (2009b) provided a review of meta-analyses and of the Cochrane review by Thomas and Perera (2006) in an effort to determine from past reviews whether school-based smoking prevention can be effective. Among the multiple meta-analyses of school-based programs was one that included 74 studies of smoking prevention among 207 studies on the prevention of substance abuse (Tobler et al. 2000), another that evaluated 65 separate programs (Hwang et al. 2004), a review of 94 randomized trials that reviewed only 23 in detail because of methodologic limitations with the remaining studies (Thomas and Perera 2006), and a review focusing on the quality of 11 evaluations but not their outcomes (Tingle et al. 2003). Reviews of the long-term effects of these programs have varied in scope: one review included 25 studies with at least 2-years of follow-up (Skara and Sussman 2003), and another found only 8 studies with outcome data for grade 12 (or 18 years of age) (Wiehe et al. 2005). The findings range from precise and substantial ESs for some types of programs (Tobler et al. 2000; Hwang et al. 2004) to conclusions that most school-based prevention programs are effective (Dobbins et al. 2008) or do not work (Glantz and Mandel 2005; Wiehe et al. 2005).

Tobler and colleagues (2000), after summarizing a series of meta-analyses, suggested that programs that used interactive learning strategies and involved same- or similar-aged peers as leaders or facilitators were most effective. In addition, Tobler and colleagues (2000) found that smoking prevention programs produced an average ES of 0.16, with interactive programs producing a significantly larger ES than did noninteractive programs (0.17 vs. 0.05). These authors also found that programs that addressed multiple substances were less effective at reducing tobacco use than were programs that targeted only tobacco (ES = 0.10 vs. 0.17), but the multiple-substance programs had the added benefit of reducing alcohol and other substance use. These researchers also found program effects to be larger in schools with predominantly special or high-risk populations (characterized by minority populations, high absenteeism or dropout rates, or poor academic records). Hwang and colleagues (2004), in a review of 65 programs, estimated an average short-term ES of 0.19 for outcomes involving smoking behaviors. These authors reported ESs of 0.22 for attitudes and skills and 0.53 for knowledge and found that all program effects were smaller at those follow-ups that did not take place immediately after the intervention. Outcomes involving behavior, however, decayed very little over 1–3 years (from the original 0.19 to 0.18) but, without further programming, they decayed by one-half (to 0.09) at follow-ups of 3 or more years. Knowledge decayed by over 60% by 1-year follow-up (to 0.19), and attitudes and skills decayed to under one-half their original effects by 1-year follow-up (to 0.10 and 0.09, respectively).

Hwang and colleagues (2004) also estimated the effects of different approaches to school-based smoking prevention: social influences, cognitive-behavioral interventions (programs that included the elements of the social influences approach plus at least two cognitive skills), and life skills. They found that social influences approaches had average ESs of 0.12 at short-term follow-up, 0.15 at 1–3 years, and 0.07 at more than 3 years; cognitive-behavioral approaches had average ESs of 0.21 at both short-term follow-up and 1–3 years; and life skills approaches had average ESs of 0.29 at short-term follow-up and 0.16 at 1–3 years. There were too few studies in their meta-analysis to provide estimates of the longer-term effects (more than 3 years) of cognitive-behavioral or life skills approaches.

Hwang and colleagues (2004) also distinguished between programs based only at a school and those in school-plus-community settings. They found that school-only programs reported average ESs of 0.22, 0.16, and 0.06 in the short term, at 1–3 years, and more than 3 years, respectively, and school-plus-community programs reported average ESs of 0.16 in the short term and 0.21 at 1–3 years. In an earlier systematic review of school and school-plus-community programs in preventing substance abuse, Flay (2000) concluded that school-plus-community programs produced about double the effect of the school-only programs when the type of school program was held constant.

Rooney and Murray's (1996) meta-analysis of 131 smoking prevention programs adjusted for studies with an error in the unit of analysis (i.e., the group analyzed was not the correct one, a common error in the relevant literature at that time), but this adjustment had little or no effect on the overall ESs. The average ES was around 0.10 at long-term follow-up, which would be about a 5% relative reduction in smoking (Rosenthal 1984). Using a modeling approach, the authors estimated that the impact of programs could be increased if they began around sixth grade as part of a multicomponent health program, gave same-age peer leaders a role in program delivery, and used booster sessions. They estimated that this might achieve a relative reduction in smoking of between 19% and 29% (or ESs in the 0.5–0.8 range).

Thomas and Perera (2006), who completed the most thorough systematic review of school-based smoking prevention studies to date (it is included in the Cochrane Database of Systematic Reviews), required a minimum of 6 months' follow-up after the completion of the intervention. They restricted their reviews to RCTs and found 94 of them. The authors rated the methodologic biases of each study and classified them as having minimal, medium, or high risk of bias; they analyzed in detail only the 23 studies they judged to be of the highest quality. They determined statistical significance from their own analysis of ORs—the odds of those who were lifetime nonsmokers at baseline starting to smoke by the posttest in the intervention group compared with the control group. When intraclass correlation coefficients (ICCs) were not reported, they assumed an ICC of 0.097, the average found in a limited set of older studies (Siddiqui et al. 1996). Another criterion imposed by Thomas and Perera (2006) was requiring a minimum of one assessment at least 6 months beyond the end of the intervention. As interventions have become more comprehensive and longer in duration, it is becoming more difficult to meet this standard; it is not clear that a study should be excluded from consideration because the last posttest was less than 6 months after the last session, especially if the bulk of the intervention took place several years earlier. The only outcome reported by Thomas and Perera (2006) was the prevalence of smoking among participants who were never smokers at pretest, and thus they did not include such possible outcomes as changes in the proportion or prevalence of ever, weekly, or monthly smokers.

In terms of program types, Thomas and Perera (2006) assigned the 94 studies to five groups: (1) information only; (2) social competence (e.g., the Good Behavior Game, the Seattle Social Development Project); (3) social influences (e.g., Project CLASP, Waterloo Smoking Prevention Project); (4) combined social competence/influences (e.g., LST, Project Towards No Tobacco Use, Child Development Project); and (5) multimodal (i.e., including family or community components). However, as Thomas and Perera (2006) acknowledged, it is extraordinarily difficult for people not intimately involved in the field to determine how to group the different interventions. In addition, over time, the programs have become more alike in principle as they incorporate ideas from each other.

Based on the above inclusion criteria, Thomas and Perera (2006) concluded the following about school-based programs to prevent smoking:

1. There is little evidence that information alone is effective.

2. Nine of 13 studies of social influences that met their criteria for inclusion demonstrated positive effects.

3. The longest-lasting test (65 lessons over 8 years) of a social influences program (Hutchinson Smoking Prevention Project) found that the program was not effective.

4. There was limited evidence for the effectiveness of social competence programs (only two studies met criteria for inclusion).

5. Of only three high-quality studies of the combination of social competence and social influences, just one showed a significant effect overall, and one

showed a significant effect only for the condition in which the program was led by a health educator (not significant for the self-instruction condition).

6. Three of the four studies of multimodal approaches that met criteria for inclusion produced positive effects.

7. There is little evidence of the long-term effectiveness of school-based programs to prevent smoking.

Assessing Short- and Long-Term Effects of Prevention Programs

Although there are multiple studies of school-based programs that have demonstrated short-term effects (at the completion of the program), there has been some concern about the maintenance of these outcomes in the long term (end of high school or beyond). Wiehe and colleagues (2005) conducted a meta-analysis of the eight studies they could locate with results reported at 12th grade or 18 years of age. Of the studies reviewed, only the LST program, an interactive program of 30 sessions (15 in 7th grade, 10 in 9th grade, and 5 in 10th grade) that incorporates the social influences approach, as well as the teaching of other general personal and social skills, was effective at long-term follow-up.

Skara and Sussman (2003) reviewed studies of 25 programs to prevent the use of tobacco or other drugs that included follow-up of at least 24 months. Eighteen of the studies reported significant short-term effects, and 15 reported significant long-term effects. Of 17 studies with both pretest and posttest data, 11 (65%) reported significant long-term effects, with an average reduction in the percentage of baseline nonusers who initiated smoking in the program (using the rate of initiation in the control group as the comparison) of 11.4% (range: 9–14.2%, ES = 0.28). Of the studies with significant short-term effects, 72% (13 of 18) had significant long-term effects. Program effects were less likely to decay when there was extended programming or booster sessions were given.

The Task Force on Community Preventive Services (Zaza et al. 2005), on behalf of the CDC, examined the effectiveness of school-based tobacco use interventions that were published from 1980 to 2001. The Task Force examined 117 studies from 154 published papers. Of these, 48 studies were excluded due to limited quality of implementation or poor study design, leaving 69 studies that were seen to provide the "best evidence" concerning the effectiveness of school-based interventions. Fifty-two studies measured changes in tobacco use prevalence among adolescents. A summary of these studies and their outcomes is shown in Table 6.9. The Task Force noted an overall median effect of nearly -1.0% in absolute difference in smoking prevalence between control and intervention groups (with a range from -10% to +4%). The Task Force concluded that school-based tobacco use interventions can be effective in the short term, but that evidence was insufficient from their review to include a recommendation of implementation at the national level, given the lack of long-term outcomes for most studies.

In a second review, the Task Force on Community Preventive Services (Zaza et al. 2005) reviewed studies of comprehensive community-wide programs that included a school-based tobacco use prevention intervention. Community-wide programs included mass media campaigns, clean indoor air legislation or ordinances, excise tax increases on tobacco products, community education efforts conducted by local groups, and interventions to restrict minors' access to tobacco products. The Task Force reviewed studies that had been published from 1980 to 2001 and identified 17 studies that (1) evaluated community or statewide multicomponent interventions that included a school-based intervention and (2) measured differences or changes in student tobacco use. Of these, one study was excluded because it did not provide measurements of differences or changes in student tobacco use behavior. A summary of the studies deemed sufficient quality for inclusion (n = 16) is found in Table 6.10. Of the 16 studies reviewed, 14 found significant reductions in student tobacco use. In particular, the combination of school-based programs, mass media campaigns, and community education demonstrated a consistent and strong reduction in adolescent tobacco use over time, with a median effect of -4.5% in absolute difference in smoking prevalence between control and intervention groups (with a range of -13% to -2%). The Task Force recommended school-based tobacco use prevention programs be implemented in combination with mass media campaigns and additional community-wide educational activities (The Community Guide 2011).

Dobbins and colleagues (2008) conducted a comprehensive review of the effectiveness of school-based tobacco use prevention programs, examining all systematic reviews and meta-analyses from 1985 to 2007. From an initial analysis of 10,163 abstracts and titles, 92 papers were potentially relevant, and 12 reviews were considered relevant with moderate or strong methodologies. Smoking behavior was reported in 11 of the 12 reviews, with 6 reviews showing a positive effect of school-based programs, 2 showing promising effects, and 3 reporting no impact on smoking outcomes. The reviewers concluded that school-based tobacco use prevention programs are effective in reducing smoking prevalence, onset, and intentions to smoke in the short term. Flay (2007) provided a review of the long-term effectiveness of school-based smoking

Table 6.9 Studies of the effectiveness of school-based interventions to reduce tobacco use

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hurd et al. 1980 (NR) 8 month (m) intervention Greatest: group nonrandomized trial Fair (4 limitations) Schools (junior high schools: 7th grade)	Minneapolis-St. Paul, Minnesota School-based education 3 arms; resist social pressures; immediate harmful effects; model behavior-nonsmoking peer leaders and older role models; commitment activity; videotapes, role-playing; 5 class sessions in health and science classes Compared with usual care	All junior high schools in district: n = 4 1: control 2: monitored control 3: curriculum + monitor 4: curriculum + monitor + other activities 7th-grade students n = 1,636 (99%) n = 1,245 (76%) with pre + post data 1: 440 2: 332 3: 365 4: 389	(1) Student self-reported smoker (not an experimenter)	I-3 13.7% I-4 4.9% C-1 5.7% C-2 9.0% Consolidated I 3-4 9.2% C 1-2 7.1%	I-3 20.3% I-4 5.9% C-1 9.6% C-2 21.1% I 3-4 12.9% C 1-2 14.5%	+6.6 percentage points (pct pts) +1.0 pct pts +3.9 pct pts +12.1 pct pts -3.7 pct pts NR	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1980 (1978) Greatest: group randomized trial Fair (4 limitations) Schools (high schools; 10th grade)	Stanford area, California School-based education, smoking prevention/cessation curriculum, 4 45-minute sessions delivered by trained teachers in health class; social pressures, selling strategies, modeled counter self-verbalizations, resisting peer pressures; cessation procedures; physiological measures-health effects Compared with usual care	All high schools in 2 districts: n = 5 I: n = 3 C: n = 2 10th-grade students in study schools I: 498 C: 399	(1) Student self-reported smoking (%) (prevalence)	Day Week Month I 13.9 19.5 29.2 C 14.5 21.6 26.3	Day Week Month 9.7 16.3 23.6 21.9 30.4	Day-2.8 pct pts NS Week –3.5 pct pts Post p <0.05 Month –9.7 pct pts Post p <0.05	6 months
			(3) Student self-reported "general opinion about smoking"	I NR C NR	I 68% C 65%	+3 pct pts NS	
			(4) Student knowledge (9 survey questions)	I various C various	I various C various	Increased. 7 of 9 questions with statistically significant difference	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Denson and Stretch 1981 (1976–78) Greatest: group randomized trial Fair (3 limitations) Schools (elementary schools)	Saskatoon, Canada School-based education for 6th or 7th grades; 4 sessions; film, lectures, discussion; harmful effects of smoking/ addiction	Elementary schools (n = 6) Matched pairs with assignment	1) Student self-reported tobacco use—regular smoking at end of grade 8 (prevalence)	1976 I 25.7% C 27.8%	1978 I 17.5% C 26.1% p <0.01	-6.5 pct pts	2 years (post)
		8th graders in annual surveys (90% response rates)	(1) Interval self-reported uptake of smoking (Initiation between 7th and 8th grades)	I 14.1% C 10.4%	I 17.5% C 26.1%	-12.3 pct pts p <0.001	
	Compared with usual care	1976 pre 1978 post I 315 292 C 273 307	(4) Student responses (yes) "do you believe smoking is a form of drug addiction?" (knowledge)	I NR C NR	I 62% C 39%	More (post) +23 pct pts p <0.05	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Evans et al. 1981 (NR) Greatest: other design with a concurrent comparison group Fair (4 limitations) Schools (middle schools; 7th grade)	Houston, Texas School-based education; delivered during physical education time with graduate + undergraduate coordinators; social learning theory, immediate consequences of smoking, social pressure coping	Selected, matched junior high schools N = 13 schools assigned to 1 of 6 study conditions	(1) Student self-reported regular/ frequent tobacco use (2 or more cigarettes per day) (prevalence) E1 vs. C1 arms	I1 2.8% C1 2.4%	I1 9.5% C1 14.2% Post differences p <0.001	-5.1 pct pts	3 years (post)
			3) Student self-reported intentions to smoke-median intention scores (lower score=greater intention to smoke) (attitudes)	I1 4.91 C1 4.89	I1-2-3 4.86 C1-2-3 4.79 Post differences p=0.21	Lower intentions to smoke (not statistically significant)	
	Compared with usual care	Students (consent) participating 7th pre / 9th post I 284 / 995 C 165 / 408	(4) Student level of knowledge about smoking	I1 NR C1 NR	I1 NR C1 NR	NR (scores related to smoking intention and behavior)	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Pederson et al. 1981 (NR) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 4–6)	London, Canada School-based education; 12 classroom hours; curriculum based on ALA publication Compared with usual care Note: subset of a larger study	Selected public school classrooms N = 8 classrooms I: n = 4 C: n = 4 Students in study classrooms N = 99 4th graders N = 101 6th graders	(1) Student self-reported smoking behaviors (prevalence)				Post intervention
			"Regular"	NR	NR	No significant effect	
			"Experimental"	NR	NR	No significant effect	
			(3) Student self-reported attitudes (attitudes)	NR	NR	Attitudes of I group became less negative p <0.10	
			(4) Student mean knowledge scores (estimated from chart) (knowledge)	I 8.9 C 12.1	I 11.8 C 10.4	Increased 11.6%; F(1,196) = 13.67 p <0.01	
Coe et al. 1982 (NR) Greatest: group nonrandomized trial Fair (4 limitations) Schools (public middle)	St. Louis, Missouri School-based education, 8 1-hour sessions delivered by trained medical students, peer pressures, mass media advertising, class incentive awards Compared with usual care	Selected public middle schools: 2 One class in each school I: n = 2 classes C: n = 2 classes 7th or 8th graders School A/School B Pre / 1 year I 39/63 28/38 C 52/72 41/43	(1) Student self-reported smoking (at least one cigarette in past 30 days) (prevalence)	A / B I 17.9% 2.6% C 9.8% 9.5%	A / B I 14.3% 10.3% C 34.1% 18.6%	A / B -20.7 -1.4 pct pts (NR)	1 year
			(3) Student self-reported attitude toward smoking (less favorable)	I NR NR C NR NR	I 22.8% 37.0% C 31.9% 30.0%	-9.1 +7.0 pct pts (NR)	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Telch et al. 1982; McAlister et al. 1980 (1977–79) Greatest: group nonrandomized trial Fair (4 limitations) Schools: (junior high schools: 7th grade) Project CLASP (Counseling Leadership Against Smoking Pressure)	San Jose, California School-based education, (drug abuse prevention); social pressures training; 6 class sessions in year 1; 2 45-minute sessions in year 2 (smoking focus in first session); peer-led trained teams of high school students Compared with school-based education (school health curriculum project with no special resistance skills training)	Selected junior high school (2) I school matched to C school on demographics 7th-grade students Baseline 21m 33m I 353 340 82.5% C 217 186 80.2%	(1) Student self-reported smoking during the preceeding week (proxy of weekly) (prevalence)	Estimated from graph: I (2%) C (1%)	21m 33m I 7.1% 5% C 18.8% 15%	At 33 months -11 pct pts (post difference -10 pct pts $x^2 = 12.2$ $p < 0.001$)	33 months (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Alexander et al. 1983 (1979–80) Greatest: group randomized trial Fair (4 limitations) Schools (years 5-6)	New South Wales, Australia School-based education; 9 weeks x 1.5 hours/week led by class teacher (1-day training); increase knowledge, recognize pressures to smoke Compared with usual care	Schools: n = 88 Students in years 5–6 (aged 10–12 years) with complete data n = 5,616 (86%) at analysis I = 2,782 C = 2,904	(1) Self-reported smoker (any use in the last 4 weeks) Monthly Note: Recalculated totals from available data	I 10.39% C 9.12%	I 18.66% C 18.46%	-1.07 pct pts NR (NS subgroups)	6 months (post 1 year)
			(1) Self-reported initiation of tobacco use by baseline nonsmokers	14.5% in usual care group	14.3% across all intervention groups	-0.2 pct pts (initiation)	
			(2) Self-reported smoking cessation by baseline smokers at follow-up	42.8%	43.6%	+0.8 pct pts (cessation)	
			(3) Percentage of students expressing strong disapproval of tobacco use and cigarette advertising (attitudes)	Subgroup data Range: 41.3–50.1%	Subgroup data Range: 38.7–50.2%	Group differences were not significant but trend decrease	
			(4) Student tobacco knowledge scores (out of 28 responses)	Subgroup data 17.2 out of 28	Subgroup data 17.8 out of 28	+0.6 score p <0.001	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Shaffer et al. 1983 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (7th grade)	Cambridge, Massachusetts School-based education, skill acquisition and rehearsal; manual for instructors; 6 45-minute sessions; film and slideshows, skits/role-playing	Selected public schools: n = 2 Selected classrooms n = 7 I: n = 5 C: n = 2 7th-grade students n = 114	(1) Student self-reported smoking (prevalence)				3 months
			Daily	I 8.9% C 8.6%	I 5.1% C 9.7%	-4.9 pct pts NR (past day measure p <0.01 posttest)	
			Past month	I 18% C 17%	I 10% C 22% p <0.01	-13 pct pts	
	Compared with school-based education-single session		(2) Students reporting "used to smoke but quit" (proxy cessation)	I 5.1% C 20%	I 10.1% C 6.5%	(+18.5 pct pts) Post only +3.6 pct pts NR	
Best et al. 1984 (NR) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 6–8)	Ontario, Canada School-based education, social-influences model; grade 6 with booster in grades 7 and 8.	Participating schools in 2 districts N = 22 schools; 11 matched pairs 6th-grade students (consent) n = 654 n = 439 (67%) with complete data at 8th-grade follow-up	(1) Student self-reported smoker (prevalence compiled from stratified results regular + exp smoker=smoker vs. nonsmoker)	I 9.7% C 13.6%	I 22.6% C 34.6%	-8.1 pct pts (no overall measure of significance)	2 years (post grade 6)
Waterloo Smoking Prevention Project	Compared with usual care (routine health education)		(1) Student self-reported smoker (any)-baseline nonsmokers (initiation)	I (0%) C (0%)	I 40% C 53%	-13 pct pts p <0.08	
			(2) Student self-reported quitter-baseline regular user (n = 13) (cessation)	I (100%) C (100%)	I 40% C 25%	+15 pct pts NS (very small quitter sample)	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) Baseline 2-year follow-up I 15 136(86%) C 161 134(83)	(1) Student self-reported smoking (prevalence) Regular	I 4% C 4%	I 9% C 6%	+3 pct pts (NR)	2 years
			Never	I 71% C 77%	I 46% C 34%	(+) 18 pct pts in retaining never smokers (NR)	
			(1) Student self-reported initiation of smoking in baseline nonsmokers (initiation)	I (0%) C (0%)	I 36% C 55%	-19 pct pts RR 2.19, 95% CI (1.2, 3.8) $p < 0.02$	
			(4) Student knowledge scores (knowledge)	I 6.4 (SD 1.49) C 6.7 (SD 1.59)	I 8.6 (SD 1.32) C 8.5 (1.29)	No difference at 2 years $t = 0.56$ NS	
Connell et al. 1985 (1982–84) Moderate: retrospective cohort (exposure assessment) Fair (4 limitations) Schools (4th–6th grades) School Health Education Evaluation of School Health Curriculum Project	United States School-based education Curricula for grades 4–6 (units for each grade). Compared with usual care	4 school districts Classrooms by exposure (n = 73) Grade 4th 5th Exposed 15 27 Unexposed 10 22 Students in study classrooms (5th or 6th grade at follow-up) N = 1,397	(1) Average percentage of students self-reporting smoking activity by exposure	Exposure Two units (full) One unit (partial) No units (unexposed)	 1.6% 2.7% 6.6%	 -5 pct pts -3.9 pct pts Reference $p < 0.05$ overall	1-2 years post exposure
			(3) Average percentage of students self-reporting intent to smoke by exposure	Exposure Two units (full) One unit (partial) No units (unexposed)	 7.3% 7.7% 14.5%	 -7.2 pct pts -6.8 pct pts Reference Overall $p < 0.01$	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dielman et al. 1985 (1981–82) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary schools)	Michigan School-based education; 4 sessions over 8 weeks led by research staff; resisting pressures to smoke films, discussion, role-playing Compared with usual care	1 district's elementary schools n = 10 I: 4 schools Mixed: 2 schools C: 4 schools 5th and 6th graders Pre / Post I 301 / 225 C 291 / 198	(1) Student self-reported smoking (prevalence) Past month Ever (3) Student self-reported intention to smoke in the future (attitude)	 I 4% C 1% I 30% C 30% I 9% C 6%	 I 8% C 15% I 50% C 49% I 9% C 10%	 -10 pct pts p = 0.003 +1 pct point NS -4 pct pts NS	15 months
Schinke and Gilchrist 1985 (NR) Greatest: group randomized trial Fair (3 limitations) Schools (6th grade) Note: See Gilchrist et al. 1986, Schinke and Gilchrist 1986, Schinke et al. 1986 for similar studies. Unclear if overlapping reports	United States; NR School-based education (2 versions with overlap)-graduate student led Health information (info) curriculum: 10 1-hour weekly sessions: debates, film, homework Skills building curriculum: 10 1-hour weekly sessions; problem-solving, resisting smoking pressures Compared with usual care	Selected elementary schools (9) I-skills 3 schools I-info 3 schools C: 3 schools 6th-grade students n = 689 follow-up rates 91-94%	(1) Student self-reported tobacco use in the last week (proxy weekly) (prevalence) (3) Student intentions to smoke cigarettes in high school (attitudes) (4) Student smoking knowledge scores (knowledge)	I-Info 3.4% I-Skills 4% C 3.7% NR NR	I-Info 11.5% I-Skills 7.8% C 12.0% NR NR	-0.2 pct pts NS -4.5 pct pts (significant) Reference I-Skills and I-Info had lower scores than did C students I-Skills students had higher knowledge scores compared with I-Info and C	24 months 24 months 12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gilchrist et al. 1986 (NR) Greatest: group randomized trial Fair (4 limitations) Schools (5th- and 6th-grade students)	United States; NR School-based education (2 arms)-both 8 60-minute sessions with homework; film; testimonials Self-control skills: communication and problem solving skills; role plays; videotape examples Health education: smoking effects; advertising impact Compared with usual care	Public elementary schools assigned to condition N = NR Students (5th to 6th grade) in study schools N = 741 pre N = 701 (95%) follow-up	(1) Student self-reported smoking 1 or more cigarettes in the preceding week (3) Student self-reported intentions to smoke (posttest mean score) (3) Skills-refusal skills score on survey items (4) Student knowledge mean score	Skills 4% Education 3.5% C 4% C 0.51 C 2.09 C 7.72	Skills 5.8% Education 9.6% C 8.3% Skills 0.32 Education 0.30 Skills 3.36 Education 2.46 Skills 10.61 Education 11.13	-2.5 pct pts +1.8 pct pts Reference: skills vs. other F(2,697) = 3.52 p <0.05 Skills and education arms had lower intentions to smoke p <0.05 Refusal skill score higher in skill arm p <0.05 Skills and education arms with higher score p <0.05	13-month follow-up (15m after pre) Posttest Posttest Posttest
Schinke and Gilchrist 1986 (NR) Greatest: group nonrandomized trial Fair (3 limitations) Schools (grades 5 and 6)	United States; NR School-based education, I-full: education sessions and problem-solving exercises and media analysis I-info: education sessions-age relevant effects, use rates Compared with usual care	Selected public schools (n = 3) Participating students in grades 5 and 6 N = 214 N = 196 (92%) at 12-month follow-up	(1) Student self-reported smoking in the past week (proxy weekly) (prevalence) (4) Mean differences (pre to 12 month follow-up) in student knowledge scores (knowledge)	I-Full 3.8% I-Info 2.9% C 3.4%	I-Full (3.7%) I-Info (11.5%) C (13.1%) I-Full +11.9 I-Info +7.3 C +4.4	I-Full vs. C -9.8 pct pts F(2, 196) = 5.12 p <0.001 I-Info vs. C-Comp 1.1 pct pts (NS) I-Full: Increased p <0.001	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke et al. 1986 (NR) Greatest: group randomized trial Fair (3 limitations) Schools (5th and 6th grades)	Western Washington state School-based education Tobacco use prevention (smoked and smokeless); 8 50-minute sessions led by adults delivered to 5th and 6th graders; both arms with homework Skills building arm: health effects education + communication and decision-making skills training and rehearsal; refusal skills Discussion (disc) arm: health effects education (films, testimonials, debates, games) Compared with usual care	Randomly selected elementary schools assigned to condition N = 12 5th–6th grade students n = 1,281 baseline loss to follow-up 10.8%	(1) Student self-reported smoking in the past week (prevalence) (1) Student self-reported smokeless tobacco use in the past week (prevalence)	I-Skills 4% I-Disc 3% C 4% I-Skills 3% I-Disc 3% C 2%	I-Skills 7% I-Disc 11% C 12% I-Skills 12% I-Disc 16% C 15%	-5 pct pts 0 pct pts Reference (skills vs. other $p < 0.05$) -4 pct pts 0 pct pts Reference (skills vs. other $p < 0.05$)	24 months 24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Biglan et al. 1987 (NR) Greatest: group randomized trial Fair (4 limitations) Schools (middle + high schools)	Lane County, Oregon School-based education Refusal skills training: 4 sessions over 2 weeks Compared with usual care	Participating schools in two districts N = 3 high schools + 6 middle schools Classrooms random assignment 7th–10th graders N = 1,730 baseline n = 1,180 (68.2%) at 1-year follow-up	(1) Student self-reported tobacco use (smoking index) (2) Student self-reported smoking-baseline regular smokers (cessation)	I NR C NR I NR C NR	I NR C NR I 22.33 (mean) C 50.35 (mean)	None of the differences were significant on x^2 (+) 28 ? ANCOVA F = 4.55 p = 0.04	1 year
Hansen et al. 1988a (1981–83) Greatest: group nonrandomized trial Fair (3 limitations) Schools (6th and 7th grades) TAPP (Tobacco and Alcohol Prevention Project)	Los Angeles, California School-based education,(drug use prevention-alcohol and tobacco); trained teachers and peer opinion leaders; 15 50-minute sessions; pressure resistance training; discussion; role-playing; student workbooks; public commitments Compared with usual care	Participating districts/ schools (assigned) 2 student cohorts Cohort 1 Los Angeles county District A: 556 District B: 605 Note: follow-up resp %: I (54%), C (49%) Cohort 2 Other District A: 1,379 District C: 328	(1) Student self-reported cigarette smoking in the previous 30 days (monthly) (prevalence)	Cohort 1 7th grade (pre) I (8%) C (9%) 6th grade District A C I NR NR C NR NR	Cohort 1 10th grade (follow-up) I 26% C 34% p=0.13 9th grade District A C I NR 8.3% C NR 20.0% NS NS	Cohort 1 Overall difference -8 pct pts (NS) No overall assessment Differences were not statistically significant	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988b (NR) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade) Project SMART (Self-Management and Resistance Training)	Los Angeles, California School-based education (drug use prevention); two curricula (social influences I-SI; affective education I-SE); trained teachers/school health staff delivered with recruited peer assistants; 1 session per week for 12 sessions Compared with usual care	Junior high schools N = 44 (70%) assigned 14 (32%) recruited and initial cohort report on 8 schools School / Class I-AE: 2 / 24 I-SI: 2 / 25 C: 4 / 35 7th-grade students n = 2,863 with pre + post data 1,374 (48%)	(1) Student self-reported tobacco use-smoking index mean (prevalence)	I-AE NR I-SI NR C NR	I-AE 1.508 I-SI 0.544 C 0.888	(Compared to C) Increased p <0.01 Not significantly different p = 0.3	12 months
			(1) Student self-reported onset of tobacco use	I-AE NR I-SI NR C NR	I-AE NR I-SI 11.8% C 17.8%	Increased +86.4% -6.0 pct pts p <0.05	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (NR) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(1) Student self-reported smoking behaviors-undefined (6-level scale) (prevalence)			Overall treatment vs. comparison group differences were significant p = 0.0001	2 months
			Boys	I 3.1 (1.3) C 3.2 (1.5)	I 4.6 (2.1) C 3.3 (1.5)		
			Girls	I 3.1 (1.3) C 3.2 (1.4)	I 5.0 (1.7) C 3.6 (1.7)		
			(1) Student self-reported change in smoking status over study period (initiation)	I 0% C 0%	I 9.7%, C 14.5%	-4.8 pct pts p = 0.25	
	Compared with usual care		(2) Student baseline smoker self-reporting cessation at 2m follow-up (cessation)	I 0% C 0%	I 3.5% C 9.3% p=0.39	-5.8 pct pts NS	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1989 (NR) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools Pre / Analysis I 256 / 189 (74) C 215 / 156 (73)	(1) Student self-reported smoking (prevalence)				Post (3.5 months)
			Past week	I 0.07 C 0.09	I NR C NR	NR: logistic regression (log reg) NS	
			Past month	I 0.09 C 0.12	I NR C NR	NR log reg p = 0.0618 (NS)	
			Past day	I 0.04 C 0.06	I NR C NR	NR log reg NS	
			(3) Student self-reported attitude regarding peer smoking (attitudes)	I 3.60 scale score C 3.61	I 3.51 C 4.05	Improved Posttest p <0.01	
			(4) Student knowledge-smoking prevalence (Knowledge)	I 0.59 scale score C 0.52	I 0.91 C 0.51	Improved Posttest p <0.0001	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Bush et al. 1989a,b (1983–85) Greatest: group randomized trial Fair (4 limitations) Schools (initiated grades 4–6 to grades 7–9) Know Your Body	Washington, D.C. School-based education + school-based health screening + parent education + parent activities (involvement in intervention) Compared with school-based health screening (parents notified of results)	Selected public elementary schools n = 9 Full I: n = 3 Partial I: n = 3 C: n = 3 Students in 4th–6th grades Baseline: 892 (72%) Follow-up: 431 (35%)	(1a) Percentage of screened students included in analysis with serum thiocyanate levels >100 umoles/L	I 5.2% C 0.0%	I 0.9% C 5.0%	-9.3 pct pts significant NR	3 years (post)
			Observed mean differences in serum thiocyantate levels over study period (3 years)-adjusted results	NA	NA	-15.74 ± 2.85 µmoles/L p = 0.000	
			(3) Mean differences in student self-reported attitudes toward cigarettes (negative)-adjusted	NA	NA	2.78 ± 1.10 p = 0.012	
Figa-Talamanca and Modolo (1989) (NR) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(1) Student self-reported smoking "regularly" (prevalence)	I-A 17.7% I-B 23.9% C 15.9%	I-A 20.4% I-B 24.2% C 17.2%	+4.0 pct pts NR +1.6 pct pts NR Reference	1 year
			(2) Student self-reported smoking status as "ex-smoker" (cessation)	I-A 15.7% I-B 15.8% C 12.5%	I-A 21.2% I-B 18.9% C 9.9%	+8.1 pct pts +5.7 pct pts Reference	
			(4) Student responses on knowledge assessed as "good" (knowledge)	I-A 11.0% I-B 16.2% C 7.9%	I-A 27.6% I-B 18.6% C 7.7%	+16.8 pct pts* +2.6 pct pts Reference *p ≤0.01	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Flay et al. 1989 (1979–80 [with 6-year follow-up]) Greatest: group randomized trial Fair (3 limitations) Schools (grade 6) Waterloo Trial	Waterloo, Canada School-based education; social influences model; information and skills development to resist social influences and improve decision making; 6 sessions in 6th grade with 2 booster sessions at end of 6th, in 7th, and 1 booster in 8th grade; research staff delivered Compared with usual care	N = 22 matched and randomly assigned schools I: n = 11 C: n = 11 Students (consent) N = 654 (94%) pre N = 551 (81%) responding at 12th-grade follow-up	(1) Self-reported regular smokers (once per week or more) (weekly) (prevalence) (estimated from graph) Logit model for 12th-grade regular smoking	Pre (6th) Post (8th) I (3%) 7.64% C (5%) 9.13% Note: At end of 8th grade–overall difference +0.51	Follow-up (12th) I 34% C 32%	+4 pct pts OR 1.24, 95% CI (0.83, 1.86)	6 years
Walter 1989 (1979–85) Greatest: group randomized trial Fair (4 limitations) Schools (elementary; 4th grade) Know Your Body	New York School-based education (cardiovascular disease risk factor reduction); teacher-led; 2 hours per week throughout 4th grade; Curriculum continued through 9th grade Compared with usual care	Participating elementary schools Bronx West Schools 22 15 Students at analysis 1,036 593 (66%) (65%) Westchester follow-up was 6 yrs with smoking results	(1) School means of students with biochemical indications of cigarette smoking at 9th grade (prevalence)	I 0.0 C 0.0	I 3.5 $\pm$ 4.3 C 13.1 $\pm$ 5.p <0.005	-9.6 pct pts Note: No significant differences at 5 yrs	6 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; NR School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers Girls / Boys Ipeer 164 / 166 Iteacher 196 / 162	(1) Student self-reported smoking (subset of responders to both follow-up surveys) Girls P 215 T 275 Boys P 252 T 256 (2) Student self-reported smoking at 2-year follow-up in baseline nonsmokers (initiation) Logistic regression analyses (95% CI not reported here) Girls P 164 T 196 Boys P 166 T 162	 IP 23.7% IT 28.7% C 29.9% IP 33.7% IT 36.7% C 36.1%	 IP 49.3% IT 49.5% C 59.3% IP 52.0% IT 45.7% C 49.3%	 -3.8 pct pts -8.6 pct pts Reference (I-both vs. C p = 0.03) +5.1 pct pts -4.2 pct pts Reference (I-T vs. C p = 0.009) IP –8.1 pct pts NS IT –6.6 pct pts NS IP +6.4 pct pts NS IT -2.8 pct pts NS	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) vs. older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(1) Student self-reported tobacco use Monthly/weekly/daily Post-test adjusted differences at 1 year Peer-led ± booster in 8th grade Teacher-led ± booster in 8th grade Note: 4m post result not presented here	I-P NR I-PB NR I-T NR I-TB NR C NR	Mth Wkly Day I-P 0.31 0.22 0.17 PB 0.12 0.05 0.03 I-T 0.26 0.16 0.11 TB 0.34 0.21 0.16 C 0.23 0.16 0.13	Mth Weekly Day I-P .08 .06 .04 PB* -.11 -.11 -.10 I-T .03 .00 -.02 TB .11 .05 .03 C ref ref ref *All PB difference p <0.05	Post (1-year) B arms or 1-year follow-up non-B arms
			(3) Student self-reported tobacco attitudes (scale score) (attitudes)	I-P NR I-PB NR I-T NR I-TB NR C NR	Score I-P 37.84 I-PB 38.95 I-T 38.29 I-TB 37.19 C 37.29	I-P increased NS I-PB increased p <0.01 I-T increased p <0.5 I-TB decreased NS C reference	
			(3) Student self-reported locus of control (skills)	I-P NR I-PB NR I-T NR I-TB NR C NR	Score I-P 7.53 I-PB 6.68 I-T 7.69 I-TB 8.19 C 7.71	I-P -0.18 I-PB –1.03 p <0.01 I-T -0.02 I-TB +0.43 C reference	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Continued			(4) Student tobacco knowledge (scale score) (knowledge)	I-P NR I-PB NR I-T NR I-TB NR C NR	Score I-P 7.95 I-PB 8.50 I-T 7.36 I-TB 8.55 C 6.74	I-P increased p <0.0001 I-PB increased p <0.0001 I-T increased p <0.0001 I-TB increased p <0.0001 C NR	
Gatta et al. 1991 (1982–86) Greatest: group randomized trial Fair (4 limitations) Schools (year 4) Italian League Against Cancer (Milan)	Milan, Italy School-based education; tobacco prevention; health effects and consequences, 1 day of lessons, slides, films, posters, comic strips, delivered by trained teachers to students in year 4 (aged 9–10 years) Compared with usual care	Schools in Milan N = 163 of 165 schools: Random assignment I: 55 C: 56 Mixed: 52 Class (I; C) Students: Year 4 Year 8 I 8,549 5,007 (58%) C 8,897 5,310 (60%)	(1) Student self-reported status as smoker (prevalence) post only comparison	I NR C NR	I 8.0% C 8.7%	-0.7 pct pts NS Risk ratio = 0.92 (95% CI 0.79, 1.06)	4 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1991 (1987–88) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade)	Los Angeles and Orange counties, California School-based education (drug use prevention); social influence theory); resistance skills training or correcting normative (norm) perceptions of use; project staff delivered 9 classroom sessions in each study arm Compared with school-based education (resistance skills vs. normative arms)	Participating, selected junior high schools: n = 12 Assigned to one of 4 study arms by school 7th-grade students in study schools N = 3,011 at baseline N = 2,416 (80%) at 1-year follow-up (8th grade)	(1) Student self-reported cigarette smoking (prevalence) within 30 days Ever use Note: Data were incompletely reported for each study arm; analyses were reported for comparisons of students exposed to normative education or resistance skills training	I-Norm: NR C-Other: NR I-Norm: NR C-Other: NR	I-Norm: 4.8% C-Other: 6.5% I-Norm 8.1% C-Other 10.3%	-1.7 pct pts I-Norm: $F = 4.71$ $p < 0.05$ -2.2 pct pts	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (MS + HS) N = 2,552 baseline N = 1,768(69%) follow-up MS HS I 610 172 C 483 503	(1) High school student self-reported tobacco use (average number per month)				1 year
			Cigarettes	Boys Girls I 9.4 5.7 C 3.2 13.9	Boys Girls 24.9 22.7 17.9	Boys: +2.8 cigs/ month NS Girls: +13 cigs/ month NS	
			Smokeless	Boys I 15.5 C 16.0	I 11.7 C 21.5	-9.3 chews/ month p <0.05 but NS on logistic transformation	
			(1) Middle school student self-reported tobacco use (average number per month)				
			Cigarettes	Boys Girls I 0.7 1.9 C 1.3 1.1	9.1 13.6 3.4 12.4	Boys: +6.3cigs/ month Girls: +0.4cigs/ month	
			Smokeless	Boys I 4.8 C 2.6	I 5.1 C 7.3	-4.0 chews/month p <0.05; NS on logistic transformation	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1992 (NR) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 I C Public 6 5 Parochial 19 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported smoking during the past month (prevalence)	I 4.86% C 5.03%	I 5.19% C 7.15%	-1.79 pct pts F(1,41) = 4.14 p <0.05	4 months (post)
			(1) Student self-reported smoking-baseline nonsmokers (initiation)	I (0%) C (0%)	I NR C NR	NR (reduced) F(1,42) = 5.74 p <0.03	
			(1) Student self-reported current smoking	I NR C NR	I NR C NR	NR F(1,41) = 3.27 p <0.08	
			(1) Student self-reported smoking in the past day or the past week	I NR C NR	I NR C NR	NR differences NS	
			(3) Student self-reported anti-smoking attitudes (scale scores)	I 40.43 C 40.51	I 37.71 C 38.32	No significant difference	
			(4) Student smoking knowledge (various) Smoking prevalence	I 0.91 C 0.88	I 0.86 C 0.57	Higher p <0.0001	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Elder et al. 1993; Kellam et al. 1998 (see also Eckhardt et al. 1997) (1988–91) Greatest: group nonrandomized trial Fair (3 limitations) Schools (7th grade) Project SHOUT (Students Helping Others Understand Tobacco)	San Diego, California School-based education; 18 sessions (10 in 7th grade, 8 in 8th grade) led by trained undergrads; refusal skills training; activities, health consequences (some student activities outside of class) + mail/telephone support (9th-grade proactive follow-up with 2 calls/semester per student) Compared with usual care	Selected, participating schools n = 22 Matched + assigned I: 11 schools C: 11 schools 7th graders at baseline: n = 3,655 9th grade at follow-up: n = 2,668 (73%) I: 1,174 C: 1,494	(1) Student self-reported tobacco use in the past month (prevalence) Logistic regression analyses (1) Combined tobacco use in the past month (1) Combined tobacco use in the past week *Note*: At end of second year of study (school-based component), differences in student self-reported tobacco use in the past month was –1.8 (NS), so an additional follow-up intervention was implemented	I 5.7% C 6.4%	I 14.2% C 22.5%	–7.1 pct pts significance NR OR = 0.71 p <0.05 OR = 0.66 p <0.05	2 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) <u>1979</u> <u>1981</u> <u>1989</u> 827 718 796 (82%) (66%) (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(1) Student self-reported weekly smoking (prevalence)	I NR C NR	I 50.3% C 53.0%	-2.7 pct pts NS	10 years
			Subgroup analysis: male students	I NR C NR	I 43.1% C 51.7%	-8.6 pct pts NS Logistic regression OR 1.73, 95% CI (1.04, 2.89)	
			(1) Student self-reported weekly smoking at follow-up in baseline nonsmokers (initiation + prevalence)				
			Males	I (0%) C (0%)	I 35.0% C 50.0%	-15 pct pts p <0.05 OR 2.09 (1.2, 3.6)	
			Females	I (0%) C (0%)	I 55.0% C 53.0%	+2 pct pts NS	
			(3) Student self-reported intentions to not smoke daily 5 years from now (attitude)	I 66.2% C 57.5%	I (+13.8 pct pts) C (+12.6 pct pts)	Overall difference +1.2 pct pts p <0.05	2 years (post)
			Subgroup analysis: student self-reported intentions to not smoke daily 5 years from now (attitude)-baseline nonsmokers	<u>Boys</u> <u>Girls</u> I 69.4% 72.5% C 64.6% 57.7%	<u>Boys</u> <u>Girls</u> I +18.7 +11.0 C +13.9 +17.9	<u>Boys</u> <u>Girls</u> +4.8 -6.9 (NR) (NR)	2 years
			(4) Student smoking knowledge test scores (maximum 14)	I 8.6 8.2 C 8.1 7.5	I +1.3 +1.7 C +1.2 +1.4	Overall: increased p <0.05	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm N schools C 10 I-FSE 10 I-M 9 I-FSE+M 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(1) Student self-reported current smoker (prevalence) (4) Student knowledge score (maximum 12) baseline and interval change	C 2.2% I-FES 1.8% I-M 4.4% I-FSE+M 1.7% C 5.18 I-FES 5.57 I-M 5.38 I-FSE+M 5.47	C 11.3% I-FES 14.4% I-M 12.0% I-FSE+M 10.1% Interval change +1.04 +1.09 +0.91 +1.28	Reference +3.5 pct pts -1.5 pct pts -0.7 pct pts Group difference NS Group differences were small and not statistically significant	1 year 1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (NR) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative SI; countering informational SI; physical consequences of use non-SI; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes x 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported smoking-weekly cigarette use (prevalence) (1) Student self-reported trial cigarette use (ever tried) (prevalence-ever) (1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless) Abbreviated results	 I-norm SI NR I-info SI NR I-non SI NR I-combined NR C-usual care NR I-norm SI NR I-info SI NR I-non SI NR I-combined NR C-usual care NR NR	Change in use +0.053 +0.032 +0.026 +0.020 +0.056 reference Change in use +0.102 +0.071 +0.061 +0.073 +0.093 I-combined –0.004 C-usual care +0.005	 -0.3 pct pts NS -2.4 pct pts* -3.0 pct pts* -3.6 pct pts* Reference *p <0.05 +0.9 pct pts NS -2.2 pct pts* -3.2 pct pts* -2.0 pct pts* Reference *p <0.05 -0.9 pct pts p <0.05 (all others NS)	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Continued							
Addendum Dent et al. 1995 (2nd-year follow-up results) (NR) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up		Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to TNT 65% (n = NR but calculated 4,692) Exposed: 4,692 Unexposed: NR (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly cigarette use (prevalence) School as unit of analyses	I-norm SI NR I-info SI NR I-non SI NR I-combined NR C-usual care NR	Change in use +9 +12 +8 +4 +9	Differences +3 pct pts NS +0 pct pts NS -1 pct pt NS -5 pct pts p <0.05 Reference (note statistically significant vs. all others)	2 years (9th grade)
			(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-norm SI NR I-info SI NR I-non SI NR I-combined NR C-usual care NR	+17 +15 +13 +16 +23	-6 pct pts* -8 pct pts* -10 pct pts* -7 pct pts* Reference (*all p <0.05 compared to reference)	
			(1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless)	I-norm SI NR I-info SI NR I-non SI NR I-combined NR C-usual care NR	+2 +2 -1 -0 +1	+3 pct pts NS +3 pct pts NS -2 pct pts p <0.05 -1 pct pt (marginal) Reference	
			(1) Student self-reported trial smokeless tobacco use (prevalence-ever) (results abbreviated)	NR	I-non SI +0 C +7	-7 pct pts p <0.05 (others were NS)	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
De Vries et al. 1994 (1986–87) Greatest: group nonrandomized trial Fair (3 limitations) Schools (8th grade) Vocational (Voc) schools High schools	The Netherlands School-based education for 8th-grade students based on social influences; 5 45-minute sessions based on peer-led program on video; peer training and peer led small group activities; manual Compared with usual care	Recruited schools Voc / HS I 3 / 5 C 3 / 3 Students in study classes (9 month follow-up) Voc / HS I 343 / 585 C 217 / 384	(1) Student self-reported regular smoking (daily + weekly prevalence) grade 9	Voc / HS I 16.4% / 3.6% C 15.8% / 3.0%	Voc / HS I 23.5% / 7.1% C 30.0% / 5.7%	Voc / HS -7.1 pct pts / +0.8 OR 2.24 (1.3, 3.9) / OR 0.78 (0.4,1.6)	9 months (9th)
			(2) Student initiation of experimental smoking-baseline nonsmokers (initiation)	C 56.5% / C 52.1%	I 64.0% / I 41.6%	+7.5 NS / -10.5 p <0.02	
			(3) Student cessation of smoking (baseline users) (cessation)	C 19.4% / C 33.3%	I 27.4% / I 28.1%	+8 NS / –5.2 NS	
			(4) Student intentions to smoke (attitudes)	NR	NR	No significant differences	
			(5) Student knowledge	NR	NR	Voc / HS NS change / Increased p <0.01	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group N at follow-up I1 762 I2 848 C 1,142	(1) Student self-reported cigarette smoking (prevalence) Weekly	 I1 4% I2 5% C 4%	 I1 23% p <0.05 I2 21% p <0.05 C 27% reference	 -4 pct pts -7 pct pts Reference	 6 years (3 years post at end of 12th grade)
			Monthly	I1 6% I2 8% C 7%	I1 27% p <0.05 I2 26% p <0.01 C 33% reference	-5 pct pts -10 pct pts Reference	
			Note: High-fidelity subsample demonstrated differences of greater magnitude; alcohol and marijuana data are not presented here				
			(3) Student self-reported normative expectations-adult smoking	I1 NR I2 NR C NR	I1 3.92 p <0.0001 I2 3.95 p <0.0001 C 4.22 reference	Lower (improved) Lower (improved)	3 years (post 9th grade)
			(4) Student knowledge on 10-item test (score) Smoking prevalence (actual)	I1 NR I2 NR C NR	I1 1.10 p <0.0001 I2 1.16 p <0.0001 C 0.93 reference	Higher (post) Higher (post) Reference	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hawthorne et al. 1995 (NR [5 year intervention]) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Schools (elementary)	Melbourne, Australia School-based education ("Life Education" drug use prevention); 5–12 years of age with new module for each class year; teacher-delivered; self-esteem, body function, drug use pressures; discussion and role-plays Compared with school-based education (usual care but equivalent hours)	Selected, stratified sample of schools in Melbourne area I: 42 C: 44 Students in year 6 (post-only) Aged 11–12 years I: 1,721 C: 1,298	(1) Student self-reported smoking (any) in the previous month (prevalence) (1) Student self-reported smoking (any) ever (prevalence)	I NR (post only) C NR I NR C NR	I 7.8% C 5.8% I 32% C 28%	+2 pct pts Logistic regression OR 1.3 (school) 95% CI (1.0, 1.9) +4 pct pts OR 1.2 (school) 95% CI (1.0, 1.4)	Post (5 school years)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect	Value used in summary	Follow-up time
Eckhardt et al. 1997 (see also Elder et al. 1993) (1988–91; 1992) Greatest: individual randomized trial Fair (4 limitations) Schools (7th–11th grades) Project SHOUT extension	San Diego, California As per Elder 1993: School-based education, SWAT, and mail/telephone support; tobacco use prevention; 7th–9th grades. Addition of 11th grade mailed newsletters (2) and proactive phone call (1) (2 study arms) Compared with 2 arms: usual care; no 11th-grade intervention	Students in the original grades 7–9 cohort contacted in 10th grade: n = 2,051 (76%) I grades (7–11) Lapsed grades (7–9) Delayed grade (11 only) C-usual care At analysis n = 1,545 (75%; 58% overall)	(1) Student self-reported smoking (any) in the past 30 days (prevalence) Note: Elder 1993 reported combined tobacco use rates	I Lapsed Delayed C Differences	NR NR NR NR NS	7%* 10.8% 9.4% 12.6% $*x^2=6.33$ $p < 0.05$	-5.6 pct pts -1.8 pct pts -3.2 pct pts Reference	Post (4 years) 1-year follow-up Post (4 years)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Weekly Note: Statistical significance was reported for comparison of nonsmoking (significant in favor of the intervention B vs. usual care	C 0.8% I-B 1.6% I-C 1.7% I-D 1.8%	C 3.0% n = 1,091 I-B 1.6% 1,060 I-C 1.1% 791 I-D 2.7% 878	Reference -2.2 pct pts -2.8 pct pts -1.3 pct pts	6 months
			Less than once/week	C 4.1% I-B 4.2% I-C 4.4% I-D 5.2%	C 5.9% I-B 4.9% I-C 5.9% I-D 6.7%	Reference -1.1 pct pts -0.3 pct pts -0.3 pct pts	
			Daily	C 2.2% I-B 1.1% I-C 2.1% I-D 3.2%	C 6.6% I-B 2.2% I-C 5.6% I-D 7.1%	Reference -2.2 pct pts -0.9 pct pts -0.5 pct pts	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) 7-day use 30-day use 24-hour use Ever use	 I 9.7% C 11.4% I 12.9% C 16.7% I 5.2% C 6.2% I 51.1% C 51.4%	 I 30.1% C 37.9% $p < 0.01$ I 33.6% C 43.5% $p < 0.01$ I 21.6% C 27.9% $p < 0.05$ I 72.2% C 77.0% NS	 -6.1 pct pts -6.1 pct pts -5.3 pct pts -4.5 pct pts	1 year (7th–9th grades)
Sussman et al. 1998 (1994–95) Greatest: group randomized trial Fair (2 limitations) Schools (continuation high schools)	Southern California School-based education; drug use prevention/ cessation; 9 classroom sessions over 3 weeks delivered by trained project staff; health motivation, social skills, decision-making; emphasis on motivational activities; additional schoolwide activities (SAC) in one arm Compared with usual care	Selected continuation high schools (21 schools from 29 districts) Blocked random assignment Class: 7 schools Class + SAC: 7 schools Usual care: 7 schools Students (all grades) N = 2,863 available N = 1,587 consent N = 1,074 (38%) at analysis	(1) Adjusted means of student self-reported cigarette use in the past 30 days (prevalence) Adjusted for baseline use, interaction between condition and baseline level, and method of follow-up	I-Class NR I-Class + SAC NR C-Usual care NR Note	I-C 34.53 (%) I-SAC 33.08 C 30.71	+3.82 pct pts +2.37 pct pts Reference Condition effect $F(2,18) = 0.16$ $p = 0.85$ Interaction effect $F(2,1049) = 0.45$ $p = 0.64$	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (NR) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(1) Student self-reported smoking in the past month (prevalence-monthly)	I 4.2% C 4.0%	I 8.8% C 12.3%	-3.7 pct pts $x^2 = 7.1$ $p < 0.005$	1 year (8th grade)
			(1) Student self-reported ever smoking (prevalence-ever)	I 19.1% C 19.2%	I 28.3% C 34.5%	-6.1 pct pts $p = 0.001$	1 year
			(1) Self-reported initiation of tobacco use over study period (initiation-undefined)	I (0%) C (0%)	I 19.6% C 23.9%	-4.3 pct pts $p = 0.02$	1 year
			(3) Student self reported intentions to smoke in the future (attitudes)	Adjusted means of scores at follow-up	I 1.68 (SE 0.03) C 1.85 (SE 0.04)	Improved $p = 0.002$	1 year
			(3) Student anti-smoking attitudes (attitude)	Adjusted means of scores at follow-up	I 87.23 (SE 0.51) C 86.34 (SE 0.62)	No significant difference	1 year
			(4) Student smoking knowledge score	Adjusted means of scores at follow-up	I 36.12 (SE 0.70) C 30.19 (SE 0.84)	Increased $p = 0.001$	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Cameron et al. 1999 (NR [1992]) Greatest: group randomized trial Fair (2 limitations) Schools ("elementary" grades 6, 7, 8) [Canada] Waterloo Curriculum	Ontario, Canada School-based smoking prevention program; social influences; lessons in grade 6 (6), grade 7 (3), and grade 8 (6); modeling, rehearsal, discussions, audio visual aids, manuals; 4 intervention arms (training/provider comparisons) Compared with usual care	7 school districts Participating schools (n = 100) stratified on baseline risk score then randomly assigned I: 4 arms C: 1 arm Students: N = 4,466 baseline response N = 3,821 (85.6%) at post	(1) Student self-reported smoking status (experimental + regular/weekly) (prevalence) Subset analysis: students in schools with baseline high risk score Note: No significant differences as function of training method or provider	I NR (post only) C NR (post only) I NR C NR	I 17.9% C 21.0% I 16.0% C 26.9%	-3.1 pct pts NS -10.9 pct pts logistic regression $F_{1,26} = 8.99$ $p = 0.006$	Post (8th grade-3 year intervention period)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes Classes Students I1 13 284 I2 15 315 C 20 350 Follow-up at 18 months n = 794 (84%)	(1) Student self-reported smoking (monthly or greater) (prevalence)	I1 7.4% I2 15.5% C 11.0% p <0.01	I1 28.4% I2 36.9% C 34.7%	-2.7 pct pts -2.3 pct pts Reference OR = 0.91 95% CI (0.48, 1.72)	18 months
			(2) Student smoking-baseline nonsmokers (initiation)	I1 (0)% I2 (0)% C (0)%	I1 NR I2 NR C NR	NR (not significant) NR (not significant) NR	
			(3) Student self-reported "high" intentions to smoke in the future (attitudes)	I1 12.0% I2 21.6% C 18.6% p <0.01	I1 26.1% I2 39.9% C 34.1%	-1.7 pct pts +2.8 pct pts Reference OR = 1.18 95% CI (0.66, 2.09)	

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dijkstra et al. 1999 (1990–92) Greatest: group randomized trial Fair (4 limitations) Schools (grades 8 and 9; high school)	The Netherlands School-based education; smoking prevention; 5 45-minute lessons delivered weekly; social influences (SI) or decision-making + SI curriculum with and without 3 magazines distributed in class as boosters (B). Compared with usual care	Recruited high schools n = 52 randomly assigned to condition Students: 8th grade at baseline: n = 4,826 N = 3,104 (64%) at post (18 months) Group N post I-SI + B 526 I-SI 575 I-SI-DM+B 351 I-SI+DM 460 C 1,192	(1) Student self-reported smoking (combined daily + weekly + occasional) (prevalence)	I-SI+B 5.3% I-SI 7.3% I-SI+DM+B 7.7% I-SI+DM 13.5% C 6.4%	15.0% 21.2% 20.5% 23.9% 21.3%	-5.2 pct pts p <0.005 -1 pct pt NS -2.1 pct pts NS -4.5 pct pts p <0.07 Reference	Post 18 months
Hawkins et al. 1999 (1981–86 [follow-up 1993]) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary)	Seattle, Washington School-based education (general social competence) + teacher education + parent education Compared with usual care	Elementary schools n = 18 assigned std to condition Students baseline follow-up Full 156 149 Late 267 243 C 220 206	(1) Student self-reported cigarette smoking-lifetime (ever) at follow-up (age 18) (prevalence) Heavy cigarette smoking	C 54.4% C NR	I-Full 53.7% I-Later 52.7% NR	-0.7 pct pts (-10.6, 10.4) NS -1.7 pct pts (-10.5, 8.0) NS No significant effects	6 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Lynam et al. 1999 also Clayton et al. 1996 (1987–88 [follow-up 1997]) Greatest: group randomized trial Fair (4 limitations) Schools (grade 6; elementary) DARE (Drug Abuse Resistance Education)	Lexington-Fayette County, Kentucky DARE: school-based education; drug use prevention; 1 hour sessions x 17 weeks delivered by trained law enforcement officers; skills teaching social pressures; decision-making; self-esteem; drug information and alternatives Compared with school-based education (usual care)	Recruited elementary schools in county: n = 31 I: 23 schools C: 8 schools Students in study schools Baseline 5 yrs 10 yrs 2,071 1,143 (55%) 1,002 (48%) I 762 10 year C 240 follow-up	(1) Student self-reported cigarette use (variety of frequency and prevalence measures) (prevalence) Hierarchical linear models with fixed effect estimates (group mean centered) (3) Positive expectancies toward cigarettes (attitude) Fixed effect estimates	I NR C NR Frequency past month cigarette use	I NR C NR Fixed effect: 0.101 0.053	No significant differences at 5-year or 10-year follow-up NS NS	10 years and 5 years
Bergamaschi et al. 2000 (1993–94) Moderate: Retrospective cohort Fair (4 limitations) Schools (middle schools) Leave Us Clean	Italy; 3 communities in Romagna School-based education campaign; antismoking; 6 units led by regular teachers for middle school students; resist influences to start smoking Compared with exposed vs. not exposed while middle school students	2nd year high school students (aged 16 years) present on date of survey N = 2,691 Exposed 863 (32.1%) Unexposed 1,828 (67.9%)	(1) Student self-reported smoker	Exposed NR Unexposed NR	Exposed 19.1% Unexposed 23.2%	-4.1 percentage points x^2=5.54 p <0.05	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Peterson et al. 2000 (1984–99) Greatest: group randomized trial Good (0 limitations) Schools (grades 3–10) Hutchinson Smoking Prevention Project	Washington state School-based education, based on social influences; led by trained teachers with curriculum for grades 3–10; 65 classroom lessons 30–50 minute each (5–10 lessons/grade) total 46.75 hours (3.2 hours/grade); also self-help cessation materials and promotion (grades 9–12), and biannual newsletters for teachers Compared with usual care (school education was noted at 2.9 hours/grade)	Recruited school districts (40 of 41) Matched pair randomization to condition I: n = 20 districts C: n = 20 districts Students 3rd-grade baseline I 4,177 C 4,211 2 years post 12th grade follow-up I 3,919 (94%) C 3,946 (94%)	(1) Mean school district smoking prevalence-daily smoking (prevalence)	I NR (3rd grade) C NR	I 28.42% C 29.07%	-0.65 pct pts 95% CI (-2.8, +3.8) p=0.68 +1.4 pct pts p=0.38 -2.6 pct pts p=0.30	2 years post 12th grade 4 years post education intervention 11 years post baseline
			Subset Girls	NR	I 27.0% C 25.6%		
			Subset Boys	NR	I 29.9% C 32.5%		
			(1) Mean school district smoking prevalence-daily smoking (prevalence)	I NR (3rd grade) C NR	I 25.4% C 25.7%	-0.3 pct pts 95% CI (-3.5, +3.7) p=0.86	12th grade 9 years post baseline

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Aveyard et al. 2001 (1997–98) Greatest: group randomized trial Fair (4 limitations) Schools (year 9)	West Midlands region, United Kingdom School-based education (6 sessions computer + classroom) Compared with school-based education (national health education curriculum)	Participating schools n = 53 (58%) I: 27 C: 26 Students in year 9 n = 8,352 enrolled n = 6,819 (73%) at 2-year follow-up	(1) Self-reported regular weekly smoking (prevalence years 9–11)	I 13.3% C 12.8%	I 23.5% C 22.4%	+0.6 pct pts overall; -1.1 pct pts (post-only) Adjusted OR 1.06 (0.86, 1.31)	2 years
			(2) Self-reported smoking in baseline regular, daily smokers (cessation)	I (100%) C (100%)	I 76.1% C 76.6%	+0.5 pct pts (-6.8, +9.9)	

Note: **CI** = confidence interval; **ALA** = American Lung Association; **ANCOVA** = analysis of covariation; **HS** = high school; **MS** = middle school; **NR** = not reported; **NS** = not significant; **OR** = odds ratio; **SD** = standard deviation; **SWAT** = Students Working Against Tobacco; **µmoles/L** = micrometer per liter.

Table 6.10 Studies of the effectiveness of multicomponent interventions that include school-based programs to reduce tobacco use

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Flay 1987 (1982–1984) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Los Angeles, California School-based education + mass media series (5 TV news segments) Compared with unexposed to school program (possible media exposure)	7th-grade students At analysis N = 1,419 I = 783 C = 636	(1) Self-reported current cigarette use Pre-post mean increase	Immediately post I = -0.56 C = -0.67	2-year follow-up I = +0.03 C = +0.08	Overall difference: -0.16 No significant difference on analyses	2 years
Johnson et al. 1990 (1984–1986) Greatest (group randomized trial) Good (1 limitation) Community-wide	Kansas City, Kansas School-based education + community education + mass media campaign Compared with usual care with potential exposure to mass media	Schools selected for evaluation N = 8 (4I + 4C) 6th- and 7th-grade students N = 1,607 baseline N = 1,122 at 2 years N = 1,105 (69%) at 3-year follow-up	(1) Self-reported cigarette smoking (any) in the last 30 days Odds ratio (intervention group) for self-reported cigarette use in the last month Adjusted net differences in the percentage of smokers (between I and C schools) in the last month	I = 9.8% C = 10.0% NR NR	I = 24.8% C = 30.5% NR NR	Overall difference -5.5 percentage points (pct pts) Multiple logistic regression p = 0.21 OR = 0.58 p <0.10 -16.0 pct pts p <0.01	3 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1992 (1983–1989) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Minnesota Mass media campaign + school-based education + community education Compared with usual care	Communities: n = 2 Schools: n = NR Students in both 1983 and 1989 surveys 6th–12th grades N = 1,080 (45% of baseline) Cross-sectional N = 1,439 in 1989	(1) Self-reported smoking status (weekly) School as unit of analysis	Cohort I = 1% C = 1% Cross-sectional I = 1.5% C = 2.5%	Cohort I = 14.6% C = 24.1% p = 0.011 Cross-sectional I = 15% C = 24.5% p = 0.007	Overall difference - 9.5 pct pts -8.5 pct pts	5 years
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Self-reported smoking prevalence (mean of pre-post differences between treatment cities: survey periods pre-post implementation of school education) Note: Multiple logistic regression was used for comparison Comparison results were summarized as "not significant" although interval changes were noted within cities Results given here are calculations based on presented data	1981–82 survey Aged 12–15 years I1 = 3.8% I2 = 12.5% C3 = 1.7% C4 = 0.0% Aged 16–19 years I1 = 28.6% I2 = 38.5% C3 = 24.3% C4 = 10.9%	1985–86 survey Aged 12–15 years I1 = 8.2 I2 = 5.6 C3 = 4.0 C4 = 6.3 Aged 16–19 years I1 = 5.9 I2 = 24.0 C3 = 17.1 C4 = 7.0%	Mean interval change Aged 12–15 years I1&I2 -1.2 C3&C4 +4.3 Overall -5.5 Aged 16–19 years I1&I2 -18.6 C3&C4 -5.6 Overall -13 Differences were not significant	2-year follow-up of school education period

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Kaufman et al. 1994 (1989–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Chicago, Illinois School-based education + mass media series (contest) Compared with media only	6th- and 7th-grade students in 3 selected schools N = 276	(1) Self-reported tobacco product use Mean score on Botvin scale	I = 13.01 C = 12.29	I = 11.63 C = 10.99	Scale difference -0.08 points F(1,145) = 0.08 NS	6 months high school
Murray et al. 1994 (1986–1990) Greatest (other design with a concurrent comparison group) Fair (3 limitations) Community-wide	Minnesota (I) and Wisconsin (C) School-based education + excise tax + mass media education + community education Compared with usual care	9th-grade students Estimated 3,600 students/year	(1) Self-reported prevalence of smoking (at least one cigarette/week)	I = 12.6 C = 15.8	I = 10.3 C = 15.9	Overall difference over study period -2.4 pct pts F = 1.17 p = 0.324	5 years
Flay et al. 1995 (1986–1988) Greatest (group randomized trial) Fair (2 limitations) Community-wide	Los Angeles and San Diego, California School-based education + mass media series (17 TV news segments) Compared with school + media; media alone; school alone; usual care	7th-grade students in 47 study schools N = 6,695 baseline N = 3,155 (47%) at 2-year follow-up	(1) Self-reported tobacco use behaviors			Logistic regression analysis No significant predictors of smoking at any post-test	2 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Baxter et al. 1997 (1991–1994) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Rotherham, United Kingdom Community education + school education (cardiovasular health promotion) Compared with usual care	7th- and 10th-grade students 1991: n = 1,327 1994: n = 1,678 Cohort 1991–1994 Cross-sectional analysis	(1) Student self-reported "active smoking" Cohort sample (aged 11–14 years)	I = <1% C = 4%	I = 21% C = 24%	0 Note: NS on cross-sectional analysis	3 years
			(2) Student self-reported "passive smoking" Cohort sample (aged 11–14 years)	I = 52% C = 57%	I = 49% C = 45%	+9 pct pts Note: NS on cross-sectional analysis	3 years
Flynn et al. 1997 (1985–1991) Greatest (group non-randomized trial) Good (1 limitation) Community-wide	Northeast United States and Montana School-based education + mass media campaign Compared with school-based education only	Students in study schools (grades 4, 5, 6 at baseline with follow-up through grades 10, 11, 12) N = 5,458 (cohort) N = 2,086 (38%) Observed in all 6 surveys	(1) Self-reported tobacco use behaviors Odds ratio for weekly smoking status Individual as the unit of analysis (Significant differences were also observed using the community as the unit of analysis)			Stepwise logistic regression Intervention OR = 0.62 95% CI (0.49, 0.78)	6 years (2 years post I)

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Lewit et al. 1997 (1990, 1992 surveys) Least (cross-sectional surveys) Fair (3 limitations) Community-wide	United States + Canada 21 communities Variable: cigarette price, and the presence/absence of COMMIT (community education), clean indoor air laws, school smoking policies, school education, antitobacco media exposure, protobacco media exposure, minors' access restrictions Compared with cross-sectional 1990 and 1992	Random samples of classrooms 9th-grade students n = 15,432 (88% of respondents)	Variable for cumulative school education exposure (self-reported total of grades with class instruction for grades 1-8) Mean exposure was 3.29 grades	NA	NA	Variable -0.02 p ≤0.05	NA
			Variable for school smoking policy (self-reported scale score from 0-allowed anywhere to 3-not allowed on school property) Mean of scale score was 2.58 Note: Primary outcomes reported were price elasticity estimates (not presented)	NA	NA	Variable -0.13 NS	NA
Chou et al. 1998 (1987–1990) Greatest (group randomized trial) Fair (3 limitations) Community-wide	Indianapolis, Indiana School-based education + other school (parent program, policy focus) + mass media campaign + community education Compared with usual care	Subset analysis 7th-grade students using tobacco at baseline <u>Baseline</u> <u>Follow-up</u> N = 212 I 53 I N = 188 C 55 C	Subset analysis: baseline tobacco users (1) Interval decrease in self-reported tobacco use in the previous month	I = NR C = NR	I = NR C = NR	Odds ratio for decreasing use OR = 1.53 95% CI (1.05, 2.24)	3.5 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	(1) Self-reported smoking status Any	I10 = 15% I5 = 13.2% C = 8.4%	I10 = 34.6% I5 = 34.3% C = 42.8%	Overall differences vs. comparison I10: -14.8 pct pts I5: -13.3 pct pts	15 years
			Daily	I10 = 3.1% I5 = 2.5% C = 1.1%	I10 = 32.5% I5 = 32.8% C = 34.7%	I10: -4.2 pct pts I5: -3.3 pct pts	15 years
			Individual as the unit of analysis				
			School as unit of analysis Self-reported smoking (any) Any education vs. usual care on baseline nonsmokers	NA NA	I = 30% C = 41%	-11 pct pts F = 11.7 p = 0.027	15 years
CDC 1999a,b (1998–1999) Least (before-after) Fair (4 limitations) Community-wide	Florida Mass media campaign + community education + student-directed community education Compared with before-after	Public school students Representative sample of middle school and high school students N = 43,518	(1) Student self-reported tobacco product use (1998–1999) High school students	27.4%	25.2%	-2.2 pct pts p<0.02	12 months
			Middle school students	18.5%	15.0%	-3.5 pct pts p <0.01	12 months

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Biglan et al. 2000a,b Also Biglan et al. 1995 and 1996 (1991–1995) Greatest (group randomized trial) Fair (3 limitations) Community-wide	16 rural communities in Oregon Community education + retailer education + school-based education Compared with school-based education only	N = 16 7th- and 9th-grade students in study school districts (approximately 2,100 students in each grade in each annual survey)	(1) Student self-reported tobacco use measured as a weekly smoking index (Link 8)	I = 10.5% C = 8.0%	I = 12.0% C = 13.9%	Reported net difference: (-)3.8 95% CI (0.2,7.3)	4 years
			(2) Student self-reported awareness of efforts to prevent illegal sales (Link 6)	NR (negative slope)	NR (positive slope)	p = 0.0026	
			(3) Parents' perceived community support for tobacco access restrictions (Link 1)	NR	NR	p = 0.006 (year 4) NS (year 5)	
CDC 2001 (1999–2000) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Oregon Funded school-based education + mass media + excise tax + community education Compared with/ without funded school-based education	Schools surveyed in both 1999 and 2000 I = 38 C = 14 8th-grade students participating in surveys 1999: n = 3,519 2000: n = 5,556	(1) Student self-reported tobacco use (any) in the previous 30 days	I = 16.6% C = 17.0%	I = 13.0% C = 15.7%	Overall difference -2.3 pct pts No measure	12 months
			Subset analysis: (2) Student self-reported tobacco use (any) in the previous 30 days High-level implementation schools Nonfunded schools	I = 14.2% C = 17.0%	I = 8.2% C = 15.7%	-4.7 pct pts Logistic regression OR = 0.65 95% CI (0.45, 0.94)	

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Texas Department of Health Services 2001 (2000) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Community-wide	14 counties in east Texas Mass media education + school education and/or community prevention programs	Selected "sentinal schools": n = NR Students in study schools 7th–12th grades Baseline Post 32,560 35,781	(1) Student self-reported tobacco use (any product in the past month) High media exposure + school/community vs. none	I = 8% C = 14%	I = 3% C = 11%	-2 pct pts (Difference outcomes reported in study)	1 year
	Compared with usual care (no media, no school or community programs)	Focus Middle Grades 6th 4,070 4,366 7th 628 735	(2) High school student smoker self-reporting cessation attempt in the last 6 months	I = NR C = NR	I = 66% C = 59%	+7 pct pts Post only	
	Note: cessation measures compare high school students in high media exposure + combined program (n = 1,066) to others (n = 14,370)		(3) High school student smoker + quit attempter self-reporting cessation	I = NR C = NR	I = 33% C = 26%	+7 pct pts Post only	

Note: **CDC** = Centers for Disease Control and Prevention; **CI** = confidence interval; **COMMIT** = Community Intervention Trial for Smoking Cessation; **NA** = not available; **NR** = not reported; **NS** = not significant; **OR** = odds ratio.

prevention for the 2007 Institute of Medicine report on tobacco control (Bonnie et al. 2007, Appendix D). From an examination of the previous reviews and meta-analyses reviewed above, Flay concluded that school-based programs to prevent smoking can have significant long-term effects if they have the following attributes: (1) They are interactive programs based on social influences or social skills; (2) 15 or more sessions are involved, including some up to at least ninth grade; and (3) substantial short-term effects are produced.

Working from these three conclusions, Flay (2009a) reviewed evaluations of programs that had included 15 or more sessions (preferably some in high school), had demonstrated effects at both short- and medium-term follow-up, and followed students to the end of high school and beyond. Only three school-based programs and three school-plus programs (i.e., plus small media, plus mass media, or plus family or community components) fulfilled these criteria. This review was not limited to randomized trials, but most of the studies reviewed by Flay (2009a) were of this type. The two groups of studies (involving school-based and school-plus programs) are labeled as Category 1. All six programs evaluated in the Category 1 studies had been included in the 25 studies with at least 2 years of follow-up reviewed by Skara and Sussman (2003), as well as in the Task Force review (2003). For Category 1, only studies that included follow-up into high school were considered. Few studies included follow-up beyond high school, but for those that did, the reported effects are of interest.

The percentage of RI was used as the indicator of ES since it was readily available for all programs, while the detailed statistics needed to calculate ES were incompletely reported. Also, RI is widely used in calculations of cost and benefit and readily understood. For randomized trials, pretest levels of smoking should be the same in both the program and control groups, and RI would be the difference between posttest control (C) and program (P) groups divided by the level in the control group: (%C – %P)/%C. However, pretest levels in the programs were not always the same (because randomization does not always result in equal pretest levels), and adjustments should be made for these differences. In cases in which pretest data were reported, RI is the posttest difference between groups minus the pretest difference between groups, divided by the control group posttest level—that is, $(\%\triangle C - \%\triangle P)/\%C_{post}$—expressed as a percentage. One may compare the ESs reported in meta-analyses and RIs by translating the ES into an RI on the basis of the area under the curve in the *Z* distribution (Rosenthal 1984). (For a convenient conversion tool, see Wilderdom [2012]). This approach translates an ES of 0.17 into a 7% relative reduction in smoking (an ES of 0.96 = an RI of 33%).

Category 1 school-based programs included the Tobacco and Alcohol Prevention Project (TAPP) (Hansen et al. 1988b), the LST program (Botvin et al. 1995a), and Project SHOUT (Students Helping Others Understand Tobacco) (Elder et al. 1993; Eckhardt et al. 1997) (see Table 6.9). On average, these three social influences/social competence programs, counting only those instances of 15 or more sessions during 2–4 years, preferably with some content in high school, had significant short-term effects (i.e., at grades seven or eight) of 21.8% (a range of 9–30%) and significant long-term effects (i.e., at grades 10–12) of 27.6% (a range of 19–44%) in terms of relative reduction in smoking. TAPP was the only one without any high school content and for which short-term effects decreased over time. Project SHOUT (Elder et al. 1993; Eckhardt et al. 1997) produced effects that may have been due to added content on activities of the tobacco industry, the teaching and encouragement of advocacy skills, and personal attention during high school. The long-term effects for the three programs suggest that a minimal personal-contact intervention of this kind in high school could increase the effects of any other program delivered in middle school. From these studies, Flay (2007) concluded that programs oriented to social influences/social competence that are of proven effectiveness and well implemented can produce long-term RIs of between 25% and 30% or ESs between 0.7 and 0.8.

The Category 1 school-plus studies included the North Karelia Project (Vartiainen et al. 1983, 1986, 1990, 1998), the Minnesota Class of 89 project (Perry et al. 1989, 1992, 1994), and MPP (Pentz et al. 1989b–e; Johnson et al. 1990). These programs produced mean short-term RIs of 40.7%, almost twice as high as the school-only programs, a finding consistent with a previous review by Flay (2000). These effects decayed over time an average of 21% to reach 32% RI. The long-term effects of school-plus-community or mass media programs were 12% better than school-only programs. It should be noted, however, that program effects were maintained at a higher level (at almost 40%, or 31% better than school-only programs) for those programs that included a high school component (North Karelia and Minnesota Class of 89), suggesting that programming in high school may reduce the decay of effects.

That the use of multiple delivery modalities increases a program's effectiveness over that obtained from school-only programs (Flay 2000) is consistent with theories about the influences on behavior that exist across multiple domains of life (Bronfenbrenner 1977, 1979, 1986; Flay and Petraitis 1994; Petraitis et al. 1995; Flay et al.

2009). Thus, it has been argued that prevention programs will be more effective if students receive consistent messages across community contexts and over time. On the basis of the Category 1 school-plus studies, Flay concluded that ongoing programs of proven short-term and intermediate-term effectiveness that combine school intervention with mass media or a community program can produce a long-term RI of between 35% and 40% or an ES between 1.0 and 1.3.

Additional School-Based Smoking Prevention Programs, 2008–2011

The systematic reviews discussed above cover the peer-reviewed literature up to 2008. Since that time, six studies have been published that provide further support for the effectiveness of school-based smoking prevention programs and comprehensive community-wide interventions that include a school-based program. The studies also point to the potential for dissemination and adaptation of programs in other countries, peer involvement, new technologies, and community-wide strategies.

Ariza and colleagues (2008) examined the effects of a school-based program (16 sessions over 3 years), smokefree policies, smoking cessation for teachers, parent education, and community-based activities, using a quasi-experimental design in schools in Barcelona, Spain. At 36 months, when the cohort was 15 and 16 years of age, 18.6% of the boys and 31.2% of the girls were regular smokers in the intervention group, compared with 21.6% of the boys and 38.3% of the girls in the control group ($p < .001$).

Campbell and associates (2008) evaluated the ASSIST intervention in a randomized trial of 59 schools in England and Wales. The intervention consisted of training influential students to act as peer supporters outside the classroom in informal interactions with their peers and to encourage their peers not to smoke. Using data from all three follow-ups, the odds of being a smoker in an intervention school compared to a control school was 0.78 (0.64–0.96), although annual data were not as compelling.

Prokhorov and colleagues (2008) examined the long-term efficacy of the computer-based ASPIRE program for culturally diverse high school students in Houston, Texas. ASPIRE is a computer-based theoretically driven program on smoking prevention and cessation for high school students. Students randomized into the ASPIRE program had significantly lower smoking initiation rates than did students in the control group (1.9% vs. 5.8%, $p < 0.05$) at the 18-month follow-up.

Perry and colleagues (2009) assessed the effectiveness of Project MYTRI, a 2 year multicomponent school-based tobacco intervention, in Delhi and Chennai, India. MYTRI, based on social cognitive theory, included peer-led activities, posters hung in the school, parental postcards, and peer activism outside of the classroom. Students in 32 schools, in sixth and eighth grades, were recruited and schools were randomized into either intervention or control groups; baseline, intermediate, and outcome data were collected for the two cohorts. At the end of the 2-year period, all students in the intervention group were significantly less likely to have smoked either bidis ($p < 0.01$) or cigarettes ($p = 0.05$) than students in the control group.

Lotrean and associates (2010) examined the effectiveness of a video and peer-led school-based smoking prevention program among students 13 and 14 years of age in Romania. Pretest and posttest data were collected 9 months apart from 1,071 students. The program was focused on increasing both self-efficacy and cigarette refusal skills. At follow-up, 4.5% of students receiving the intervention reported weekly smoking compared with 9.5% in the control group; multivariate logistic regression demonstrated that nonsmokers in the control groups were twice as likely to become smokers (OR = 2.23, $p < 0.01$) compared to nonsmokers in the intervention group.

Hawkins and colleagues (in press) evaluated the effectiveness of the Communities that Care (CTC) prevention program on levels of risk and adolescent problem behaviors, including cigarette use. Twenty-four communities were matched and randomly assigned to either the intervention or the control group; 4,407 5th-grade students, in 2004, were recruited and surveyed annually through 10th grade, in 2009. Students in the CTC communities were 21% less likely to report smoking cigarettes in the past 30 days compared to students in the control communities (adjusted OR = 0.79, $p < 0.05$).

Summary of Review of Reviews

Ultimately, the purpose of reviews of smoking prevention programs is to provide guidance to schools and communities as to what approaches might be effective. In a field such as school-based smoking prevention, which compares disparate programs with differing formats, theoretical orientations, targeted behaviors, and targeted populations and age groups, the application of meta-analysis methods can be difficult. Despite the challenges, the meta-analyses by Tobler and colleagues (2000) and Hwang and associates (2004) both provide clear directions on what types of programs are most effective. From a systematic review of reviews and individual studies of mediators, boosters, peer-directed versus adult-led programs, and community components of drug prevention programs, Cuijpers (2002) developed a useful summary of the important ingredients of effective prevention programs that can be set forth as follows:

1. They use interactive delivery methods.
2. They employ the social influences model (defined more broadly than by Hwang and colleagues [2004]).
3. They include components on norms and commitments not to use tobacco and intentions not to use this product.
4. They add community components.
5. They include the use of peer leaders rather than relying totally on adult providers.
6. They include training and practice in the use of refusal and other life skills.

In addition, meta-analyses have established that programs that have relatively more sessions and continue for multiple years are more effective. From a systematic review of the long-term effects of school-based prevention, Flay (2007) concluded that programs with demonstrated short- and intermediate-term effectiveness could have large long-term effects in the range of 35%–40% reductions in the proportion of youth who smoke.

Additional Comments on Reviews and Meta-Analyses

Evidence-based programs. In recent years, evidence-based practice and related terms have become part of the language for clinicians and health care researchers in the United States and other countries. Multiple agencies have reviewed evaluations of programs to prevent substance abuse and produced lists of scientifically proven or evidence-based programs (CDC 2009), and the University of Colorado at Boulder (2010) has provided a comparative matrix.

The stated purpose of such lists and guides is to help decision makers at both the federal and local levels choose programs supported by the best available evidence (Petrosino 2003). After the U.S. Department of Education compiled one such list (of 9 "exemplary" and 33 "promising" programs) with the help of a panel of eminent researchers in prevention, school districts using federal funds were strongly encouraged to select a program from that list (Weiss et al. 2005). These lists of programs are very useful as guides; of course, content and fit for a given community need to be considered.

Cultural sensitivity. Cultural sensitivity is believed to be important for effective prevention (Schinke et al. 1987, 1988, 1990; LaFromboise et al. 1993; Lynagh et al. 1997; Klonoff and Landrine 1999; Litrownik et al. 2000; Vélez 2001; Sussman et al. 2003; Chen 2004; Flay et al. 2004; Shelley et al. 2004; Miranda et al. 2005; Hecht and Krieger 2006; Ferketich et al. 2007). Many studies have evaluated the effectiveness of untargeted or targeted prevention curricula in White, minority, or diverse samples, but few studies have directly compared culturally relevant curricula for smoking prevention with curricula that do not address cultural issues (Johnson et al. 2005). In one study, Botvin and colleagues (1995a) found that culturally targeted and nontargeted versions of their life-skills program were more effective than a control condition in preventing smoking among African American and Hispanic adolescents. Later, another group of researchers (Gosin et al. 2003; Hecht et al. 2003, 2006; Hecht and Krieger 2006; Warren et al. 2006) compared prevention curricula targeted to the values of several cultural groups: Mexican Americans, Blacks/Whites (the study was conducted in a region with a very low prevalence of Blacks), and a multicultural group. All three curricula were more effective than a control curriculum and the Mexican American and multicultural curricula affected more outcome variables (regardless of the students' ethnic characteristics) than did the Black/White curriculum.

In a study in ethnically diverse schools (Hispanic, Asian American, and White) in Southern California, Johnson and colleagues (2005, 2007) compared two eight-session curricula based on the social influences approach. One, Project CHIPS (Choosing Healthy Influences for a Positive Self), a version of Project SMART (Self –Management and Resistance Training) (Hansen et al. 1988a), had content that emphasized "looking after yourself." The other, Project FLAVOR (Fun Learning about Vitality, Origin, and Respect), included cultural values from Hispanic and Asian cultures that emphasized group objectives, interdependence of family members, respect for ancestors, and harmonious interpersonal relations. The authors found that the multicultural curriculum (Project FLAVOR) was effective for Hispanic students in mostly Hispanic schools. In contrast, the curriculum framed for individuals (Project CHIPS) was effective only for Asian students in Asian/multicultural schools.

The results reported above suggest that caution is needed when implementing programs with different ethnic groups or in different cultures. Some programs seem to be equally effective with many different groups, but studies suggest that making programs culturally relevant might be very important. Clearly, more research is needed on this issue. In the meantime, any community or country adopting a program will need to evaluate it rigorously to determine its effectiveness in the new setting or culture.

The role of school policies. Before the 1994 Surgeon General's report (USDHHS 1994), several researchers and educators had suggested that school smoking policies could reduce smoking among youth. School policies generally include rules about tobacco use on campus by students, teachers, staff, and visitors and rules about possession of tobacco products. For example, Pentz and associates (1989a) examined the effects of school policies on adolescents in California and concluded that they were associated with reduced smoking in that group. Overall, the literature on the effectiveness of school smoking policies is surprisingly small, perhaps because such policies are now universally and widely applied to students and schools.

By the late 1980s, most school districts had some type of policy or regulation on tobacco smoking (CDC 1989), and the federal *Pro-Children Act of 1994* prompted the majority of schools to create additional tobacco-related policies. However, although research exists relative to facilitating the adoption of tobacco-free school policies (Goldstein et al. 2003), once such policies are implemented, their enforcement and application to students and staff vary considerably. Kumar and colleagues (2005) examined the association between certain variables related to school policies and smoking among middle school (8th grade) and high school (10th and 12th grades) students using the1999–2000 MTF survey to obtain smoking prevalence and relying on data about school policies provided by administrators. The authors found that permissive smoking policies for school staff were positively but not significantly associated with student smoking in middle schools and that this was the only school policy variable associated with the prevalence of smoking in high school. The level of monitoring of smoking in the school was inversely related to the prevalence of smoking among middle school but not among high school students. The severity of consequences was not related to the prevalence of smoking in either group of students, a finding consistent with previous research (Pentz et al. 1989a). This research suggests that to be successful, schools need to take a proactive approach to implementing school no-smoking policies. Similarly, in a study of nearly 5,000 Australian students, Hamilton and colleagues (2003) found that rates of smoking among students were lower in schools that provided education or counseling rather than a discipline-only approach.

Wakefield and associates (2000) examined 1996 survey data for high school students across the United States as part of the Study of Smoking and Tobacco Use Among Young People; the authors examined the effects of both the existence of a smoking ban (as reported by students) and whether the ban was enforced. They found no effect on youth smoking from the existence of a ban but found that an enforced ban was associated with a lower likelihood of progressing from a lower to a higher intensity of smoking. Later, Powell and colleagues (2005) examined the same data on students but used information from administrators on the existence of a smoking ban; they found that the effect of bans on the prevalence of smoking was attenuated by including levels of peer smoking in the statistical model, although the effect of the smoking ban remained significant.

Students' perceived enforcement of their school's smoking policy may also be an important factor in reducing the risk of smoking. Murnaghan and colleagues (2008), in a study of 10th-grade Canadian students, found that students who believed that tobacco policies were enforced were less likely to smoke. Similarly, using a random sample of schools from five Canadian provinces, Lovato and colleagues (2007) reported that students' perception of enforcement was a significant predictor of the prevalence of smoking.

The research reviewed above highlights the importance of implementing and enforcing school tobacco policies and ensuring that students perceive that the policies are enforced. Thus, to provide accurate conclusions when evaluating a policy, studies should evaluate its enforcement (Murnaghan et al. 2007).

Students' attitudes toward school policies may also have an impact on their decisions to smoke. Using data from a representative sample of 10th-grade California students, Unger and associates (1999) explored adolescents' attitudes toward no-smoking policies, including school-based policies. Attitudes toward no-smoking policies varied widely and were associated with smoking status, other psychosocial variables, and smoking-related advocacy efforts by the students. The researchers suggested that attitudes toward no-smoking policies may be either a determinant or a consequence of smoking behavior.

In summary, school policies on tobacco use have been recommended as an important component of comprehensive, multicomponent efforts to prevent use (CDC 1989; Barnett et al. 2007). Overall, research has shown that, to be effective, tobacco-related policy needs to be enforced and should foster a proactive approach by schools to prevention.

Ineffective programs. Many programs and prevention activities that have received a lot of attention have been shown to be ineffective, especially in the long term, when they were evaluated fully. Examples include one-time visiting speakers, other 1-day special events, poster competitions, lotteries, and other similar efforts. Other programs that are more similar to the multiple-session school-based prevention programs reviewed above have also been shown to be ineffective.

The D.A.R.E. program was developed by the Los Angeles Police Department and the Los Angeles Unified School District in the early 1980s. These groups essentially took the two variants of Project SMART being tested with seventh-grade students in Los Angeles schools at the time (Graham et al. 1990), combined them, and added a great deal of information about drugs (including, in some variants of the program, what they looked like, where to get them, and how they were used). Police officers were to deliver the program to students in fifth and sixth grades. The results of a randomized trial of the two Project SMART variants found that the program in resistance skills was effective but that the self-management component led to increased drug use relative to that of control group students (Hansen et al. 1988a; Graham et al. 1990). These results, combined with evidence that providing only information does not generally influence behavior change (Goodstadt 1978, 1980), and the use of police officers who are not trained to be highly skilled teachers, indicate that D.A.R.E. is most likely an ineffective program.

Although early nonrandomized studies suggested that D.A.R.E. sometimes had small effects for elementary school students, multiple randomized trials (Ennett et al. 1994a; Rosenbaum et al. 1994; Clayton et al. 1996; Dukes et al. 1996; Rosenbaum and Hanson 1998; Lynam et al. 1999) and two meta-analyses (Ennett et al. 1994b; West and O'Neal 2004) have established that D.A.R.E. has little or no impact on drug use in the short term and no impact in the long term, indicating its ineffectiveness. Even so, D.A.R.E. has been disseminated widely (Rogers 1995a; Des Jarlais et al. 2006). In response to the increasing evidence of the program's ineffectiveness, the D.A.R.E. organization has developed new programs for junior and senior high school students, but the program for junior high also has been shown to be ineffective (Perry et al. 2000, 2003), and evaluations of the high school program are not yet completed (Sloboda et al. 2009).

The Hutchinson Smoking Prevention Project (conducted at the Fred Hutchinson Cancer Research Center, University of Washington) has received much attention because the outcome evaluation was of such high quality and conducted over the long term. The project was designed to be a multiyear (grades 3–10) social influences program. A large randomized trial (20 school groups per condition) of the project produced no significant effects either by the end of grade 12 or 2 years later (Peterson et al. 2000). The findings of the trial are, however, quite difficult to interpret. The investigators did not report what its effects were at any time other than the two times noted above, including before entering high school (when most other programs report short-term and immediate-term results) or at the end of the program (grade 10). The effects of an intervention are generally measured immediately or shortly after the program ends to see the maximum impact, and the long-term measurement should serve to assess how permanent the effect was or how quickly it decayed.

Youth Empowerment and Activism

Interventions that rely on empowering youth or urging them to be activists are a relatively recent approach to preventing tobacco use. As Holden and colleagues (2004b) summarized, youth empowerment programs can be regarded as an offshoot of the second generation of community-based interventions. Initially, community-based interventions were theory driven and multicomponent, but the community's participation was limited to advisory roles and volunteer work in implementation. The second generation of community-based interventions emerged in the 1990s, with community input playing a more critical role throughout the research process. Youth empowerment programs are designed to engage youth in the planning, implementation, and evaluation stages of a program; tobacco-related prevention is a fitting venue for interventions to include youth empowerment, because experimentation and initiation with tobacco generally begin during adolescence (Haviland 2004). To date, much of the research regarding youth empowerment has been funded by the American Legacy Foundation, the creator of the "truth" campaign (this campaign is discussed in detail under "Mass Media Campaigns" earlier in this chapter). Up to this point, there are few studies on the efficacy of youth empowerment programs (Altman and Feighery 2004), and empirical evidence has only begun to emerge. The following section discusses youth empowerment programs that are not delivered through the mass media.

Because interventions to empower young people are relatively new, researchers face the task of operationalizing the concept of empowerment. One of several recent studies that sought to do this was conducted by Holden and colleagues (2004b), who reported that a panel of experts was convened at the American Legacy Foundation's YE (Youth Empowerment) Work Group to build a conceptual model establishing key components of youth empowerment and a set of operational measures. The conceptual framework had five major domains: (1) predisposing characteristics (i.e., reason for joining/motivation, demographic characteristics, history of involvement in similar groups and tobacco control, and smoking environment); (2) collective participation (duration, level, and intensity of participation; roles played by youth; and opportunities for involvement); (3) group structure (incentives provided, decision-making process, relationships to existing groups, opportunities for involvement, and available support and resources); (4) adult and institutional involvement (characteristics of adult coordinator, parental support, agency support, and support from the state program); and

(5) group climate (resiliency, cohesion, collective efficacy, and efficacy for outcomes). The attributes included in the conceptual framework were then operationalized though a set of questions. In turn, the findings were used to guide the development of an evaluation plan. In addition, Holden and colleagues (2004a) sought to determine the extent to which involvement in local efforts related to tobacco control influenced empowerment. The results suggest that involvement in local efforts is an independent component of empowerment and may influence this construct. Subsequently, using a convenience sample of youth participating in local tobacco control efforts, Holden and associates (2005) examined the attributes used to operationalize empowerment; the results provided a framework for understanding the potential outcomes of tobacco-related interventions, but empowerment is a complex phenomenon. More recently, with a sample of 112 participants in tobacco-related youth empowerment programs, Marr-Lyon and associates (2008) developed a measure of individual empowerment and discussed challenges related to evaluating empowerment among youth.

Earlier, Evans and colleagues (2004b) explored adult and group influences on the participation of youth in the Statewide Youth Movement Against Tobacco Use (SYMATU) programs. The SYMATU initiative "aims to engage youths in community action against tobacco use, to build state and local youth coalitions, and to foster meaningful youth-led tobacco prevention activities" (Hinnant et al. 2004, p. 629). Adults play several roles, which include serving as coordinators of youth groups, leaders of state tobacco control organizations, and teachers and mentors of participating youth. In addition, the adults are parents and members of the communities in which the youth reside. Results indicated that the involvement of adults did not have a significant direct effect on youth participation, but characteristics of the groups had a significant direct effect on participation by youth and mediated the relationship between adult involvement and such participation. The results emphasize the importance of group characteristics as influences on participation in youth empowerment programs.

Using case studies of five youth empowerment programs funded by the American Legacy Foundation, LeRoy and associates (2004) employed these programs as the unit of analysis to determine how organizational structures, program design features, and intraorganizational processes lead to organizational empowerment. They defined organizational empowerment as "organizational efforts that generate psychological empowerment among members and organizational effectiveness needed for goal achievement" (LeRoy et al. 2004, p. 577). These researchers reported that, on the basis of the data, there were three organizational models among the five programs: centralized, decentralized, and participatory. In the centralized model, a subcontract was given to a statewide prevention network with officials located in all of the state's counties. In the decentralized model, the state, in accordance with the belief that local organizations better understand and serve their constituents, subcontracted with regional organizations. In the participatory model, the state issued a request for proposals to all community-based organizations in the state and, after proposals were reviewed by a committee of adolescents, awarded grants. The research suggested that several intraorganizational processes are important for empowerment, including leadership and social support.

Ribisl and associates (2004) described the North Carolina Youth Empowerment Study, a 3-year participatory evaluation of tobacco prevention programs in North Carolina. The authors found that the number of groups working on tobacco-related issues in the state that included youth had grown in recent years. These groups were working on policy advocacy activities and expressed frustration with attempting to change tobacco-related policies because of the political and economic power of the tobacco industry in the state. Overall, the data suggested that youth had been influential in changing school-based policies in North Carolina. Hinnant and colleagues (2004) explored the influence of community support on the quantity and focus of group activities in youth empowerment programs. Using a convenience sample of adult coordinators of SYMATU youth groups in 17 states, they found that (1) community support variables were not related to the total number of group activities, although there was a marginally significant positive relationship between school support and the number of such activities; (2) the total number of group members, having a paid adult coordinator, and the hours an adult coordinator devoted to group supervision were all associated with the number of group activities; (3) community support was not associated with the number of educational activities performed by the group; (4) the size of a group's annual budget was related to the number of educational activities; and (5) support by youth outside the group and a group's annual budget were both significant predictors of the number of policy-related activities. Overall, adult coordinators believed that schools provided the greatest support for tobacco control issues, but these coordinators did not believe these issues received a high level of support from any other specific entity in the community.

In summary, a literature base on youth empowerment is emerging. As public health practice incorporates a more participatory research approach (Holden et al. 2004b) and emphasizes positive youth development (Kim et al. 1998; Flay 2002; Catalano et al. 2004), a more comprehensive understanding of interventions incorporating youth empowerment has been developing.

Cost-Effectiveness

It is difficult to estimate the costs and benefits of successful prevention programs and, therefore, their cost-benefit ratio (Caulkins et al. 1999; Foster et al. 2003). First, the costs and benefits for a particular program are variable; second, the long-term effectiveness of these programs has varied a great deal as well (Tengs 1996). Nevertheless, several scholars have provided estimates of cost-benefit ratios, using different techniques to do so.

One analysis estimated the cost of an effective 30-session prevention program in the United States at US$150 per student for program materials, training, teacher time, and other expenses (Caulkins et al. 1999). The estimated savings from such programs owing to the benefits of preventing significant numbers of students from initiating smoking and delaying the start date for those who later initiate smoking (and therefore the lifetime consumption) were substantial (Caulkins et al. 2004). For example, the estimated social benefits of smoking prevention alone were about US$300 per student, for a cost-benefit ratio of 2.0, and the estimated total benefits were about US$840, a cost-benefit ratio of 5.6.

The cost of an effective school-based smoking prevention program in Canada was estimated at C$67 per student (Stephens et al. 2000). Assuming a modest 4% level of long-term effectiveness, the benefits of smoking prevention were estimated to be lifetime savings for health care of C$3,400 per person and an increase in (lifetime) productivity of almost C$14,000 (Stephens et al. 2000), a cost-benefit ratio of 15.4. In other words, a moderately successful school-based smoking prevention program could produce a savings of C$15.40 for every C$1.00 spent.

Almost two decades ago, Hodgson (1992) asserted that smokers incur about US$9,379 more in lifetime health costs than do nonsmokers. Using this information, Wang and colleagues (2001) estimated the cost-effectiveness of LST to be about US$13,316 per life saved and US$8,482 per quality-adjusted life year (QALY), with the program costing US$13.29 per student. Given the large increases in unit costs for health care since 1992, these figures would have to be updated, but the results are instructive as to the cost-effectiveness of LST.

A group that looked at Project Towards No Tobacco Use (TNT) estimated its costs at US$48 per student and determined that it would cost about US$20,000 per QALY gained (Tengs et al. 2001). Although TNT was not cost saving, the authors concluded that the prevention of smoking offers gains in both survival and health-related quality of life that make it worth the cost. This latter statement is based on citizens' demonstrated "willingness to pay" for gains on the order of several hundred thousand dollars per QALY saved. In addition, an earlier analysis by Tengs and coworkers (1995) found that the median cost of 587 medical and public health interventions was US$42,000 per year of life saved and concluded that school-based smoking prevention is more efficient than most health/medical interventions.

The social benefits of even broader programs for improving behavior could be considerably greater. For example, Aos and colleagues (2004), at the Washington State Institute for Public Policy, who analyzed the cost-effectiveness of about 70 prevention programs, estimated that LST cost US$29 per student and led to benefits of US$746 (from the prevention of both smoking and drug abuse), a benefit of over US$25.61 per dollar spent, or a cost-benefit ratio of 25.61. In addition, they estimated that TNT cost US$5 per student and produced a benefit of US$279, a cost-benefit ratio of 55.84. Other programs included in both that review and in this chapter include the Good Behavior Game (cost-benefit ratio = 25.92), the MPP (ratio of 5.29), the Minnesota Smoking Prevention Program (ratio of 102.29), and a category of "other social influence/skills building substance prevention programs" (cost-benefit ratio of 70.34).

Although these cost effectiveness studies have focused on school-based prevention programs, their results support all prevention efforts. From a societal perspective, the costs of effective prevention are justified, both to the individual student and to society as a whole. In the study by Aos and colleagues (2004), cost-benefit ratios ranged from 2 to more than 100 for the prevention programs reviewed.

Summary Regarding School-Based Prevention

There are effective school-based smoking prevention programs that can be adopted, adapted, and deployed with at least short-term outcomes among adolescents. Programs can be found at the National Registry of Evidence-based Programs and Policies. Communities and school districts should invest only in the research-proven programs and avoid spending money on programs with little or no evidence of effectiveness. When implementing programs, decision makers must pay attention to maintaining program fidelity to ensure quality control.

Unfortunately, the inconsistent results and conclusions reported in the literature have caused many researchers, educators, and policymakers to conclude that school-based prevention does not work. Prior reviews have suggested that a more appropriate conclusion would be that many existing school-based programs have demonstrated effectiveness in the short term and that selected programs have demonstrated long-term effectiveness (Skara and Sussman 2003; Flay 2007, 2009a). Importantly, school-based programs produce *larger and more sustained* effects when they are implemented in combination with supplementary or complementary family-, mass media-, or community-based programs (Table 6.3). Similarly, other kinds of interventions produce larger effects when carried out in combination with other interventions (e.g., mass media plus taxation). Theories from sociology and public health (Bronfenbrenner 1977, 1979, 1986; Flay and Petraitis 1994; Flay et al. 2009) reveal that the more risk and protective factors an intervention or set of interventions addresses, the greater will be the effects. All of these data support the conclusion that a comprehensive, multicomponent approach to tobacco use prevention is more efficacious than a single strategy.

Thus, for school-based prevention to be effective, the programs should be comprehensive, interactive, start early, be sustained, incorporate an appropriate number of lessons, and be integrated into a community-wide approach (Flay 2007). Even among studies that have presented different conclusions regarding the effectiveness of school-based prevention, numerous studies (Sutton 2000; Cuijpers 2002; La Torre et al. 2005; Davis et al. 2007b; Warner 2007b) have concluded that school-based prevention works when combined with a comprehensive approach; that is, prevention efforts must address more distal, social, and community influences, too.

Smoking Cessation Among Youth

Research indicates that the prevalence of daily cigarette smoking in the United States increases from an estimated 4% among 12-year-olds to 8% among 16-year-olds, 12% among 18-year-olds, and 15% among 20-year-olds, and then levels off at 22% among 26-year-olds before dropping to 18% among older adults (Johnston et al. 2007a,b). The relatively steep curve for the prevalence of daily smoking that is evident during adolescence supports the need for cessation programming during this period of life. The need becomes even more evident when one considers that an estimated 60–85% of young tobacco users are likely to have made at least one attempt to quit and failed (Burt and Peterson 1998; Warren et al. 2000; Swart et al. 2001; Sithole 2003; Sirichotiratana et al. 2005; Sussman et al. 2006; Gervais et al. 2007; Johnston et al. 2007a,b). It appears that most youth who want to quit tobacco prefer to quit cold turkey (Mermelstein 2003), but few are successful using this approach.

Unique Aspects of Tobacco Cessation Among Youth

Cognitive differences between adolescents and adults suggest that effective interventions in the cessation of tobacco use have to be designed specifically for adolescents. Sussman (2002) has argued that adolescents are less likely than adults to structure their lives (e.g., keep careful records and schedule meetings) and to engage in higher-order thinking tasks (e.g., to take interest in analyzing their motivation for smoking). These attributes of adolescents also make it difficult to reach a large number of adolescents with an intensive face-to-face intervention. Mermelstein (2003) has recommended developmentally appropriate interventions for adolescents because they often do not have well-developed cognitive self-regulation skills (i.e., the ability to identify their own behaviors, engage in self-monitoring, and anticipate and develop practical plans for problem situations). "Simply taking strategies and presentations that are developed for adults and putting them into the jargon of adolescents or imbedding them in fun formats does not necessarily overcome the cognitive complexities of the strategies involved" (Mermelstein 2003, p. i31).

Adolescence is a time of change and experimentation, and during the initiation stage, tobacco use behaviors are highly variable. Adolescents may be experimenting with both cigarettes and smokeless tobacco as well as trying alcohol and other drugs. Because of their limited access to such products, their increased mobility as they get older, and environmental and cost restrictions on their behavior, the frequency with which adolescents use tobacco is likely to vary a great deal from day to day. Furthermore, adolescents who do not use tobacco for days or even weeks at a time may not label these times as periods of cessation. Although some measures of addiction to nicotine can occur fairly rapidly, it may take several years of experimentation and increased use before adolescents develop nicotine dependence (Biglan and Lichtenstein 1984; see Chapter 2, "The Health Consequences of Tobacco Use Among Young People"). In this age group, interventions will need to be designed to help both regular, more dependent daily users (NCI 2008) and those who are less dependent.

Review

Programming for the cessation of cigarette smoking among adolescents is defined as any type of programming in any setting that targets an age range of 12–19 years, that focuses on persons who smoke cigarettes at baseline (generally at least once in the last 30 days), and that encourages them to quit cigarette smoking. There have been nine systematic reviews of the relevant literature. In the first, Sussman and colleagues (1999) evaluated 34 trials, 17 on smoking cessation and 17 on smoking prevention, for their impact on cessation of cigarette smoking. Next, Sussman (2002) provided an enlarged review of 66 cessation trials and 17 studies of self-initiated quitting, and then McDonald and colleagues (2003) provided a review of many of the same studies (Sussman 2002). Garrison and colleagues (2003) reviewed six studies that used relatively rigorous designs, and Backinger and colleagues (2003) performed a qualitative review of prevention and cessation programs.

In the first meta-analysis of smoking cessation programs for adolescents, Sussman and colleagues (2006) included 48 studies with control groups. Shortly thereafter, Grimshaw and Stanton (2006) provided a Cochrane meta-analysis of 15 studies. The main difference in inclusion criteria between the two meta-analyses was that Grimshaw and Stanton required that studies contain follow-ups at least 6 months after the intervention (the standard used for adult cessation programs), while Sussman and colleagues did not. Both meta-analyses included RCTs, cluster RCTs, and non-RCTs. Next, Gervais and colleagues (2007) empirically reviewed 16 RCTs derived from previous reviews and data searches up to November 2006.

Sussman and Sun (2009) provided the most recent review; their literature search covered January 1970 to December 2007. This review included 64 studies, 16 more than the initial meta-analysis by Sussman and associates (2006), and included any English-language article or report with data on the contents of an adolescent smoking cessation effort, rates of quitting, and an age range of 12–19 years. Studies that included fewer than eight cigarette smokers at baseline were excluded because of the extremely small sample (fewer than five smokers per condition). Tobacco-related interventions for pregnant females were not included, and all reviewed studies included both genders. Data available through surveys of practitioners in the field were not reviewed. Finally, only studies that included a control condition were selected, and multiple-baseline, quasi-experimental, or experimental designs were permitted.

The 64 controlled trials that met the criteria for inclusion in the Sussman and Sun (2009) review were selected from an initial 130 studies; 50% of those 130 lacked control conditions (were single-group designs) and were not included in the review. An estimated one-third of the studies completed after 2000 that were in the initial group of 130 were single-group designs, suggesting some improvement in the design of these types of studies in recent years. Also, about one-third of the original 130 studies were published in 2000 or later (n = 42), an indication of increasing interest in adolescent cessation. A summary of the studies included in this review can be found in Table 6.11.

The variables examined by Sussman and Sun (2009) included program content, modalities of delivery, number of contacts, and expected rates of quitting at follow-ups. In addition, the means of recruiting and retaining smokers in the programs and suggestions on the lead time needed for a measurable effect were discussed. The results of the Sussman and Sun (2009) review were consistent with all previous reviews, except that of Garrison and colleagues (2003), which reviewed only six studies. The 64 studies in Sussman and Sun (2009) had an average reach to the recruited target audience of more than 35% and an average retention rate of approximately 75% for follow-up. The studies reviewed showed little evidence of disruption during implementation, sessions that were omitted, or restart of the intervention. However, specific documentation of the fidelity of implementation was not provided in most studies. Across the 64 studies, direct interpersonal contact of the treatment provider with potential participants and recruitment in contexts (e.g., classrooms) in which most of the members were potential participants led to relatively higher participation in the programs.

Sussman and colleagues (2006) and Sussman and Sun (2009) examined the mean estimated effects for four main predictors of outcomes (Tables 6.12–6.15) from their reviews. The five types of focus were social influences, cognitive-behavioral, motivational, medical, and other (e.g., reduction of supply and clarification of affect). The nine modalities of delivery were classified as classroom, school clinics, medical clinics, family, systemwide, computer, sensory deprivation, court diversion, and interventions in other public settings (e.g., worksite, shopping mall, and dormitory). The number of sessions varied from one to four, five to eight, to nine or more (three categories). Length of follow-up ranged from 0 to 3 months, 4 to 12 months, and more than 12 months past immediate posttest (three categories).

Most studies on adolescent cessation were underpowered statistically; in this case, the samples tended to be too small to detect significant differences between the program and control means with reasonable certainty (Cohen 1988). Also, most studies failed to use analyses that were appropriate for clustered data; in this instance when one unit, such as a cessation group, is nested within another, such as a school, the study should account for the confounding of the association between the cessation group and the school to permit a more accurate interpretation of rates of quitting. In addition, randomization generally is most effective with large sample sizes, so differences in treatment groups at baseline needed to be considered.

Table 6.11 Studies on smoking cessation among youth

Study (country)	Intervention theory, modality (number of sessions/contacts)	Design and total baseline sample size	Last follow-up (months)	Relative improvement; notes
Suedfeld et al. 1972 (United States)	Other Sensory deprivation (1)	Experimental with standard care control (SCC) n = 40	3	0%; affect oriented
Beaglehole et al. 1978 (New Zealand)	Social influences Classroom (16)	Quasi-experimental with SCC n = 128	3	0%
Greenberg and Deputat 1978 (United States)	Other School-based clinic (7)	Quasi-experimental with SCC n = 100	5	8.3%; affect oriented
Perry et al. 1980 (United States)	Social influences Classroom (4)	Quasi-experimental with SCC n = 243	4	1.7%
Jason et al. 1982 (United States)	Social influences Classroom (6)	Quasi-experimental with SCC n = 32	17	41.0%
Lotecka and McWhinney 1983 (United States)	Cognitive-behavioral School-based clinic (4)	Quasi-experimental with minimal program control (MPC) n = 49	0	0%; coping versus information only (programs equated for amount of delivery time)
Peterson and Clark 1986 (Australia)	Social influences School-based clinic (3)	Quasi-experimental with SCC n = 22	1	0%
Chan and Witherspoon 1988 (United States)	Motivation College dormitory (1)	Experimental with MPC n = 40	9	21.3%; health-risk assessment plus feedback versus health-risk assessment only
Killen et al. 1988 (United States)	Social influences Classroom (20)	Quasi-experimental with SCC n = 180	2	-5.5%
Ary et al. 1990 (United States)	Social influences Classroom (10)	Experimental with SCC n = 776	12	5.8%
Zavela et al. 1991 (United States)	Medical model School-based clinic (5)	Experimental with MPC n = 42	1	11.3%
Charlton 1992 (United Kingdom)	Cognitive-behavioral School-based clinic (6)	Quasi-experimental with MPC n = 87	6	7.8%
Baskerville et al. 1993 (Canada)	Motivation Systemwide (2)	Quasi-experimental with SCC n = 331	0; 6 months but not reported	17.9%; contingency-based reinforcement

Table 6.11 Continued

Study (country)	Intervention theory, modality (number of sessions/contacts)	Design and total baseline sample size	Last follow-up (months)	Relative improvement; notes
Diguisto 1994 (Australia)	Cognitive-behavioral School-based clinic (6)	Quasi-experimental with SCC n = 277	4	7.5%
Murray et al. 1994 (United States)	Other Systemwide (4)	Quasi-experimental with SCC n = 450	0	6.0%; supply reduction
Sussman et al. 1995 (United States)	Cognitive-behavioral School-based clinic (5)	Experimental with SCC n = 244	3	7.0%
Cinnomin and Sussman 1995 (United States)	Cognitive-behavioral School-based clinic (6)	Experimental with only program conditions n = 60	1	17.0%; programs equated for amount of delivery time
Horswell and Horton 1997 (Canada)	Social influences School-based clinic (3)	Quasi-experimental with SCC n = 36	6	6.0%
Hotte et al. 1997 (Canada)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 558	6	5.0%; at 1-month follow-up
Rigotti et al. 1997 (United States)	Other Systemwide (1)	Quasi-experimental with SCC n = 2,900	24	3%; supply reduction
Dino et al. 1998 (United States)	Cognitive-behavioral School-based clinic (8)	Quasi-experimental with SCC n = 29	2	22.0%
Forster et al. 1998 (United States)	Other Systemwide (4)	Experimental with SCC n = 660	36	-5.4%; supply reduction
Aveyard et al. 1999 (United Kingdom)	Motivation Computer based (6)	Experimental with MPC n = 1,090	5	0%; stages of change
Bloor et al. 1999 (United Kingdom)	Social influences Classroom (about 3)	Quasi-experimental with SCC n = 12	3	-2.3%; use of peer-nominated group leaders as teachers
Coleman-Wallace et al. 1999 (United States)	Motivation School-based clinic (8)	Quasi-experimental with SCC n = 351	0	15.0%; stages of change
Etter et al. 1999 (Switzerland)	Other Systemwide (2)	Quasi-experimental with SCC n = 582	7	0%; supply reduction
Glasgow et al. 1999 (United States)	Motivation Medical clinic (2)	Experimental with MPC n = 506	6	4.3%

Table 6.11 Continued

Study (country)	Intervention theory, modality (number of sessions/contacts)	Design and total baseline sample size	Last follow-up (months)	Relative improvement; notes
Kentala et al. 1999 (Finland)	Motivation Medical clinic (2)	Experimental with SCC n = 148	36	6.1%; dental clinic
Bauman et al. 2000 (United States)	Motivation Family (5)	Experimental with SCC n = 110	12	11.5%; home based
Cai et al. 2000 (Singapore)	Medical model Medical clinic (12)	Experimental with SCC n = 330	3	-1.3%; laser vs. sham acupuncture
Quinlan and McCaul 2000 (United States)	Motivation School-based clinic (1)	Experimental with SCC 3 conditions n = 94	1	14%; stages of change: personal match to stage of change (3%) or action-oriented stage (14%) vs. SCC (0%)
Adelman et al. 2001 (United States)	Cognitive-behavioral School-based clinic (8)	Experimental with MPC n = 74	3	9.6%
Dino et al. 2001a (United States)	Cognitive-behavioral School-based clinic (14)	Quasi-experimental with SCC n = 100	5	1.1%
Dino et al. 2001b (United States)	Cognitive-behavioral School-based clinic (12)	Quasi-experimental with MPC n = 346	5	3.2%
Hancock et al. 2001 (Australia)	Social influences Systemwide (about 3)	Experimental with SCC n = 3,800	42	5.2%
Lazovich et al. 2001 (United States)	Contingency based Court diversion (1)	Experimental with MPC n = 112	3	0%; attended court diversion class or paid a fine (the MPC)
Sussman et al. 2001 (United States)	Motivation School-based clinic (5)	Experimental with SCC n = 335	5	9.8%
Sussman et al. 2002 (United States)	Motivation School-based clinic (5)	Experimental with SCC n = 583	12	5.4%
Brown et al. 2003 (United States)	Motivation Medical clinic (2)	Experimental with MPC n = 191	12	4.4%
Lando et al. 2007 (and unpublished data) (United States)	Motivation Medical clinic (2)	Experimental with MPC n = 344	12	-4.5%

Table 6.11 Continued

Study (country)	Intervention theory, modality (number of sessions/contacts)	Design and total baseline sample size	Last follow-up (months)	Relative improvement; notes
Robinson et al. 2003 (United States)	Motivation School-based clinic (4)	Experimental with MPC n = 316	12	-1.7%; for youth caught smoking; control was the CDC “I Quit” self-help guide
Lipkus et al. 2004 (United States)	Motivation Other public setting (about 2)	Experimental with MPC n = 402	8	2.5%; shopping mall and home telephone counseling
Winkleby et al. 2004 (United States)	Social influences Classroom (5)	Experimental with MPC n = 813	6	5.0%; tobacco-focused advocacy; intervention versus modified drug abuse prevention program; programs equated for amount of delivery time
Zheng et al. 2004 (China)	Motivation School-based clinic (5)	Single-group multiple baseline within group control n = 46	4	11.3%; in the 2006 review, the immediate posttest results were used; these have not been replaced in the current paper with the 4-month follow-up results
Colby et al. 2005 (United States)	Motivation Medical clinic (2)	Experimental with MPC n = 85	6	7.1%
Hamilton et al. 2005 (Australia)	Motivation Classroom (8)	Experimental with SCC n = 2,335	24	4.5%; harm reduction
Hollis et al. 2005 (United States)	Motivation Computer based (3)	Quasi-experimental with SCC n = 448	24	10.0%; stages of change
Horn et al. 2005a (North Carolina and West Virginia, United States)	Cognitive-behavioral School-based clinic (12)	Quasi-experimental with MPC n = 250	15	2.5%
Horn et al. 2005a (Florida 1997–1998 cohort, United States)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 153	0	17.7%
Horn et al. 2005a (Florida 1998–1999 cohort, United States)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 305	0	8.9%
Horn et al. 2005a (Florida 1999–2000 cohort, United States)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 237	0	3.8%
Horn et al. 2005a (Florida 2000–2001 cohort, United States)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 186	0	-0.7%

Table 6.11 Continued

Study (country)	Intervention theory, modality (number of sessions/contacts)	Design and total baseline sample size	Last follow-up (months)	Relative improvement; notes
Horn et al. 2005a (North Carolina 2001–2002 cohort, United States)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 122	0	3.4%
Horn et al. 2005a (North Carolina and West Virginia 2000–2001, United States)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 128	0	8.4%
Horn et al. 2005b (United States)	Cognitive-behavioral School-based clinic (10)	Quasi-experimental with MPC n = 74	3	8.9%; American Indians
Myers and Brown 2005 (United States)	Motivation Medical clinic (6)	Quasi-experimental with SCC n = 54	6	6.1%
Rodgers et al. 2005 (New Zealand)	Cognitive-behavioral Computer based (about 3)	Experimental with SCC n = 617	6	2.2%; use of cell phone text messaging
Stoddard et al. 2005 (United States)	Social influences Other public setting (8)	Experimental with SCC n = 560	12	6.9%; worksites
Zack et al. 2005 (United States)	Cognitive-behavioral School-based clinic (6)	Experimental with SCC n = 125	12	10.4%
Audrey et al. 2006 (United Kingdom)	Cognitive-behavioral Classroom (about 3)	Experimental with SCC n = 424	12	3.0%; use of peer-nominated group leaders as teachers
Pbert et al. 2006 (United States)	Medical Medical clinic (4)	Experimental with SCC n = 1,148	3	20.0%; nurses as deliverers of the "5 A's" quit approach
Horn et al. 2007 (United States)	Motivation Medical clinic (4)	Experimental with SCC n = 75	6	0%; motivational interviewing in emergency room
Sussman et al. 2007 (United States)	Motivation Classroom (8)	Experimental with SCC n = 461	12	4.1%
Kohler et al. 2008 (United States)	Cognitive-behavioral School-based clinic (14)	Quasi-experimental with SCC n = 492	12	2.1%

Note: The 64 studies are controlled trials that met the criteria for the Sussman and Sun 2009 review. **CDC** = Centers for Disease Control and Prevention.

Table 6.12 Youth cessation treatment means, 2006 and 2007 analyses, stratified by duration of follow-up

Duration of follow-up	2006 estimate	2007 estimate
0–3 months (36, 38)	3.88	4.17
4–12 months (21, 29)	2.92	4.06
>12 months (5, 8)	6.62	6.78

Note: Numbers in parentheses are the sample sizes of studies in the Sussman et al. (2006) and Sussman and Sun (2009) reviews, respectively. Data were intent-to-treat (ITT) quit rates, and weighted least squares random effects models were used to pool results from study net effects (program minus control) estimates. When pooled, studies were weighted by sample size and adjusted for follow-up duration category in the overall estimate, theory, modality, and number of sessions models. The effects reported are pooled ITT net effects.

Table 6.13 Youth cessation treatment means, 2006 and 2007 analyses, stratified by theory

Theory	2006 estimate	2007 estimate
Social influence (8, 11)	3.77	4.34
Cognitive-behavioral (17, 23)	4.72	5.32
Motivation (15, 22)	3.66	3.97
Medical (1, 3)	13.16	15.86
Other (6, 6)	-0.16	-0.17

Note: Numbers in parentheses are the sample sizes of studies in the Sussman et al. (2006) and Sussman and Sun (2009) reviews, respectively. Data were intent-to-treat (ITT) quit rates, and weighted least squares random effects models were used to pool results from study net effects (program minus control) estimates. When pooled, studies were weighted by sample size and adjusted for follow-up duration category in the overall estimate, theory, modality, and number of sessions models. The effects reported are pooled ITT net effects.

Table 6.14 Youth cessation treatment means, 2006 and 2007 analyses, stratified by modality

Modality	2006 estimate	2007 estimate
Classroom (7, 11)	4.15	4.21
School clinics (25, 29)	5.62	6.30
Medical clinics (5, 9)	2.40	4.62
Family (1, 1)	21.37	19.10
Systemwide (5, 6)	-0.22	0.81
Computer (2, 3)	5.60	5.40
Other public setting (2, 5)	1.45	3.92

Note: Numbers in parentheses are the sample sizes of studies in the Sussman et al. (2006) and Sussman and Sun (2009) reviews, respectively. Data were intent-to-treat (ITT) quit rates, and weighted least squares random effects models were used to pool results from study net effects (program minus control) estimates. When pooled, studies were weighted by sample size and adjusted for follow-up duration category in the overall estimate, theory, modality, and number of sessions models. The effects reported are pooled ITT net effects.

Table 6.15 Youth cessation treatment means, 2006 and 2007 analyses, stratified by number of sessions

Number of sessions	2006 estimate	2007 estimate
1–4 (17, 26)	-0.08	3.20
5–8 (15, 20)	6.43	6.24
≥9 (15, 18)	4.47	4.20

Note: Numbers in parentheses are the sample sizes of studies in the Sussman et al. (2006) and Sussman and Sun (2009) reviews, respectively. Data were intent-to-treat (ITT) quit rates, and weighted least squares random effects models were used to pool results from study net effects (program minus control) estimates. When pooled, studies were weighted by sample size and adjusted for follow-up duration category in the overall estimate, theory, modality, and number of sessions models. The effects reported are pooled ITT net effects.

On average, almost twice as many in the treatment groups quit as in the control groups: 13.4% versus 7.4% (RI = 6.4%; $p < 0.001$). The most effective studies used programs based on social influences, cognitive-behavioral theory, or programming to enhance motivation as the theory behind their intervention design. Results also appeared promising for medical-/recovery-based programming, but the number of studies here was too small ($n = 3$) to infer consistent effects. The modalities in which programming achieved the strongest effects were classroom-based educational programs, school-based clinics, and computer-based programming.

One limitation in trying to differentiate the effects of theory from modality is that these were not independent categorizations. In the current sample, 7 of 11 classroom-based studies involved manipulations of social influences;

20 of 29 school clinic studies were cognitive-behavioral; 8 of 9 medical clinic studies were based on enhancement of motivation; 4 of 6 systemwide studies were in the "other" theory category; and 2 of 3 computer-based studies were based on enhancing motivation.

Relatively higher rates of quitting were found for programs having five or more sessions (none with fewer than five sessions produced significant findings, but those with five or more sessions showed a 5% increase in quitting compared with controls). In addition, effects for programs with five or more sessions were also maintained at short-term (1 year or less) and long-term (greater than 1 year) follow-ups. Eight studies examined follow-ups longer than 12 months, and in these studies, the short-term effects were maintained. More studies with long-term follow-ups are needed; even so, these data are promising, suggesting that adolescent cessation rates tend not to decrease much over time.

Use of Pharmacologic Adjuncts for Cessation

There is a strong interest in pharmacologic adjuncts for tobacco cessation in adolescents because these agents have been very useful among adults (Fiore et al. 2000). Pharmacologic agents have generally been used as an adjunct to other treatment programming, such as cognitive-behavioral treatment; that is, many trials have compared an active treatment alone with the active treatment plus a pharmacologic adjunct. (Studies with these types of designs were not contained in the meta-analysis by Sussman and Sun [2009] because the comparison condition was an "active" control.)

Ten studies have assessed the use of pharmacologic adjuncts for cessation with adolescents, seven of which were controlled trials (Smith et al. 1996; Hurt et al. 2000; Hanson et al. 2003; Killen et al. 2004; Niederhofer and Huber 2004; Sussman et al. 2004; Moolchan et al. 2005; Roddy et al. 2006; Muramoto et al. 2007). All of these studies included cognitive-behavioral programming (e.g., standard counseling on cessation, including instruction on coping skills).

Five of the seven controlled trials failed to show an effect for the use of nicotine replacement as an adjunct among youth. In the other two studies, the effects were not significant. The mean effect at last follow-up for nicotine gum was 2.5% (two controlled studies: 4% and 1%); for the nicotine patch it was 6% (four controlled studies: 2%, 15%, 1%, and 0%); and for bupropion it was 1% (three controlled studies: 1%, 1%, and 37%). Only Moolchan and colleagues (2005) found a significant treatment effect for nicotine gum (4%) and the nicotine patch (15%, 6-month trial, n = 120). In addition, only Niederhofer and Huber (2004) found an effect for bupropion (37% absolute difference, 3-month trial, n = 22). It is not known why the effects in these two studies differed from the rest.

Use of Electronic Technology for Smoking Cessation Among Youth

Another area of current interest is the use of electronic communications technology to assist in helping adolescents to quit smoking; here, five studies with comparison groups were identified (Rabius et al. 2004; Rodgers et al. 2005; Chen and Yeh 2006; Mermelstein and Turner 2006; Patten et al. 2006). Only two of these studies (Rabius et al. 2004; Rodgers et al. 2005) were included in the 64-study review by Sussman and Sun (2009).

Chen and Yeh (2006) compared a smoking cessation group plus instruction through an Internet-assisted program with a standard-care group in a pre-post quasi-experimental design with 77 high school adolescents in Taiwan for 6 weeks. Being in the program resulted in a higher reduction in rates of daily smoking (reduction of 21% vs. an increase of 2.5% in the control group) and a greater number of attempts to quit (an average of one more attempt during the 6-week period). The youth appeared to have been favorably disposed to including the Internet component, but data on cessation, or the means to estimate this rate, were not provided in the paper.

Mermelstein and Turner (2006) contrasted Not On Tobacco (N-O-T), a school-based cessation clinic, with a condition that included the clinic plus an Internet Web site and proactive telephone calls. In a clustered RCT (n = 351, 14- to 19-year-olds) at 29 high schools, the enhanced condition doubled rates of quitting at the 3-month follow-up in a comparison with use of the clinic alone (7-day rates of quitting: 14% vs. 7%), but the difference was only marginally significant.

Patten and associates (2006) contrasted a four-session office-based program (n = 139) that involved motivational interviewing and problem solving among 11- to 18-year-olds with a home-based Internet program (Stomp Out Smokes) in an RCT. In the Internet condition, access was provided for 24 weeks; 66% of participants stopped using the program by its third week. The 30-day ITT rate of quitting at 36 weeks favored the office-based program, 13% versus 6%, but this difference was not significant.

In a study by Rabius and associates (2004), one group received five sessions of telephone counseling while the other received only self-help booklets. This was an RCT among 18–25-year-olds (12% of the sample of 420 young adults was either 18 or 19 years of age). At 6-month follow-up, 10% versus 3% had quit (defined as no smoking in the last 48 hours); this difference was statistically significant.

The use of mobile telephones and text messaging by adolescents has potential for future intervention efforts. As of 2010, 75% of adolescents aged 12–17 years owned cell telephones, up from 45% in 2004. In addition, 72% of these adolescents were text messagers (and made up 88% of all adolescent users of cell telephones) (Lenhart et al. 2010). A recent meta-analysis of youth and adults shows some promise for at least short-term smoking cessation using text messaging (Whittaker et al. 2009), in that the authors found significant short-term increases in cessation rates. Finally, a study by Rodgers and colleagues (2005) involved an RCT of 617 adolescent smokers. One group received personalized text messaging from a cell telephone that involved a cognitive-behavioral approach for 1 week before and 4 weeks after a designated "quit day," while the control group received bimonthly general text messages to keep them involved in the study. Although the early results looked promising (14% vs. 6% quit rates based on ITT at 6 weeks; 29% vs. 19% at 12 weeks), there was essentially no difference between the test and control groups at 6-month follow-up (25% vs. 24%).

In conclusion, the use of telephone counseling appears to be promising. Use of the Internet or text messaging may be effective if programming is bolstered during a long period.

Summary Regarding Smoking Cessation Programs for Youth

Overall, several smoking cessation programs for adolescents have been found to be efficacious. Many of the findings for youth programs are consistent with those found in the literature on adults, particularly regarding the importance of using cognitive-behavioral strategies and achieving a sufficient dosage of programming (Fiore et al. 2000). For example, the N-O-T Program targeting 14–19-year-old daily smokers is based on social cognitive theory and includes 10 hour-long sessions (plus 4 boosters) covering such topics as self-management, social influences, relapse prevention, and managing nicotine withdrawal (Horn et al. 2005a). One difference is that, at present, there is little evidence of the efficacy of pharmacologic adjuncts for youth, in contrast with the strong efficacy for adults. Future work on the metabolism of pharmacologic adjuncts, patterns of tobacco use among youth, and self-reported withdrawal symptoms might help researchers and policymakers improve their understanding of the potential effectiveness of pharmacologic adjuncts among youth.

There is a strong need for more research on youth cessation that makes use of appropriate controls, uses more standard measures of cessation, and conducts longer follow-ups (12 months and perhaps longer). Research on how to effectively recruit young smokers is needed. Also, metrics such as the cost-effectiveness of treatment per QALYs gained and years of disability avoided should be examined in future studies on youth smoking cessation. The use of such metrics could demonstrate even greater cost-effectiveness for early interventions than would be found for smoking cessation programs among adults. There is also a need for evaluating whether different cessation programs are needed for different levels of use or for different kinds of tobacco products, such as smokeless tobacco.

Special Issues

This section examines special issues in both the prevention of tobacco use and in cessation for young people. In particular, it focuses on preventing the use of smokeless tobacco and on cessation programs that target smokeless tobacco use. Although most research on tobacco use among young people has focused on smoking, increasing attention is being paid to smokeless tobacco. Furthermore, since the broad adoption of smokefree ordinances, the use of smokeless tobacco may be promoted in response to restrictions on smoking. Now that cigarette companies are increasingly focusing on bringing new "spitless" smokeless tobacco products to market, these new tobacco products may be heavily marketed, and their use may be growing among young people (see Chapter 3, "The Epidemiology of Tobacco Use Among Young People in the United States and Worldwide"). The section below on preventing the use of smokeless tobacco discusses efforts to prevent the use of snuff and chew with a variety of interventions. The next section focuses on cessation of smokeless tobacco use, a subject that has received far less attention than has cessation of cigarette smoking among youth.

Community-, Family-, and Health-Care-Based Prevention of Smokeless Tobacco Use

Few studies have been conducted on the prevention of smokeless tobacco use by youth and young adults. Federal agencies, voluntary groups, and professional organizations freely offer a limited selection of booklets, videos, posters, and other written materials about the risks of smokeless tobacco, but as yet, it is not known whether they have been widely disseminated or whether they have had an impact on reducing the uptake of smokeless tobacco by young people. Most prevention programs with a smokeless tobacco component that have been evaluated have been conducted in schools, with a small number in community, family, or health care settings.

Community-based efforts incorporating a comprehensive approach to prevention that includes schools, media, family, advocacy, and public policy may be effective in preventing the use of smokeless tobacco by youth. Project SixTeen (Biglan et al. 2000a), an RCT of a community intervention to prevent adolescent tobacco use, tested whether a comprehensive community-wide effort to prevent tobacco use among adolescents would have a greater deterrent effect on tobacco use than would a school-based tobacco prevention program alone. The community intervention included a media advocacy component, a youth antitobacco module, family communication activities, and a youth-access campaign. The school-based intervention consisted of an evidence-based curriculum called Programs to Advance Teen Health. The study found a significant effect on decreasing the prevalence of smokeless tobacco use among boys after 1 year of the community intervention but no change with the school-based condition. The results suggest that a community intervention that targets multiple influences on adolescent tobacco use can be effective for reducing boys' smokeless tobacco use.

Despite the paucity of efforts to prevent the use of smokeless tobacco, studies showed an overall decline in adolescent use of this product through the late 1990s and an increase in the percentage of 8th-, 10th-, and 12th-grade students who perceived regular use of smokeless tobacco as harmful (Nelson et al. 2006). The efforts against tobacco use among youth that took place throughout the country in the 1990s, although focused primarily on cigarette smoking, may have helped to increase the perception that smokeless tobacco is harmful as well (Nelson et al. 2006). However, the use of smokeless tobacco began to increase again in 2003 and subsequently the prevalence has stalled (see Chapter 3, "The Epidemiology of Tobacco Use Among People in the United States and Worldwide"). Data from Massachusetts are suggestive here; beginning in 1993, the Massachusetts Tobacco Control Program fostered efforts to prevent smoking among youth through a statewide comprehensive approach in communities and schools and through the media. An analysis of school survey data from the Massachusetts Prevalence Study (Soldz et al. 2000) between 1993 and 1996 found a decline in the use of smokeless tobacco greater than that seen nationally, suggesting that the program was effective in preventing smokeless tobacco use (it was also effective in lowering the use of cigarettes among middle school males).

Elsewhere, in an RCT of a family-directed program designed to decrease tobacco (cigarettes and smokeless tobacco) and alcohol use among adolescents, effects were observed for smoking, but because so few adolescents reported the use of smokeless tobacco, the sample was simply too small to assess for effects of the program on the onset of its use (Bauman et al. 2001).

Interventions by health care providers also appear to offer a natural conduit to the prevention of smokeless tobacco use—in particular, interventions by oral health professionals who have a unique opportunity to see the consequences of smokeless tobacco use. Although dental settings have provided an avenue for several cessation studies (Severson et al. 1998; Andrews et al. 1999; Bauman et al. 2001; Gordon and Severson 2001), this clinical setting has not been evaluated for providing preventive interventions. A study based in pediatric primary care physicians' practices in New England attempted to prevent smokeless tobacco use as part of a comprehensive systems-based effort to influence adolescent health behaviors, but found no significant effect on the prevention of smokeless tobacco use (Stevens et al. 2002).

Tobacco control policies, including higher taxes on smokeless tobacco, higher minimum ages for the legal purchase of tobacco products, strong provisions for licensing the sale of tobacco, restrictions on the distribution of free samples, and the posting of signs for minimum age of purchase, are effective in reducing the use of smokeless tobacco among adolescent males (Chaloupka et al. 1997). By one estimate, as reported earlier in this chapter, a 10% increase in the price of smokeless tobacco products would reduce consumption of this product among male youth by about 5.9% (Chaloupka et al. 1997).

In sum, there have been few evaluations of community-, family-, or health-care-based interventions to reduce the rate at which young people take up smokeless tobacco or to prevent its use altogether in this group. The results reported by Biglan and colleagues (2000a) are encouraging, but additional research is needed to determine effective ways to educate both children and parents about the health risks of using this product. The dental health care setting offers a unique venue to provide preventive education to youth and families, but studies to date have focused on youth and adult cessation in this setting rather than youth prevention.

Interventions in the School Curriculum

The lack of effective education on smokeless tobacco in the schools is perplexing but may have many explanations. Most schools teach both males and females, but in the United States the primary users of smokeless tobacco are male; overall prevalence is somewhat lower than that of cigarette smoking; there are large regional and geographic differences restricting the issue to areas of the country with higher prevalence rates. Parents are more likely to accept their child's use of smokeless tobacco than of cigarettes, since they view smokeless tobacco as less dangerous. However, recent research showing that early use of smokeless tobacco may be a significant risk factor for subsequent smoking (Severson et al. 2007) may alter this perception. Another reason for the lack of effective education may be that most interventions for smokeless tobacco in schools are simply too broad to adequately affect those youth at high risk for use, or they may focus too little on prevention.

One study that demonstrated a preventive effect on the use of smokeless tobacco among young people was a school-based social influences program conducted by the Oregon Research Institute (Severson et al. 1991) that was delivered by regular classroom teachers and peer leaders in randomly assigned schools. This study sought to make students sensitive to both overt and covert pressures to use smokeless tobacco and cigarettes. Students practiced refusal skills, and in addition to using a structured curriculum with role-play activities, teachers used videotapes to standardize instruction and maintain student engagement. Although only two of the seven class periods in the intervention were devoted to smokeless tobacco, use among boys in both seventh, and to a lesser extent, the ninth grade, was reduced. However, parallel analyses failed to show that the intervention had any positive effect on cigarette smoking.

In another school-based program, Elder and colleagues (1993) developed Project SHOUT and evaluated it in 22 junior high schools in San Diego County, California. Based on an operant conditioning model of tobacco use (Elder and Stern 1986), the intervention was delivered in randomly assigned schools to seventh-grade students; intervention and assessment continued for 3 years through ninth grade. At the 3-year follow-up, the intervention had a significant effect on cigarette use, use of smokeless tobacco, and use of cigarettes and smokeless tobacco combined. The intervention effect was particularly strong during the ninth grade.

The school curriculum titled Project Towards No Tobacco Use (Sussman et al. 1993b; Dent et al. 1995) has also shown promising results for preventing the use of smokeless tobacco and its component on physical consequences has shown particular promise. Consistent with most social influences programs, this project had three primary components: the teaching of refusal skills, awareness of misperceptions about social values, and physical consequences. Although the combined curriculum was effective in reducing initial and weekly use of smokeless tobacco, a 2-year follow-up suggested that the curriculum on physical consequences was the only one to have a long-term impact on whether students tried that product. The results contradicted previous research that had found programming on social influences to be superior to programming focused primarily on physical consequences. However, the programming on physical consequences had several novel features that may have contributed to its effectiveness, such as correcting myths about experimentation with tobacco and addiction, role-playing that one has a disease, and presenting probabilities of consequences in ways more personally relevant to youth. In the long run, presenting information on physical consequences was deemed especially important for preventing the use of smokeless tobacco.

School- and community-based efforts have shown promising results, but by broadly targeting substance use and tobacco, many prevention programs do not emphasize use of smokeless tobacco enough and are unlikely to show a significant impact on initiation rates for this behavior. It is not known whether these programs would be effective if they were more narrowly focused; it appears that most tobacco prevention programs focus almost exclusively on smoking and pay relatively little attention to smokeless tobacco.

Special Populations

Overall, usage rates for smokeless tobacco among youth are considerably lower than those for cigarette smoking, but certain subgroups have rates notably higher than the average. Use of smokeless tobacco is much more common in males than in females (Hatsukami and Severson 1999), with the highest rates observed in American Indians and Alaska Natives, in the southern states, and in rural populations with low socioeconomic status (Hatsukami and Severson 1999). Use is also more common among young players of particular sports, such as baseball (Severson et al. 2005).

A study that focused on American Indian youth (Schinke et al. 2000) developed and tested a skills- and community-based approach to prevent substance abuse, including the use of smokeless tobacco. Intervention sessions in school involved instruction, modeling, and rehearsal in cognitive and behavioral skills associated with preventing substance abuse. The program was carefully tailored to the cultural prerogatives and everyday realities of American Indian young people in the targeted western reservations. Although cigarette use was unaffected, at follow-up, rates of smokeless tobacco use were lower for youth who received the skills intervention.

Various studies have documented that high school males frequently use smokeless tobacco when playing or watching a sport (Creath et al. 1988; Murray et al. 1988; Boyd and Glover 1989; Colborn et al. 1989; Riley et al. 1991; Gottlieb et al. 1993), and the greater their athletic involvement, the more likely they are to be users (Colborn et al. 1989). A behavioral intervention that targeted male high school baseball athletes (Walsh et al. 2003) was designed to promote cessation of smokeless tobacco use and discourage initiation. This intervention, conducted in rural high schools in California, included an interactive peer-led component and a dental component with a screening examination for oral cancer. Although the intervention was found to be effective in promoting cessation, it was ineffective in preventing initiation by nonusers. The strongest predictors of initiation to past-month smokeless tobacco use were being a current smoker, trying smokeless tobacco in the past, and perceiving high use of smokeless tobacco among teammates. These findings suggest that prevention of relapse and providing information that many leading baseball players do not use smokeless tobacco would be important components of an effective prevention program.

Summary Regarding the Prevention of Smokeless Tobacco Use

Three well-designed school-based interventions have shown positive preventive effects for the use of smokeless tobacco, but this small body of evidence pales against the extensive literature reviewed in this chapter on school-based prevention of cigarette smoking. School-based prevention programs that include special attention to the negative physical and health effects of smokeless tobacco may be helpful in reducing the likelihood that young males will start using it. There have been few community interventions, but one well-controlled trial was encouraging. Other interventions that have targeted families or used health care settings have not been adequately evaluated. Because the use of smokeless tobacco is very high among some special populations, such as high school baseball athletes and American Indians, it is encouraging that special interventions have been adapted for these groups. To date, no interventions have been evaluated with populations of Alaska Natives, although studies report their use to be very high (Angstman et al. 2007).

Cessation of Smokeless Tobacco Use Among Youth

Adolescent use of smokeless tobacco represents an important public health problem, and yet little research has focused on developing efficacious, practical cessation tools that are appealing to this age group. Most cessation programs have been aimed at college-aged or adult users, and the small number of interventions designed for youth have usually been incorporated as a secondary element of multicomponent programs to prevent tobacco use. Even if school- or community-based prevention programs have an impact on reducing initiation or use, there is still a need for programs to help young users quit using snuff and chewing tobacco.

Research on Smokeless Tobacco Cessation with Youth

Of the few publications describing programs to quit smokeless tobacco for youth (Table 6.16; Sussman et al. [2006]), most have focused on high school or college athletes who are known to have higher rates of use (Boyd and Glover 1989; Colborn et al. 1989). Some reviews of more broadly targeted programs, designed to reduce the adoption of overall tobacco use by middle school and high school youth, have examined the impact of these programs on cessation among those students who were using tobacco products at baseline. A handful of these studies have included smokeless tobacco as a part of their comprehensive focus on the tobacco problem, but none has teased out the results for smokeless tobacco in a manner that provides guidance as to which components of the intervention are most effective for quitting the use of this product, nor do they provide long-term cessation results for smokeless tobacco that serve as useful benchmarks (Mermelstein 2003; Skara and Sussman 2003; Sussman et al. 2003). One highly relevant report described results from a focus group of 27 adolescents on the acceptability and appeal of a Web-based smoking prevention program (Parlove et al. 2004) and formative data suggest that this could be a promising avenue to providing assistance with cessation for smokeless tobacco, but no outcome data were reported.

Eakin and colleagues (1989) tested a three-session, multicomponent, cognitive-behavioral intervention that included self-monitoring of smokeless tobacco use, a component designed to increase the user's awareness of health risks, behavioral coping strategies, frequent telephone contact, and training in the prevention of relapse. Biochemical (carbon monoxide and cotinine) verification of self-reports was obtained. Twenty-one of the 25 adolescents in the original study (14–18 years of age, averaging five to eight dips per day) completed treatment, 9 (36%) were abstinent at the conclusion of the program, and 4 (16%) maintained abstinence at the 3-month follow-up. Participants who did not achieve complete abstinence reported substantial reductions in use of smokeless tobacco. Of those who also were cigarette smokers, none reported an increase in cigarette consumption as a result of reducing the use of or quitting smokeless tobacco. Predictors of cessation for smokeless tobacco included lower baseline consumption levels and involvement in school athletics.

In the study of high school baseball players in rural California (Eakin et al. 1989; Walsh et al. 2000, 2003) described above, 44 high schools were randomly assigned to a treatment condition (516 participants) or a no-treatment control (568 participants). The intervention

Table 6.16 Studies on smokeless tobacco cessation for youth

Study	Intervention theory, modality, and number of sessions/contacts	Design, age, and sample size	Last follow-up	Percentage who quit	Biochemical verification of self-report
Eakin et al. 1989	Cognitive-behavioral 3 sessions/group treatment	14- to 18-year-olds Within-person replicated cognitive-behavioral design N = 25	3 months	36% at end of treatment 16% at 3-month follow-up	Yes
Chakravorty 1992	Oral substitutes to aid cessation 2 group sessions	3-group design N = 70	1 month	13% across treatment groups No difference between groups	No
Walsh et al. 1999	Psychosocial education and oral exams 2 milligrams nicotine gum 1 group session/2 phone calls	16 colleges randomized N = 171 treatment N = 189 control	1 year	35% treatment 16% control	No (bogus pipeline)
Walsh et al. 2000	Psychosocial education Group treatment with oral exam	Cluster randomized control N = 516 treatment N = 569 control	1 year	27% for treatment schools 14% for control schools	No
Fisher et al. 2001	Cognitive-behavioral Interactive computer program Individual treatment	Median age: 20 years N = 50	6 weeks	44% (intent to treat)	No
D'Onofrio et al. 2002	Social influences theory Group sessions	Random assignment N = 36 pairs (4-H club)	1 year	Cessation rates not reported	No
Stotts et al. 2003	Behavioral treatment with pharmacology adjunct Group treatment/6 weeks	14- to 19-year-olds Randomized double-blind controlled trial N = 303	1 year	Active patch: 17.3% Placebo patch: 25% Control group: 11.4% Combined active and placebo patch: 21%	Yes
Gansky et al. 2005	Diffusion of innovation and cognitive-behavioral theory Peer-led educational and oral exam 2 sessions with oral exam	Colleges matched and randomized N = 702 control N = 883 treatment	1 year	36% treatment group 37% control group	No
Gala et al. 2008	Health belief model Interactive Web site Individual treatment	No control group College baseball players N = 18	1 month	8% at 1 month No control	No
Burton et al. 2009	Cognitive-behavioral Group treatment	Randomly assigned to group within school Grades 9–12 N = 42	4 months	45% at end of treatment 14.3% intent to treat Control = 0%	Yes

included discussion of the harmful effects of using smokeless tobacco, refusal skills, a strong peer opinion leader who encouraged cessation of smokeless tobacco, a meeting with parents and coaches to obtain their support and a self-help guide for quitting, a dental exam (with advice on cessation from a dentist and behavioral counseling from a dental hygienist), and booster sessions to prevent relapse. Cessation was observed in 27% of the athletes attending the intervention schools and 14% of athletes in the control schools (RI = 17.8%). The results were based on self-reports, but the authors did take saliva samples from participants who were told that the samples could be used to confirm the veracity of the self-reports (Evans et al. 1977; Murray and Perry 1987), even though there was no intention to test all of them (this is the "bogus-pipeline" procedure). The multiple intervention components, including the use of oral health screening exams, brief counseling, and peer-led educational sessions were successful in doubling the rate of quitting over that obtained by participants in control schools. Previous studies on cessation with adults have reported that oral exams can be a significant motivator for users of smokeless tobacco to quit (Severson and Hatsukami 1999; Ebbert et al. 2007).

A study similar to the one in rural California was designed to determine the efficacy of a college-based intervention that targeted athletes at 16 of the public colleges in California (Walsh et al. 1999). Permission was sought from participating schools to assess all varsity athletes at a team meeting early in the season to seek their participation. Players completed a questionnaire assessing their tobacco use, and the 16 colleges were matched on the prevalence of smokeless tobacco use within these institutions. The intervention schools had 171 participants, and the control schools (no intervention) had 189. The groups did not differ on demographics, characteristics of tobacco use, or motivation to quit.

The intervention was based on cognitive social learning theory (Bandura 1986). A dentist examined the oral soft tissues of each team member in the intervention schools, advised users to quit, pointed out tissue changes related to smokeless tobacco, showed photographs of facial disfigurement caused by oral cancer, provided a self-help cessation guide, and offered the smokeless users a single 15- to 20-minute session of individual counseling. Players who wanted to quit were offered 2 mg of nicotine gum to mitigate their withdrawal symptoms. Dental hygienists met with nonusers in small groups to discuss the quitting process and encourage them to support the efforts of the users to quit. Two follow-up telephone calls were made to users attempting to quit. On average, the observed self-reported rates of quitting were 34.5% for intervention schools and 15.9% for control schools (RI = 28%; $p < .008$) at 1-year follow-up. In addition to doubling the rate of quitting, the intervention led to significant reductions in reported use of smokeless tobacco for participants who did not quit. The use of the nicotine gum did not appear to be related to success in quitting.

A more recent study involved the direction by athletic trainers of a smokeless tobacco cessation program for collegiate baseball players (Gansky et al. 2005), who are known to be high users of snuff (Severson et al. 2005). This study involved 52 California colleges (27 intervention colleges and 25 control schools) in a stratified cluster RCT to prevent initiation of smokeless tobacco use and promote its cessation among baseball players. Schools were stratified by tertiles on the basis of their baseline prevalence of smokeless tobacco use. The intervention included videoconference training, newsletters, a screening exam for each player, a self-help guide for quitting, and a counseling session for interested players. Players who expressed an interest in quitting received follow-up support and referral. Student athletes who were peer leaders conducted a single 60-minute educational team meeting that included video and slides. The overall program reduced the initiation of smokeless tobacco use at 1-year follow-up, but there was no effect on cessation. The authors attributed the lack of effects to a small number of dependent users who were enrolled in the study.

In an earlier study, Chakravorty (1992) assigned 83 male users of smokeless tobacco (14–18 years of age, averaging 1.5 dips per day) to one of three conditions in a school setting: use of a nontobacco product composed of crushed mint leaves (mint snuff), use of nicotine chewing gum, or attendance at a lecture-only control condition. More than 90% of study participants were reached at posttest, and 13% of the participants in both intervention conditions were found to have quit using smokeless tobacco (confirmed by biochemical validation) compared with no quitters in the control group ($p < .05$). No long-term follow-up figures were reported.

A cessation study on smokeless tobacco among younger users (10–14 years of age) was implemented in 4-H clubs throughout California (D'Onofrio et al. 2002). Seventy-two clubs were matched and then assigned to the intervention (tobacco education delivered by volunteers in five successive monthly club meetings) or a no-treatment control condition. At the 1-year follow-up, results from 1,438 club members (77.6% of eligible participants) in the intervention condition revealed significantly improved knowledge regarding the harmful effects of using smokeless tobacco. Seven of the 24 program effects (including knowledge, attitudes, and intentions) were significant at 1-year follow-up; however, no significant differences were seen in use of smokeless tobacco between intervention and control clubs at the 2-year follow-up (Lynch and Bonnie 1994; D'Onofrio et al. 2002).

In another study, Stotts and associates (2003) examined whether adolescent users of smokeless tobacco (14–19 years of age) were aided in their cessation attempts by using nicotine patches and receiving several follow-up telephone counseling sessions. Three hundred students were assigned to one of three conditions: (1) counseling only (6 weeks of 50-minute age-relevant behavioral intervention classes based on NCI materials); (2) counseling plus an active nicotine patch and telephone support; and (3) counseling plus a placebo patch and telephone calls. Following completion of the class, students who were enrolled in the counseling-only condition were contacted at 2-week and 1-year assessment points, and participants in the two groups that received a patch (active or placebo) plus telephone support received seven 15-minute telephone calls that included "stage-based counseling" and a $5 gift certificate. Analysis of the 1-year follow-up indicated no differences between the two groups receiving a patch and telephone calls, but these conditions combined were more successful in encouraging cessation of smokeless tobacco (32.8%) than was the counseling-only condition (22.9%) (RI = 14.7%). This was a highly intensive intervention, however, and it is not clear whether the telephone calls or the patch (nicotine or placebo) produced the significant effect. The lack of effects for nicotine replacement (vs. placebo) is consistent with studies evaluating the efficacy of nicotine replacement for cessation of smokeless tobacco use among adults.

Burton and colleagues (2009) reported on a school-based study that compared two models of cessation for both smokers and users of smokeless tobacco in high schools. Students were randomly assigned to one of three groups: an addiction group, a psychosocial dependency group (both were treatment groups), or a control group. Sixteen schools in California and Illinois participated, with two treatment groups per school. Each of the 32 groups met for five sessions spaced over 1 month, with follow-up completed 4 months after the end of treatment. The majority of participants were smokers, but 8% of California's participants and 17.3% of Illinois' participants used smokeless tobacco only, and an additional 8% and 9% of participants, respectively, reported both smoking and current use of smokeless tobacco. The treatment groups shared some components of the intervention, and the sessions were divided between presentation of information and group discussion. Video clips were used to elicit discussion, and users of smokeless tobacco were encouraged to use oral substitutes. All participants received incentives for participation and attendance. On the basis of an ITT analysis and according to both verbal reports and biochemical verification of these self-reports, the smokeless tobacco users were more likely to be abstinent from tobacco use at the 4-month follow-up than were smokers. The validated rate of quitting at the 4-month follow-up was 14.3% for smokeless tobacco users, while the control group had no one reporting abstinence (RI = 14.3%).

Consistent with the studies discussed above, a Cochrane review of smokeless tobacco cessation by Ebbert and colleagues (2007) concluded that pharmacotherapy has not been shown to affect long-term abstinence in young adults and adults.

Young people are using computers, smartphones, and the Internet with increasing frequency, and these channels might provide a unique opportunity to engage youth in quitting. Fisher and colleagues (2001) reported on an interactive, computer-mediated intervention designed to help adolescents quit smokeless tobacco. This small pilot study was conducted with 50 high school students who used the cessation program Chewer's Choice; the study used a baseball field as an interface, which appealed to the mostly male users. Participants were given brief instructions before using the program on their own. The authors reported that 85% of the users had made an attempt to quit, and at the 6-week follow-up, 58% reported having quit all tobacco for at least 24 hours. Neither biochemical verification of self-report nor long-term follow-up was included.

Gala and colleagues (2008) reported on a pilot study in which an Internet-based program on cessation of smokeless tobacco use was evaluated using 17 baseball athletes attending California colleges. The interactive Web site appeared to be feasible, was acceptable to users, and resulted in a 26% self-reported reduction in use of smokeless tobacco at 1-month follow-up, but only one subject reported abstinence at this point.

The use of the Internet to deliver a cessation program to young users is being more fully evaluated in a current study supported by NCI; this randomized clinical trial involves the evaluation of a Web-based cessation program (My Last Dip 2010) offered to young users of smokeless tobacco between the ages of 15 and 24 years (Severson and Danaher 2009). The study will evaluate the efficacy of two Web sites designed for this population of young chewers. One Web condition will provide a text-based site designed to offer a proven cessation program as well as information and resources on quitting smokeless tobacco; the other site will offer a tailored and more interactive site that provides video and other engaging activities in addition to the opportunity to post to blogs. One unique feature of this study is that no parental consent is required to participate; previous research has shown that requiring consent from parents can be a significant deterrent to enrolling young people in cessation or prevention studies (Severson and Ary 1983; Severson and Biglan 1989; Gala et al. 2008).

Although no data are yet available on the efficacy of this program, a previous study with adult users of smokeless tobacco demonstrated the efficacy of providing cessation support through the Internet. That study compared an interactive, tailored, Web-based intervention (enhanced condition) with a more linear text-based Web site (basic condition) in a randomized trial with 2,523 adult users (Severson et al. 2008). The point prevalence of all tobacco use (smoking and smokeless use) at 3 months, 6 months, and both 3 and 6 months was 48%, 45%, and 34%, respectively. The researchers found that participants in the enhanced condition quit at significantly higher rates than those in the basic condition. The intent-to-treat analysis indicated quit rates of 12.6% among those in the enhanced condition and 7.9% for those in the basic condition ($p < 0.001$). With the use of complete case analysis, including those with data at all time points, it was found that abstinence was 41% in the enhanced condition and 21% in the basic condition ($p < 0.001$). Program use was significantly related to the outcomes as well as to attrition. The authors concluded that a tailored, interactive, Web-based cessation program may be a promising method of helping to stop the use of smokeless tobacco. It remains to be seen whether these encouraging results can be replicated with a younger population of users, but given the high use of the Internet by young people and the reach of such a program, a program designed specifically for young users could provide a low-cost alternative for promoting cessation.

Discussion Regarding Cessation of Smokeless Tobacco Use

Although many studies have been conducted on smoking cessation for youth, few have focused on smokeless tobacco in this age group. The relative lack of research on smokeless tobacco may be due to the far lower overall prevalence of using this product (vs. cigarette smoking), particularly in females. In addition, the use of chewing tobacco and snuff varies significantly by region and is viewed as a behavior confined mostly to rural and small-town areas in some parts of the country.

Most of the interventions for smokeless tobacco cessation have been based on multicomponent cognitive-behavioral interventions used in smoking cessation (Severson and Hatsukami 1999). Although the basic elements of these interventions apply equally well to smokeless tobacco, cessation of smokeless tobacco use has some unique aspects. The most obvious is the opportunity presented by oral exams to both motivate users to quit and to show them the direct effects of regular use of smokeless tobacco products. Not all users will have observable oral lesions, but it has been reported that 73% of snuff users will have identifiable oral lesions within 3 years of regular use. The lesions' severity and ratings are directly related to the amount of tobacco used weekly and the number of years of use (Little et al. 1992). The use of oral exams has been a key element of several interventions described above and, for this reason, it has been recommended that a dentist or dental hygienist be part of the intervention team. Other modifications of the interventions focused on smokeless tobacco users involve modified measures used for assessing dependence and use (Hatsukami and Severson 1999).

There is currently a need for innovative, validated, easily delivered, and low-cost interventions to facilitate cessation in smokeless tobacco users, an underserved population. The Internet and interactive computer-based cessation may offer channels of intervention that are particularly attractive to young users, but the data on the efficacy of these interventions are limited.

Although the literature is not extensive, the outcomes of several well-controlled studies suggest that young users can be effectively helped to quit smokeless tobacco. The focus on male athletes who use smokeless tobacco is encouraging, but studies are lacking that target other high-risk or high-use groups, including Alaska Natives, American Indians, and athletes who are involved in rodeo. The prevalence of smokeless tobacco use is very high in these groups, and specialized interventions may be needed to help them to quit.

Evidence Summary

There is a large, robust, and consistent evidence base that documents known effective strategies in reducing the initiation, prevalence, and intensity of smoking among youth and young adults. This science base includes studies, analyses, and evidence reviews of multicomponent programs, as well as studies on individual strategies and theories underlying these strategies. Sustained programs combining mass media campaigns; tax increases on tobacco products; regulatory initiatives such as those that ban advertising to youth, restrict youth access to tobacco, and establish smokefree public and workplace environments; and statewide, community-wide, and school-based programs and policies are effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.

Several health behavior theories underlie interventions designed to prevent tobacco use among young people. TTI, which is consistent with other health behavior frameworks applied to tobacco use interventions, organizes factors that promote or deter health behaviors such as smoking along two dimensions—levels of causation and streams of influence—and into three interacting streams: intrapersonal, social/normative, and environmental (Flay et al. 2009). Variables that might influence smoking can be found at ultimate, distal, and proximal distances from actual smoking behaviors. TTI's metatheoretical framework not only provides a construct for understanding behavior, but also facilitates application of behavioral theory to specific interventions for preventing youth tobacco use.

In addition to examining theoretical bases for adolescent and young adult attitudes and behavior relative to tobacco use, this chapter reviews evidence for various approaches to preventing tobacco use within these populations. Since the release in 1994 of the first Surgeon General's report on preventing tobacco use among young people, the emphasis on environmental and policy approaches to tobacco control has increased. For example, the 2007 CDC Best Practices for Comprehensive Tobacco Control Programs strongly recommended comprehensive programs that include increasing the unit price of tobacco products and implementing smoking bans through policies, regulations, and laws, as well as other coordinated efforts that establish smokefree social norms. This focus on environmental and regulatory/policy approaches has also been supported by other reviews including the National Institutes of Health's State-of-the-Science Conference (NIH State-of-the-Science Panel 2006).

Evidence indicates that mass media campaigns can be one of the most effective strategies in changing social norms and preventing youth smoking. Studies cited in this chapter find that youth exposure to antismoking messages, particularly in mass media campaigns, leads to changes in, or increased salience of, attitudes, beliefs, and intentions relative to smoking as well as reduced smoking behavior (Popham et al. 1994; Sly et al. 2001b, 2005: Farrelly et al. 2002; White et al. 2003; Meshack et al. 2004; Niederdeppe et al. 2004; Emery et al. 2005). A significant number of population-based investigations on mass media campaigns has provided convincing evidence that these campaigns, even as stand-alone initiatives, can decrease youth smoking (Davis et al. 2007a; NCI 2008; Farrelly et al. 2009; Solomon et al. 2009). Evidence also suggests a dose-response relationship between exposure to antismoking media messages and reduced smoking behavior among youth and provides strong evidence that media ads designed for adults also decrease the prevalence of smoking among youth. Influential and successful campaigns contain a number of essential elements including optimized themes, appropriate emotional tone, appealing format, clear messages, intensity, and adequate repetition (Pechmann 2001; Siegel 2002; Farrelly et al. 2003a; Wakefield et al. 2003b,c; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008). Mass media campaigns lacking these elements have been shown to be less effective. Nonetheless, the evidence is sufficient to conclude that there is a causal relationship between adequately funded antismoking media campaigns and a reduced prevalence of smoking among youth.

In addition to mass media campaigns a number of high-impact legislative or regulatory strategies have been proven to reduce tobacco use (USDHHS 2000b; Task Force on Community Preventive Services 2005; NIH State-of-the-Science Panel 2006; CDC 2007a,b). There is compelling evidence from CDC, as well as the reviewed research, that increasing tobacco prices is effective at lowering both smoking prevalence and consumption levels of tobacco products, especially by youth and young adults and other price-sensitive populations (Zaza et al. 2005). Federal, state, and local taxes that raise prices on tobacco products improve public health by reducing initiation, prevalence, and intensity of smoking among young people. Comprehensive reviews of the literature on the effect of price on tobacco consumption estimate a 3–5% reduction in overall cigarettes consumed as a result of a 10% increase in cigarette prices, and youth and young adults have proven to be even more responsive than adults to higher cigarette prices (USDHHS 2000b; Chaloupka and Warner 2000). Higher cigarette prices, including those resulting from increased excise taxes, have also been shown to increase cessation among young adults; one study (Tauras 2004) confirmed a positive relationship between cigarette prices and smoking cessation, with a 10% rise in price increasing successful cessation by young adults by an estimated 3.5%.

In the past decade, there has been significant growth in the number of states enacting comprehensive smoke-free policies for public places including worksites, bars, restaurants, schools, child care centers, and other public facilities. The number of colleges, universities, and technical schools adopting smokefree policies also has grown significantly in recent years. This movement toward clean indoor air has occurred in large part as a result of strong evidence of the serious health risks associated with secondhand smoke, but this chapter also examines the impact of these policies on youth smoking. Reviewing data from YRBS and NSDUH, McMullen and colleagues (2005) determined that the strength of clean indoor air laws was inversely related to the prevalence of smoking among youth. Smoke-free policies have also been found to contribute to cessation; using the longitudinal data on young adults from MTF, Tauras (2004) found that stronger restrictions on smoking in private worksites and public places increased the probability of smoking cessation among young adults. Further, as clean air policies change social norms relative to public smoking, there has been an increase in the number of private households establishing smokefree norms, restrictions that may be a powerful tool to reduce youth smoking in the future (IARC 2009; Emory et al. 2010).

With the enactment of the *Family Smoking Prevention and Tobacco Control Act* in 2009, FDA was given regulatory authority and responsibility over the manufacture, marketing, and distribution of tobacco products. The 2009 law required that U.S. cigarette packs contain larger pictorial labels covering 50% of the front and back of the packs instead of small text-only health warning labels. This requirement, which is currently under legal review, also applies to a requirement for health warnings to cover 20% of advertising materials for tobacco products. Smokeless tobacco products are now required to have larger text warnings covering 30% of the two main surfaces (and 20% of advertising). Data in this chapter include studies examining the effects of such tobacco product labeling; these data conclude that small text-only health warning labels have limited impact on youth and young adults (Fischer et al. 1989; Brubaker and Mitby 1990; Krugman et al. 1994; Crawford et al. 2002; Bonnie et al. 2007). Larger warnings and warnings that include pictures that elicit strong emotional reactions are significantly more effective at discouraging tobacco use (Environics Research Group 1999; Nilsson 1999; Bonnie et al. 2007; Hammond 2011).

Regulations under the 2009 *Family Smoking Prevention and Tobacco Control Act* also continued a progression of legislative and regulatory initiatives that have reduced youth access to tobacco products; for example, the act bans self-service or vending machine sale of cigarettes and smokeless tobacco except in facilities that persons under 18 years of age are prohibited from entering. Other legislative initiatives have included the 1992 Synar Amendment (*ADAMHA Reorganization Act* 1992), which required states to restrict youth access to tobacco products and to enforce the restrictions through compliance checks, and state and local laws prohibiting underage possession, use, and purchase of tobacco products. Although data are mixed, a Cochrane review concluded that policies to limit youth access and enforcement of these policies can improve the compliance of retailers, and the prevalence of smoking will be affected if the commercial supply is sufficiently restricted through these means (Stead and Lancaster 2005). The Community Preventive Task Force concluded that community mobilization combined with additional interventions, such as stronger laws directed at retailers, active enforcement of retailer sales laws, and retailer education with reinforcement are recommended (Task Force on Community Preventive Services 2005). Youth are known to obtain tobacco products both through commercial means and through social means—buying, borrowing, or stealing them from other youth and adults. Accordingly, even well-enforced commercial restrictions on youth access may not adequately reduce the supply of tobacco products available to young people (Forster et al. 1998; Altman et al. 1999; DiFranza and Coleman 2001; Ling et al. 2002).

One policy initiative that has been shown to reduce youth tobacco consumption is the use of bans on tobacco product advertising targeted to youth. After the U.S. ban on TV and radio tobacco advertising went into effect in 1971, additional advertising restrictions were included in the 1998 Master Settlement Agreement, which addressed outdoor advertising and advertising that targeted youth. The *Family Smoking Prevention and Tobacco Control Act* directed FDA to promulgate rules banning a variety of other promotional activities traditionally used by the tobacco industry (e.g., sponsorship of music and sports events, sale and distribution of tobacco-branded products such as clothing and accessories, etc.) that are especially appealing to youth and young adults. Evidence cited in this chapter from a broad range of studies has concluded that bans on cigarette advertising, especially if the bans are comprehensive rather than partial, reduce youth smoking (Saffer and Chaloupka 2000; Lancaster and Lancaster 2003; Iwasaki et al. 2006; NCI 2008).

Numerous studies over many years have consistently concluded that comprehensive state tobacco control programs that include a range of coordinated and complementary strategies have been effective at not only reducing tobacco use by youth and young adults but also have resulted in overall reductions in smoking prevalence and concomitant decreases in state spending on tobacco-related health care (USDHHS 2000b; Sly et al. 2001a; Rigotti et al. 2002; Soldz et al. 2002; Niederdeppe et al. 2004; Pierce et al. 2005; Bonnie et al. 2007; Lightwood et al. 2008; NCI 2008; Lightwood and Glantz 2011). These comprehensive state tobacco control programs combine the strategies found to be most effective individually; these include mass media campaigns, increasing the price of tobacco products, establishing smokefree policies, and other programmatic and policy interventions that influence social norms, systems, and networks (CDC 2007a,b). Evidence on the efficacy of community-based tobacco control programs, which have combined a more limited range of policy and environmental strategies to reduce youth tobacco, has been less consistent. A Cochrane review of 17 studies that examined such initiatives (Sowden and Stead 2003) found only limited support for the effectiveness of these interventions in preventing the uptake of smoking by young people. Later studies have also been inconsistent, with some community programs having little or no effect on youth tobacco use (Bowen et al. 2003) and some resulting in youth smoking declines (Ross et al. 2006).

Evidence on school-based programs points to short-term results for programs based on the social influences model using interactive delivery methods, and teaching refusal skills, with some school-based prevention programs, also demonstrating longer-term outcomes. A thorough systematic review of school-based smoking prevention studies to 2006 by Thomas and Perera concluded that while information-only school programs had limited effect on smoking prevention, the majority of programs that addressed social influences on tobacco use demonstrated positive effects. However, this review also concluded that there was little evidence of the long-term effectiveness of school-based programs to prevent smoking. Two meta-analyses (Tobler et al. 2000; Hwang et al. 2004) provided clear directions on the types of programs they found most effective: those that are interactive, address social influences, include components on intentions not to use tobacco, use peer leaders, add community components, and include life skills practice. Another examination of evidence reviews and meta-analyses (Flay 2009a) concluded that school-based programs to prevent smoking can have significant long-term effects if they are interactive and are based on social influences or social skills, contain at least 15 sessions including some up to at least ninth grade, and have produced substantial short-term effects. Newer studies included in Table 6.9 and 6.10 assess the influence on youth of various tobacco control interventions including school-based programs alone and in combination with other strategies. Overall, evidence cited in this chapter shows that several existing school-based programs have demonstrated effectiveness in the short term and that selected programs have demonstrated long-term effectiveness. As is the case with other strategies to prevent and reduce youth tobacco use, school-based programs produce larger and more sustained effects when they are implemented in combination with other initiatives such as mass media campaigns, family programs, and state and community programs.

Although some specific programs, stand-alone elements, programmatic approaches, and strategies with narrower focus have been proven ineffective in addressing youth tobacco use, the preponderance of evidence suggests that there are multiple intervention strategies and approaches that are effective at preventing smoking, reducing tobacco consumption, and assisting cessation within the youth and young adult populations. Further, the evidence indicates that sustained programs combining mass media campaigns; price increases including those that result from tax increases; regulatory initiatives such as those that ban advertising to youth, restrictions on youth access to tobacco, and establishment of smokefree public and workplace environments; and statewide, community-wide, and school-based programs and policies are effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.

Conclusions

1. The evidence is sufficient to conclude that mass media campaigns, comprehensive community programs, and comprehensive statewide tobacco control programs can prevent the initiation of tobacco use and reduce its prevalence among youth.

2. The evidence is sufficient to conclude that increases in cigarette prices reduce the initiation, prevalence, and intensity of smoking among youth and young adults.

3. The evidence is sufficient to conclude that school-based programs with evidence of effectiveness, containing specific components, can produce at least short-term effects and reduce the prevalence of tobacco use among school-aged youth.

References

Ackard DM, Neumark-Sztainer D. Health care information sources for adolescents: age and gender differences on use, concerns, and needs. *Journal of Adolescent Health* 2001;29(3):170–6.

Action on Smoking and Health. *Tobacco Product Warnings: A Survey of Effectiveness*. London: Action on Smoking and Health, 1998.

ADAMHA Reorganization Act, Public Law 102-321, 42 *U.S. Code* § 300x-26 (1992).

Adelman WP, Duggan AK, Hauptman P, Joffe A. Effectiveness of a high school smoking cessation program. *Pediatrics* 2001;107(4):E50.

Aftab M, Kolben D, Lurie P. International cigarette labeling practices. *Tobacco Control* 1999;8(4):368–72.

AGB Spectrum Research. *Testing the Positions of Health Warnings on Cigarette Packages.* Prepared for Health Promotion Programme, Department of Health, New Zealand, 1987; <http://legacy.library.ucsf.edu/tid/lel70g00>.

Aguirre-Molina M, Gorman DM. The Perth Amboy Community Partnership for Youth: assessing its effects at the environmental and individual levels of analysis. *International Quarterly of Community Health Education* 1995;15(4):363–78.

Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 1991; 50(2):179–211.

Alesci NL, Forster JL, Blaine T. Smoking visibility, perceived acceptability, and frequency in various locations among youth and adults. *Preventive Medicine* 2003;36(3):272–81.

Alesci NL, Forster JL, Erickson DJ. Did youth smoking behaviors change before and after the shutdown of Minnesota Youth Tobacco Prevention Initiative? *Nicotine & Tobacco Research* 2009;11(10):1196–204.

Alexander HM, Callcott R, Dobson AJ, Hardes GR, Lloyd DM, O'Connell DL, Leeder SR. Cigarette smoking and drug use in schoolchildren. IV: factors associated with changes in smoking behaviour. *International Journal of Epidemiology* 1983;12(1):59-66.

Altman DG, Feighery EC. Future directions for youth empowerment: commentary on application of youth empowerment theory to tobacco control. *Health Education & Behavior* 2004;31(5):641–7.

Altman DG, Wheelis AY, McFarlane M, Lee H, Fortmann SP. The relationship between tobacco access and use among adolescents: a four community study. *Social Science & Medicine* 1999;48(6):759–75.

American Medical Association. *Guidelines for Adolescent Preventive Services (GAPS): Recommendations Monograph*. Chicago: American Medical Association, 1997.

American Nonsmokers' Rights Foundation. Municipalities with Local 100% Smokefree Laws, 2011a; <http://www.no-smoke.org/pdf/100ordlisttabs.pdf>; accessed: July 15, 2011.

American Nonsmokers' Rights Foundation. Summary of 100% Smokefree State Laws and Population Protected by 100% US Smokefree Laws, 2011b; <http://www.no-smoke.org/pdf/SummaryUSPopList.pdf>; accessed: May 24, 2011.

American Nonsmokers' Rights Foundation. United States 100% Smokefree Air Laws, 2011c; <http://www.no-smoke.org/pdf/100Map.pdf>; accessed: July 15, 2011.

American Nonsmokers' Rights Foundation. U.S. Colleges and Universities with Smokefree Air Policies, 2011d; <http://www.no-smoke.org/pdf/smokefreecollegesuniversities.pdf>; accessed: May 24, 2011.

Andrews JA, Severson HH, Lichtenstein E, Gordon JS, Barckley MF. Evaluation of a dental office tobacco cessation program: effects on smokeless tobacco use. *Annals of Behavioral Medicine* 1999;21(1):48–53.

Angstman S, Patten CA, Renner CC, Simon A, Thomas JL, Hurt RD, Schroeder DR, Decker PA, Offord KP. Tobacco and other substance use among Alaska Native youth in western Alaska. *American Journal of Health Behavior* 2007;31(3):249–60.

Angus K, Brown A, Hastings G. The effect of tobacco control mass media campaigns, counter-advertising, and other related community interventions on youth tobacco use. Background paper for the WHO Tobacco Free Initiative Global Consultation on Effective Youth Tobacco Control Policy Interventions. Stirling (Scotland): University of Stirling, Institute for Social Marketing, Centre for Tobacco Control Research, 2008.

Aos S, Lieb R, Mayfield J, Miller M, Pennucci A. *Benefits and Costs of Prevention and Early Intervention Programs for Youth*. Olympia (WA): Washington State Institute for Public Policy, 2004.

Ariza C, Nebot M, Tomás Z, Giménez E, Valmayor S, Tarilonte V, De Vries H. Longitudinal effects of the European smoking prevention framework approach (ESFA) project in Spanish adolescents. *European Journal of Public Health* 2008;18(5):491–7.

Armstrong BK, de Klerk NH, Shean RE, Dunn DA, Dolin PJ. Influence of education and advertising on the uptake of smoking by children. *Medical Journal of Australia* 1990;152(3):117–24.

Ary DV, Biglan A, Glasgow R, Zoref L, Black C, Ochs L, Severson H, Kelly R, Weissman W, Lichtenstein E, et al. The efficacy of social-influence prevention programs versus "standard care": are new initiatives needed? *Journal of Behavioral Medicine* 1990;13(3):281–96.

Asumda F, Jordan L. Minority youth access to tobacco: a neighborhood analysis of underage tobacco sales. *Health Place* 2009;15(1):140–7.

Audrey S, Holliday J, Campbell R. It's good to talk: adolescent perspectives of an informal, peer-led intervention to reduce smoking. *Social Science & Medicine* 2006;63(2):320–34.

Aveyard P, Cheng KK, Almond J, Sherratt E, Lancashire R, Lawrence T, Griffin C, Evans O. Cluster randomised controlled trial of expert system based on the transtheoretical ("stages of change") model for smoking prevention and cessation in schools. *BMJ (British Medical Journal)* 1999;319(7215):948–53.

Aveyard P, Sherratt E, Almond J, Lawrence T, Lancashire R, Griffin C, Cheng KK. The change-in-stage and updated smoking status results from a cluster-randomized trial of smoking prevention and cessation using the transtheoretical model among British adolescents. *Preventive Medicine* 2001;33(4):313–24.

Backinger CL, Fagan P, Matthews E, Grana R. Adolescent and young adult tobacco prevention and cessation: current status and future directions. *Tobacco Control* 2003;12(Suppl 4):iv46–iv53.

Balanced Budget Act of 1997, Public Law 105-33, 111 *U.S. Statutes at Large* 251.

Balbach ED, Glantz SA. Tobacco control advocates must demand high-quality media campaigns: the California experience. *Tobacco Control* 1998;7(4):397–408.

Balbach ED, Traynor MP, Glantz SA. The implementation of California's tobacco tax initiative: the critical role of outsider strategies in protecting proposition 99. *Journal of Health Politics, Policy and Law* 2000;25(4): 689–715.

Ball-Rokeach SJ. A theory of media power and a theory of media use: different stories, questions, and ways of thinking. *Mass Communication and Society* 1998; 1(1–2):5–40.

Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs (NJ): Prentice-Hall, 1986.

Bandura A. Health promotion by social cognitive means. *Health Education & Behavior* 2004;31(2):143–64.

Barnett TA, Gauvin L, Lambert M, O'Loughlin J, Paradis G, McGrath JJ. The influence of school smoking policies on student tobacco use. *Archives of Pediatrics & Adolescent Medicine* 2007;161(9):842–8.

Baskerville B, Hotte A, Dunkley G. *Evaluation of a High School Quit and Win Smoking Cessation Program*. Ottawa (Canada): University of Ottawa, Community Health Research Unit, 1993. CHRU Publication No. M93-4.

Bauer UE, Johnson TM, Hopkins RS, Brooks RG. Changes in youth cigarette use and intentions following implementation of a tobacco control program: findings from the Florida Youth Tobacco Survey, 1998–2000. *JAMA: the Journal of the American Medical Association* 2000;284(6):723–8.

Bauman KE, Brown JD, Bryan ES, Fisher LA, Padgett CA, Sweeney JM. Three mass media campaigns to prevent adolescent cigarette smoking. *Preventive Medicine* 1988;17(5):510–30.

Bauman KE, Ennett ST, Foshee VA, Pemberton M, King TS, Koch GG. Influence of a family-directed program on adolescent cigarette and alcohol cessation. *Prevention Science* 2000;1(4):227–37.

Bauman KE, Ennett ST, Foshee VA, Pemberton M, King TS, Koch GG. Influence of a family program on adolescent smoking and drinking prevalence. *Prevention Science* 2002;3(1):35–42.

Bauman KE, Foshee VA, Ennett ST, Hicks K, Pemberton M. Family Matters: a family-directed program designed to prevent adolescent tobacco and alcohol use. *Health Promotion Practice* 2001;2(1):81–96.

Bauman KE, LaPrelle J, Brown JD, Koch GG, Padgett CA. The influence of three mass media campaigns on variables related to adolescent cigarette smoking: results of a field experiment. *American Journal of Public Health* 1991;81(5):597–604.

Baumeister RF, Vohs KD, DeWall CN, Zhang L. How emotion shapes behavior: feedback, anticipation, and reflection, rather than direct causation. *Personality and Social Psychology Review* 2007;11(2):167–203.

Baxter AP, Milner PC, Hawkins S, Leaf M, Simpson C, Wilson KV, Owen T, Higginbottom G, Nicholl J, Cooper N. The impact of heart health promotion on coronary heart disease lifestyle risk factors in schoolchildren: lessons learnt from a community-based project. *Public Health* 1997;111(4):231–7.

Beaglehole R, Brough D, Harding W, Eyles E. A controlled smoking intervention programme in secondary schools. *New Zealand Medical Journal* 1978;87(610):278–80.

Beattie A. Health education and the science teacher: invitation to a debate. *Education and Health* 1984;2(1): 9–16.

Beaudoin CE. Exploring antismoking ads: appeals, themes, and consequences. *Journal of Health Communication* 2002;7(2):123–37.

Benuck I, Gidding SS, Binns HJ. Identification of adolescent tobacco users in a pediatric practice. *Archives of Pediatrics & Adolescent Medicine* 2001;155(1):32–5.

Bergamaschi A, Gambi A, Gentilini F, Monti C, Stampi S, Zanetti F. Tobacco smoking among high school students in Romagna (Italy) and evaluation of a prevention campaign. *Substance Use & Misuse* 2000;35(9):1277–95.

Berndt TJ. Developmental changes in conformity to peers and parents. *Developmental Psychology* 1979;15(6):608–16.

Best JA, Flay BR, Towson SM, Ryan KB, Perry CL, Brown KS, Kersell MW, D'Avernas JR. Smoking prevention and the concept of risk. *Journal of Applied Social Psychology* 1984;14(3):257–73.

Biener L. Anti-tobacco advertisements by Massachusetts and Philip Morris: what teenagers think. *Tobacco Control* 2002;11(Suppl 2):ii43–ii46.

Biener L, Ji M, Gilpin EA, Albers AB. The impact of emotional tone, message, and broadcast parameters in youth anti-smoking advertisements. *Journal of Health Communication* 2004;9(3):259–74.

Biener L, McCallum-Keeler G, Nyman AL. Adults' response to Massachusetts anti-tobacco television advertisements: impact of viewer and advertisement characteristics. *Tobacco Control* 2000;9(4):401–7.

Biener L, Wakefield M, Shiner CM, Siegel M. How broadcast volume and emotional content affect youth recall of anti-tobacco advertising. *American Journal of Preventive Medicine* 2008;35(1):14–9.

Biglan A, Ary D, Koehn V, Levings D, Smith S, Wright Z, James L, Henderson J. Mobilizing positive reinforcement in communities to reduce youth access to tobacco. *American Journal of Community Psychology* 1996;24(5):625–38.

Biglan A, Ary D, Smolkowski K, Duncan T, Black C. A randomised controlled trial of a community intervention to prevent adolescent tobacco use. *Tobacco Control* 2000a;9(1):24–32.

Biglan A, Ary D, Wagenaar AC. The value of interrupted time-series experiments for community intervention research. *Prevention Science* 2000b;1(1):31–49.

Biglan A, Glasgow R, Ary D, Thompson R, Severson H, Lichtenstein E, Weissman W, Faller C, Gallison C. How generalizable are the effects of smoking prevention programs: refusal skills training and parent messages in a teacher-administered program. *Journal of Behavioral Medicine* 1987;10(6):613–28.

Biglan A, Henderson J, Humphreys D, Yasui M, Whisman R, Black C, James L. Mobilising positive reinforcement to reduce youth access to tobacco. *Tobacco Control* 1995;4(1):42–8.

Biglan A, Lichtenstein E. A behavior-analytic approach to smoking acquisition: some recent findings. *Journal of Applied Social Psychology* 1984;14(3):207–23.

Black DR, Tobler NS, Sciacca JP. Peer helping/involvement: an efficacious way to meet the challenge of reducing alcohol, tobacco, and other drug use among youth? *Journal of School Health* 1998;68(3):87–93.

Blair MH. An empirical investigation of advertising wearin and wearout. *Journal of Advertising Research* 2000;40(6):95–100.

Bleakley A, Hennessy M, Fishbein M, Jordan A. Using the integrative model to explain how exposure to sexual media content influences adolescent sexual behavior. *Health Education and Behavior* 2011;38(5):530–40.

Bloor M, Frankland J, Parry Langdon N, Robinson M, Allerston S, Catherine A, Cooper L, Gibbs L, Gibbs N, Hamilton-Kirkwood L, et al. A controlled evaluation of an intensive, peer-led, schools-based, anti-smoking programme. *Health Education Journal* 1999;58(1):17–25.

Blum RW, Beuhring T, Wunderlich M, Resnick MD. Don't ask, they won't tell: the quality of adolescent health screening in five practice settings. *American Journal of Public Health* 1996;86(12):1767–72.

Blumenfeld K. *Smoke-free Vehicles When Children are Present*. Summit (NJ): New Jersey GASP (Global Advisors on Smokefree Policy), 2008.

Bonnie RJ, Stratton K, Wallace RB, editors. *Ending the Tobacco Problem: A Blueprint for the Nation*. Washington: National Academies Press, 2007.

Borland R, Hill D. Initial impact of the new Australian tobacco health warnings on knowledge and beliefs. *Tobacco Control* 1997a;6(4):317–25.

Borland R, Hill D. The path to Australia's tobacco health warnings. *Addiction* 1997b;92(9):1151–7.

Bornstein RF. Exposure and affect: overview and meta-analysis of research, 1968–1987. *Psychological Bulletin* 1989;106(2):265–89.

Botvin GJ, Baker E, Dusenbury L, Botvin EM, Diaz T. Long-term follow-up results of a randomized drug abuse prevention trial in a white middle-class population. *JAMA: the Journal of the American Medical Association* 1995a;273(14):1106–12.

Botvin GJ, Baker E, Dusenbury L, Tortu S, Botvin EM. Preventing adolescent drug abuse through a multimodal cognitive-behavioral approach: results of a 3-year study. *Journal of Consulting and Clinical Psychology* 1990a;58(4):437–46.

Botvin GJ, Baker E, Filazzola AD, Botvin EM. A cognitive-behavioral approach to substance abuse prevention: one-year follow-up. *Addictive Behaviors* 1990b;15(1):47–63.

Botvin GJ, Baker E, Renick NL, Filazzola AD, Botvin EM. A cognitive-behavioral approach to substance-abuse prevention. *Addictive Behaviors* 1984;9(2):137–47.

Botvin GJ, Dusenbury L, Baker E, James-Ortiz S, Botvin EM. Smoking prevention among urban minority youth: assessing effects on outcome and mediating variables. *Health Psychology* 1992;11(5):290–9.

Botvin GJ, Dusenbury L, Baker E, James-Ortiz S, Kerner J. A skills training approach to smoking prevention among Hispanic youth. *Journal of Behavioral Medicine* 1989;12(3):279–96.

Botvin GJ, Griffin KW, Diaz T, Miller N, Ifill-Williams M. Smoking initiation and escalation in early adolescent girls: one-year follow-up of a school-based prevention intervention for minority youth. *Journal of the American Medical Women's Association* 1999;54(3):139–43, 152.

Botvin GJ, Schinke SP, Epstein JA, Diaz T, Botvin EM. Effectiveness of culturally focused and generic skills training approaches to alcohol and drug abuse prevention among minority adolescents: two-year follow-up results. *Psychology of Addictive Behaviors* 1995b;9(3):183–94.

Bowen DJ, Orlandi MA, Lichtenstein E, Cummings KM, Hyland A. Intervention effects on youth tobacco use in the community intervention trial (COMMIT). *Journal of Epidemiology and Community Health* 2003;57(2):159–60.

Boyd GM, Glover ED. Smokeless tobacco use by youth in the U.S. *Journal of School Health* 1989;59(5):189–94.

Boyd RG, Seldon BJ. The fleeting effect of advertising: empirical evidence from a case study. *Economics Letters* 1990;34(4):375–9.

Brannon BR, Dent CW, Flay BR, Smith G, Sussman S, Pentz MA, Johnson CA, Hansen WB. The television, school, and family project. V: the impact of curriculum delivery format on program acceptance. *Preventive Medicine* 1989;18(4):492–502.

BRC Marketing & Social Research. *Smoking Health Warnings Study: Optimising Smoking Health Warnings, Stage 2 – Text Graphics, Size and Colour Testing.* Wellington (New Zealand): BRC Marketing & Social Research, 2004.

Brindis CD, Lee PR. Illness, adolescents conceptualization. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. I. New York: Garland Publishing, 1991:534–40.

Briton NJ, Clark TW, Baker AK, Posner B, Soldz S, Krakow M. *Adolescent Tobacco Use in Massachusetts; Trends Among Public School Students 1984–1996.* Boston: Health and Addictions Research, 1997.

Bronfenbrenner U. Toward an experimental ecology of human development. *American Psychologist* 1977; 32(7):513–31.

Bronfenbrenner U. *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge (MA): Harvard University Press, 1979.

Bronfenbrenner U. Ecology of the family as a context for human development: research perspectives. *Developmental Psychology* 1986;22(6):723–42.

Brown BB, Clasen DR, Eicher SA. Perceptions of peer pressure, peer conformity dispositions, and self-reported behavior among adolescents. *Developmental Psychology* 1986;22(4):521–30.

Brown RA, Ramsey SE, Strong DR, Myers MG, Kahler CW, Lejuez CW, Niaura R, Pallonen UE, Kazura AN, Goldstein MG, et al. Effects of motivational interviewing on smoking cessation in adolescents with psychiatric disorders. *Tobacco Control* 2003;12(Suppl 4):iv3–iv10.

Brown S, Birch D, Thyagaraj S, Teufel J, Phillips C. Effects of a single-lesson tobacco prevention curriculum on knowledge, skill identification and smoking intention. *Journal of Drug Education* 2007;37(1):55–69.

Brubaker RG, Mitby SK. Health-risk warning labels on smokeless tobacco products: are they effective? *Addictive Behaviors* 1990;15(2):115–8.

Bruvold WH. A meta-analysis of adolescent smoking prevention programs. *American Journal of Public Health* 1993;83(6):872–80.

Buckelew SM, Adams SH, Irwin CE Jr, Gee S, Ozer EM. Increasing clinician self-efficacy for screening and counseling adolescents for risky health behaviors: results of an intervention. *Journal of Adolescent Health* 2008;43(2):198–200.

Burns DM. Positive evidence on effectiveness of selected smoking prevention programs in the United States. *Journal of the National Cancer Institute Monographs* 1992;(12):17–20.

Burt RD, Peterson AV Jr. Smoking cessation among high school seniors. *Preventive Medicine* 1998;27(3): 319–27.

Burton D, Chakravorty B, Weeks K, Flay BR, Dent C, Stacy A, Sussman S. Outcome of a tobacco cessation randomized trial with high-school students. *Substance Use & Misuse* 2009;44(7):965–80.

Bush PJ, Zuckerman AE, Taggart VS, Theiss PK, Peleg EO, Smith SA. Cardiovascular risk factor prevention in black school children: the "Know Your Body" evaluation project. *Health Education Quarterly* 1989a;16(2): 215–27.

Bush PJ, Zuckerman AE, Theiss PK, Taggart VS, Horowitz C, Sheridan MJ, Walter HJ. Cardiovascular risk factor prevention in black schoolchildren: two-year results of the "Know Your Body" program. *American Journal of Epidemiology* 1989b;129(3):466–82.

Buttross LS, Kastner JW. A brief review of adolescents and tobacco: what we know and don't know. *American Journal of the Medical Sciences* 2003;326(4):235–7.

Cacioppo JT, Gardner WL. Emotion. *Annual Review of Psychology* 1999;50:191–214.

Cai Y, Zhao C, Wong SU, Zhang L, Lim SK. Laser acupuncture for adolescent smokers—a randomized double-blind controlled trial. *American Journal of Chinese Medicine* 2000;28(3/4):443–9.

Cameron R, Brown KS, Best JA, Pelkman CL, Madill CL, Manske SR, Payne ME. Effectiveness of a social influences smoking prevention program as a function of provider type, training method, and school risk. *American Journal of Public Health* 1999;89(12):1827–31.

Campaign for Tobacco-Free Kids. *A Broken Promise to Our Children: The 1998 State Tobacco Settlement 13 Years Later*. Washington: Campaign for Tobacco-Free Kids, American Heart Association, American Cancer Society, Cancer Action Network, American Lung Association, and Robert Wood Johnson Foundation, 2011a; http://www.tobaccofreekids.org/what_we_do/state_local/tobacco_settlement/; accessed: December 8, 2011.

Campaign for Tobacco Free Kids. Top combined state-local cigarette tax rates (state plus county plus city) [fact sheet], October 7, 2011b; <http://www.tobaccofreekids.org/research/factsheets/pdf/0267.pdf>; accessed: November 7, 2011.

Campbell R, Starkey F, Holliday J, Audrey S, Bloor M, Parry-Langdon N, Hughes R, Moore L. An informal school-based peer-led intervention for smoking prevention in adolescence (ASSIST): a cluster randomised trial. *Lancet* 2008;371(9624):1595–602.

Capehart T. The Changing Tobacco User's Dollar. Electronic Outlook Report from the Economic Research Service. Washington: U.S. Department of Agriculture, 2004; <http://www.ers.usda.gov/publications/tbs/OCT04/tbs25701/tbs25701.pdf>; accessed: June 10, 2009.

Carpenter C, Cook PJ. Cigarette taxes and youth smoking: new evidence from national, state, and local Youth Risk Behavior Surveys. *Journal of Health Economics* 2008;27(2):287–99.

Catalano RF, Berglund ML, Ryan JAM, Lonczak HS, Hawkins JD. Positive youth development in the United States: research findings on evaluations of positive youth development programs. *Annals of the American Academy of Political and Social Science* 2004; 591(1):98–124.

Caulkins JP, Pacula RL, Paddock S, Chiesa J. What we can—and cannot—expect from school-based drug prevention. *Drug and Alcohol Review* 2004;23(1):79–87.

Caulkins JP, Rydell CP, Everingham SS, Chiesa J, Bushway S. *An Ounce of Prevention, a Pound of Uncertainty: The Cost-Effectiveness of School-Based Drug Prevention Programs.* Santa Monica (CA): RAND, 1999. Publication No. MR-923-RWJ.

Cavalcante TM. *Labeling and Packaging in Brazil*. Geneva: World Health Organization, 2003.

Cawley J, Markowitz S, Tauras J. Lighting up and slimming down: the effects of body weight and cigarette prices on adolescent smoking initiation. *Journal of Health Economics* 2004;23(2):293–311.

Cawley J, Markowitz S, Tauras J. Obesity, cigarette prices, youth access laws, and adolescent smoking initiation. *Eastern Economic Journal* 2006;32(1):149–70.

Cecil H, Evans RI, Stanley MA. Perceived believability among adolescents of health warning labels on cigarette packs. *Journal of Applied Social Psychology* 1996; 26(6):502–19.

Center for Substance Abuse Prevention. *Preventing Substance Abuse Among Children and Adolescents: Family-Centered Approaches. Reference Guide.* Prevention Enhancement Protocols System Series. Washington: U.S. Government Printing Office, 1998. DHHS Publication No. (SMA) 3223-FY98.

Centers for Disease Control and Prevention. School policies and programs on smoking and health—United States, 1988. *Morbidity and Mortality Weekly Report* 1989;38(12):202–3.

Centers for Disease Control and Prevention. Minors' access to tobacco—Missouri, 1992, and Texas, 1993. *Morbidity and Mortality Weekly Report* 1993;42(7):125–8.

Centers for Disease Control and Prevention. Cigarette smoking among high school students—11 states, 1991–1997. *Morbidity and Mortality Weekly Report* 1999a;48(31):686–92.

Centers for Disease Control and Prevention. Tobacco use among middle and high school students—Florida, 1998 and 1999. *Morbidity and Mortality Weekly Report* 1999b;48(12):248–53.

Centers for Disease Control and Prevention. Effectiveness of school-based programs as a component of a statewide tobacco control initiative—Oregon 1999–2000. *Morbidity and Mortality Weekly Report* 2001;50(31):663–6.

Centers for Disease Control and Prevention. Usual sources of cigarettes for middle and high school students—Texas, 1998–1999. *Morbidity and Mortality Weekly Report* 2002;51(40):900–1.

Centers for Disease Control and Prevention. *Promising Practices in Chronic Disease Prevention and Control: A Public Health Framework for Action*. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 2003; <http://www.hpclearinghouse.ca/downloads/Promising_Practices_cdc.pdf>; accessed: November 30, 2011.

Centers for Disease Control and Prevention. *Addressing Tobacco Use and Addiction*. Atlanta, (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Division of Adolescent and School Health, 2007a.

Centers for Disease Control and Prevention. *Best Practices for Comprehensive Tobacco Control Programs—2007.* Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2007b.

Centers for Disease Control and Prevention. Decline in smoking prevalence—New York City, 2002–2006. *Morbidity and Mortality Weekly Report* 2007c;56(4):604–8.

Centers for Disease Control and Prevention. Disparities in secondhand smoke exposure—United States, 1988–1994 and 1999–2004. *Morbidity and Mortality Weekly Report* 2008a;57(27):744–7.

Centers for Disease Control and Prevention. *Guidelines for School Health Programs to Prevent Tobacco Use: Summary*. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, 2008b.

Centers for Disease Control and Prevention. State Tobacco Activities Tracking and Evaluation (STATE) System; 2007 Tobacco Control Highlights Minnesota. Atlanta (GA): Centers for Disease Control and Prevention, 2008c; <http://apps.nccd.cdc.gov/statesystem/statehilite.aspx>; accessed: May 7, 2009.

Centers for Disease Control and Prevention. Registries of Programs Effective in Reducing Youth Risk Behaviors, February 2009; <http://www.cdc.gov/HealthyYouth/AdolescentHealth/registries.htm>; accessed: March 16, 2010.

Centers for Disease Control and Prevention. Cigarette package health warnings and interest in quitting smoking—14 countries, 2008–2010. *Morbidity and Mortality Weekly Report* 2011a;60(20):645–51.

Centers for Disease Control and Prevention. State Tobacco Activities Tracking and Evaluation (STATE) System, 2011b; <http://apps.nccd.cdc.gov/statesystem/Default/Default.aspx>; accessed: December 29, 2011.

Centre for Behavioural Research in Cancer. *Health Warnings and Contents Labelling on Tobacco Products: Review, Research and Recommendations*. Carlton South (Australia): Centre for Behavioural Research in Cancer, 1992.

Chaiton M, Cohen J, Kaiserman MJ, Leatherdale ST. Beliefs and attitudes. In: *2002 Youth Smoking Survey Technical Report*. Ottawa (Canada): Health Canada, 2002.

Chakravorty BJ. A product substitution approach to adolescent smokeless tobacco cessation [dissertation]. Chicago: University of Illinois at Chicago, 1992.

Chaloupka FJ, Grossman M, Tauras JA. Public policy and youth smokeless tobacco use. *Southern Economic Journal* 1997;64(2):503–16.

Chaloupka FJ, Pacula RL. Sex and race differences in young people's responsiveness to price and tobacco control policies. *Tobacco Control* 1999;8(4):373–7.

Chaloupka FJ, Straif K, Leon ME, International Agency for Research on Cancer Working Group. Effectiveness of tax and price policies in tobacco control. *Tobacco Control* 2011;20(3):235–8.

Chaloupka FJ, Warner KE. The economics of smoking. In: Culyer AJ, Newhouse JP, editors. *Handbook of Health Economics*. New York: Elsevier, 2000:1539–1627.

Chan CW, Witherspoon JM. Health risk appraisal modifies cigarette smoking behavior among college students. *Journal of General Internal Medicine* 1988;3(6):555–9.

Charlton A. Smoking cessation help for young people: the process observed in two case studies. *Health Education Research* 1992;7(2):249–57.

Chatrou M, Maes S, Dusseldorp E, Seegers G. Effects of the brabant smoking prevention programme: a replication of the Wisconsin programme. *Psychology & Health* 1999;14(1):159–78.

Chen H-H, Yeh M-L. Developing and evaluating a smoking cessation program combined with an Internet-assisted instruction program for adolescents with smoking. *Patient Education and Counseling* 2006;61(3):411–8.

Chen MS Jr. Challenges in tobacco use prevention among minority youth. *Cancer Epidemiology, Biomarkers & Prevention* 2004;13(3):253s–255s.

Cheng TL, DeWitt TG, Savageau JA, O'Connor KG. Determinants of counseling in primary care pediatric practice: physician attitudes about time, money, and health issues. *Archives of Pediatrics & Adolescent Medicine* 1999;153(6):629–35.

Cheng K-W, Glantz SA, Lightwood JM. Association between smokefree laws and voluntary smokefree-home rules. *American Journal of Preventive Medicine* 2011;41(6):566–72.

Chou C-P, Montgomery S, Pentz MA, Rohrbach LA, Johnson CA, Flay BR, MacKinnon DP. Effects of a community-based prevention program on decreasing drug use in high-risk adolescents. *American Journal of Public Health* 1998;88(6):944–8.

Christakis DA, Garrison MM, Ebel BE, Wiehe SE, Rivara FP. Pediatric smoking prevention interventions delivered by care providers: a systematic review. *American Journal of Preventive Medicine* 2003;25(4):358–62.

Christakis DA, Zimmerman FJ, Rivara FP, Ebel B. Improving pediatric prevention via the Internet: a randomized controlled trial. *Pediatrics* 2006;118(3):1157–66.

Chung PJ, Garfield CF, Rathouz PJ, Lauderdale DS, Best D, Lantos J. Youth targeting by tobacco manufacturers since the Master Settlement Agreement. *Health Affairs (Millwood)* 2002;21(2):254–63.

Cinnamin D, Sussmann S. In: Sussman S, Dent CW, Burton D, Stacy AW, Flay BR, editors. *Developing School-Based Tobacco Use Prevention and Cessation Programs*. Newbury Park (CA): Sage, 1995.

Clark PI, Schooley MW, Pierce B, Schulman J, Hartman AM, Schmitt CL. Impact of home smoking rules on smoking patterns among adolescents and young adults. *Preventing Chronic Disease* 2006;3(2):A41; <http://www.cdc.gov/pcd/issues/2006/apr/05_0028.htm>; accessed: December 22, 2010.

Clayton RR, Cattarello AM, Johnstone BM. The effectiveness of Drug Abuse Resistance Education (project DARE): 5-year follow-up results. *Preventive Medicine* 1996;25(3):307–18.

Clean Indoor Air Act, N.Y. Pub. Health Law § 1399n (2003).

Clemenger BBDO. *Marketing Inputs to Assist the Development of Health Warnings for Tobacco Packaging*. Sydney (Australia): Clemenger BBDO, 2004.

Coe RM, Crouse E, Cohen JD, Fisher EB Jr. Patterns of change in adolescent smoking behavior and results of a one year follow-up of a smoking prevention program. *Journal of School Health* 1982;52(8):348–53.

Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale (NJ): Lawrence Erlbaum Associates, 1988.

Cohen J. Attitude, affect, and consumer behavior. In: Moore BS, Isen AM, editors. *Affect and Social Behavior*. New York: Cambridge University Press, 1990:152–206.

Colborn JW, Cummings KM, Michalek AM. Correlates of adolescents' use of smokeless tobacco. *Health Education & Behavior* 1989;16(1):91–100.

Colby SM, Monti PM, O'Leary Tevyaw T, Barnett NP, Spirito A, Rohsenow DJ, Riggs S, Lewander W. Brief motivational intervention for adolescent smokers in medical settings. *Addictive Behaviors* 2005;30(5):865–74.

Coleman-Wallace D, Lee JW, Montgomery S, Blix G, Wang DT. Evaluation of developmentally appropriate programs for adolescent tobacco cessation. *Journal of School Health* 1999;69(8):314–9.

Committee on Environmental Health, Committee on Substance Abuse, Committee on Adolescence, Committee on Native American Child Health. From the American Academy of Pediatrics: Policy statement—Tobacco use: a pediatric disease. *Pediatrics* 2009;124(5):1474–87.

Connell DB, Turner RR, Mason EF. Summary of findings of the School Health Education Evaluation: health promotion effectiveness, implementation, and costs. Journal of School Health 1985;55(8):316–21.

Connolly GN, Harris JE, Goldman LK, Glantz SA. Evaluating antismoking advertising campaigns [letter]. *JAMA: the Journal of the American Medical Association* 1998; 280(11):964–5.

Cost Kids. Children Opposed to Smoking Tobacco, 2010; <http://www.costkids.org/>; accessed: January 30, 2012.

Cragg Ross and Dawson. *Health Warnings on Cigarette and Tobacco Packs: Report on Research to Inform European Standardization*. London: 1990.

Crawford MA, Balch GI, Mermelstein R, Tobacco Control Network Writing Group. Responses to tobacco control policies among youth. *Tobacco Control* 2002;11(1): 14–19.

CRÉATEC + Market Studies. *Effectiveness of Health Warning Messages on Cigarette Packages in Informing Less-literate Smokers: Final Report.* Montreal (Canada): CRÉATEC + Market Studies, 2003.

Creath CJ, Shelton WO, Wright JT, Bradley DH, Feinstein RA, Wisniewski JF. The prevalence of smokeless tobacco use among adolescent male athletes. *Journal of the American Dental Association* 1988;116(1):43–8.

Cuijpers P. Effective ingredients of school-based drug prevention programs: a systematic review. *Addictive Behaviors* 2002;27(6):1009–23.

Cullen KJ, Cullen AM. Long-term follow-up of the Busselton six-year controlled trial of prevention of children's behavior disorders. *Journal of Pediatrics* 1996;129(1):136–9.

Curry SJ, Hollis J, Bush T, Polen M, Ludman EJ, Grothaus L, McAfee T. A randomized trial of a family-based smoking prevention intervention in managed care. *Preventive Medicine* 2003;37(6 Pt 1):617–26.

Czart C, Pacula RL, Chaloupka FJ, Wechsler H. The impact of prices and control policies on cigarette smoking among college students. *Contemporary Economic Policy* 2001;119(2):135–49.

Dahl RE. Affect regulation, brain development, and behavioral/emotional health in adolescence. *CNS Spectrums* 2001;6(1):60–72.

Dahl RE. Adolescent brain development: a period of vulnerabilities and opportunities. *Annals of the New York Academy of Sciences* 2004;1021:1–22.

Damasio AR. *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Penguin Group USA, 1994.

Damon W. Self-concept, adolescent. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. II. New York: Garland Publishing, 1991:987–91.

Davidson L. *Wensleydale Smokebusters: Project Report*. Northallerton (England): Northallerton Health Authority, 1992.

Davis KC, Nonnemaker JM, Farrelly MC. Association between national smoking prevention campaigns and perceived smoking prevalence among youth in the United States. *Journal of Adolescent Health* 2007a;41(5):430–6.

Davis RM, Wakefield M, Amos A, Gupta PC. The Hitchhiker's Guide to Tobacco Control: a global assessment of harms, remedies, and controversies. *Annual Review of Public Health* 2007b;28:171–94.

De Vries H, Backbier E, Dijkstra M, Van Breukelen G, Parcel G, Kok G. A Dutch social influence smoking prevention approach for vocational school students. *Health Education Research* 1994;9(3):365–74.

DeCicca P, Kenkel D, Mathios A. Racial differences in the determinants of smoking onset. *Journal of Risk and Uncertainty* 2000;21(2–3):311–40.

DeCicca P, Kenkel D, Mathios A. Cigarette taxes and the transition from youth to adult smoking: smoking initiation, cessation, and participation. *Journal of Health Economics* 2008a;27(4):904–17.

DeCicca P, Kenkel D, Mathios A, Shin YJ, Lim JY. Youth smoking, cigarette prices, and anti-smoking sentiment. *Health Economics* 2008b;17(6):733–49.

Denson R, Stretch S. Prevention of smoking in elementary schools. *Canadian Journal of Public Health* 1981;72(4):259–63.

Dent CW, Sussman S, Stacy AW, Craig S, Burton D, Flay BR. Two-year behavior outcomes of project towards no tobacco use. *Journal of Consulting and Clinical Psychology* 1995;63(4):676–7.

Des Jarlais DC, Sloboda Z, Friedman SR, Tempalski B, McKnight C, Braine N. Diffusion of the D.A.R.E. and syringe exchange programs. *American Journal of Public Health* 2006;96(8):1354–8.

Devlin E, Eadie D, Stead M, Evans K. Comparative study of young people's response to anti-smoking messages. *International Journal of Advertising* 2007;26(1): 99–128.

Dexheimer JW, Talbot TR, Sanders DL, Rosenbloom ST, Aronsky D. Prompting clinicians about preventive care measures: a systematic review of randomized controlled trials. *Journal of the American Medical Informatics Association* 2008;15(3):311–20.

Dickinson S, Holmes M. Understanding the emotional and coping responses of adolescent individuals exposed to threat appeals. *International Journal of Advertising* 2008;27(2):251–78.

Dielman TE, Lorenger AT, Leech SL, Lyons AL, Klos DM, Horvath WJ. Fifteen-month follow-up results of an elementary school based smoking prevention project: resisting pressures to smoke. *Hygie* 1985;4(4):28–35.

DiFranza JR. Is it time to abandon youth access programmes [letter]? *Tobacco Control* 2002;11(3):282.

DiFranza JR. Which interventions against the sale of tobacco for minors can be expected to reduce smoking? *Tobacco Control* 2011;Oct 12 [epub ahead of print].

DiFranza JR, Brown LJ. The Tobacco Institute's "It's the Law" campaign: has it halted illegal sales of tobacco to children? *American Journal of Public Health* 1992; 82(9):1271–3.

DiFranza JR, Coleman M. Sources of tobacco for youths in communities with strong enforcement of youth access laws. *Tobacco Control* 2001;10(4):323–8.

DiFranza JR, Savageau JA, Fletcher KE. Enforcement of underage sales laws as a predictor of daily smoking among adolescents: a national study. *BMC Public Health* 2009;9:107.

Diguisto E. Pros and cons of cessation interventions for adolescent smokers at school. In: Richmond R, editor. *Interventions for Smokers: An International Perspective*. Baltimore: Williams & Wilkins, 1994:107–36.

Dijkstra M, Mesters I, De Vries H, van Breukelen G, Parcel GS. Effectiveness of a social influence approach and boosters to smoking prevention. *Health Education Research* 1999;14(6):791–802.

Dillard JP, Nabi RL. The persuasive influence of emotion in cancer prevention and detection messages. *Journal of Communication* 2006;56(Suppl s1):S123–S139.

Dinno A, Glantz S. Tobacco control policies are egalitarian: a vulnerabilities perspective on clean indoor air laws, cigarette prices, and tobacco use disparities. *Social Science and Medicine* 2009;68(8):1439–47.

Dino G, Horn KA, Goldcamp J, Fernandes A, Kalsekar I, Massey C. A 2-year efficacy study of Not On Tobacco in Florida: an overview of program successes in changing teen smoking behavior. *Preventive Medicine* 2001a;33(6):600–5.

Dino GA, Horn KA, Goldcamp J, Maniar SD, Fernandes A, Massey CJ. Statewide demonstration of Not On Tobacco: a gender-sensitive teen smoking cessation program. *Journal of School Nursing* 2001b;17(2):90–7.

Dino GA, Horn KA, Meit H. A pilot study of Not on Tobacco: a stop smoking programme for adolescents. *Health Education* 1998;98(6):230–41.

Dobbins M, DeCorby K, Manske S, Goldblatt E. Effective practices for school-based tobacco use prevention. *Preventive Medicine* 2008;46(4):289–97.

D'Onofrio CN, Moskowitz JM, Braverman MT. Curtailing tobacco use among youth: evaluation of project 4-health. *Health Education & Behavior* 2002; 29(6):656–82.

Donovan RJ, Jalleh G, Carter OBJ. Tobacco industry smoking prevention advertisements' impact on youth motivation for smoking in the future. *Social Marketing Quarterly* 2006;12(2):3–13.

DuBois DL, Flay BR, Fagen MC. Self-esteem enhancement theory: an emerging framework for promoting health across the life-span. In: DiClemente RJ, Crosby RA, Kegler MC, editors. *Emerging Theories in Health Promotion Practice and Research.* 2nd ed. San Francisco: Jossey-Bass, 2009:97–130.

Dukes RL, Ullman JB, Stein JA. Three-year follow-up of Drug Abuse Resistance Education (D.A.R.E.). *Evaluation Review* 1996;20(1):49–66.

Dunlop SN, Wakefield M, Kashima Y. Pathways to persuasion: cognitive and experiential responses to health-promoting mass media messages. *Communication Research* 2010;37(1):133–64.

Dunlop SM, Wakefield M, Kashima Y. The contribution of anti-smoking advertising to quitting: intra- and interpersonal processes. *Journal of Health Communication* 2008;13(3):250–66.

Durkin S, Wakefield M. Maximizing the impact of emotive antitobacco advertising: effects of interpersonal discussion and program placement. *Social Marketing Quarterly* 2006;12(3):3–14.

Durkin S, Wakefield M. Interrupting a narrative transportation experience: program placement effects on responses to antismoking advertising. *Journal of Health Communication* 2008;13(7):667–80.

Eagly AH, Chaiken S. *The Psychology of Attitudes*. Fort Worth (TX): Harcourt Brace Jovanovich College Publishers, 1993.

Eakin E, Severson H, Glasgow RE. Development and evaluation of a smokeless tobacco cessation program: a pilot study. *National Cancer Institute Monographs* 1989;(8):95–100.

Ebbert JO, Montori V, Vickers KS, Erwin PC, Dale LC, Stead LF. Interventions for smokeless tobacco use cessation. *Cochrane Database of Systematic Reviews* 2007, Issue 4. Art. No.: CD004306. DOI: 10.1002/14651858.CD004306.pub3.

Eckhardt L, Woodruff SI, Elder JP. Relative effectiveness of continued, lapsed, and delayed smoking prevention intervention in senior high school students. *American Journal of Health Promotion* 1997;11(6):418–21.

Edwards CA, Harris WC, Cook DR, Bedford KF, Zuo Y. Out of the smokescreen: does an anti-smoking advertisement affect young women's perception of smoking in movies and their intentions to smoke? *Tobacco Control* 2004;13(3):277–82.

Eisenberg ME, Forster JL. Adolescent smoking behavior: measures of social norms. *American Journal of Preventive Medicine* 2003;25(2):122–8.

Elder JP, Perry CL, Stone EJ, Johnson CC, Yang M, Edmundson EW, Smyth MH, Galati T, Feldman H, Cribb P, et al. Tobacco use measurement, prediction, and intervention in elementary schools in four states: the CATCH Study. *Preventive Medicine* 1996;25(4):486–94.

Elder JP, Stern RA. The ABCs of adolescent smoking prevention: an environment and skills model. *Health Education Quarterly* 1986;13(2):181–91.

Elder JP, Wildey M, de Moor C, Sallis JF Jr, Eckhardt L, Edwards C, Erickson A, Goldbeck A, Hovell M, Johnston D, et al. The long-term prevention of tobacco use among junior high school students: classroom and telephone interventions. *American Journal of Public Health* 1993;83(9):1239–44.

Elkind D, Bowen R. Imaginary audience behavior in children and adolescents. *Developmental Psychology* 1979;15(1):38–44.

Ellickson PL, Bell RM, McGuigan K. Preventing adolescent drug use: long-term results of a junior high program. *American Journal of Public Health* 1993;83(6):856–61.

Elliott & Shanahan Research. *Developmental Research for New Australian Health Warnings on Tobacco Products—Stage 1*. Sydney (Australia): Elliott & Shanahan Research, 2002.

Elliott & Shanahan Research. *Developmental Research for New Australian Health Warnings on Tobacco Products—Stage 2*. Sydney (Australia): Elliott & Shanahan Research, 2003.

Emery S, Szczypka G, Powell LM, Chaloupka FJ. Public health obesity-related TV advertising: lessons learned from tobacco. *American Journal of Preventive Medicine* 2007;33(4 Suppl):S257–S263.

Emery S, Wakefield MA, Terry-McElrath Y, Saffer H, Szczypka G, O'Malley PM, Johnston LD, Chaloupka FJ, Flay B. Televised state-sponsored antitobacco advertising and youth smoking beliefs and behavior in the United States, 1999–2000. *Archives of Pediatrics & Adolescent Medicine* 2005;159(7):639–45.

Emory K, Saquib N, Gilpin EA, Pierce JP. The association between home smoking restrictions and youth smoking behaviour: a review. *Tobacco Control* 2010;19(6): 495–506.

Ennett ST, Rosenbaum DP, Flewelling RL, Bieler GS, Ringwalt CL, Bailey SL. Long-term evaluation of drug abuse resistance education. *Addictive Behaviors* 1994a;19(2):113–25.

Ennett ST, Tobler NS, Ringwalt CL, Flewelling RL. How effective is drug abuse resistance education: a meta-analysis of Project DARE outcome evaluations. *American Journal of Public Health* 1994b;84(9):1394–401.

Environics Research Group. *Canadian Adult and Youth Opinions on the Sizing of Health Warning Messages*. Toronto (Canada): Environics Research Group, 1999.

Environics Research Group. *Testing New Health Warning Messages for Cigarette Packages: A Summary of Three Phases of Focus Group Research—Final Report*. Toronto (Canada): Environics Research Group, 2000.

Environics Research Group. *Evaluation of New Warnings on Cigarette Packages*. Toronto (Canada): Environics Research Group, 2001.

Environics Research Group. *Wave 11: The Health Effects of Tobacco and Health Warning Messages on Cigarette Packages, Survey of Youth*. Toronto (Canada): Environics Research Group, 2006.

Escalas JE, Moore MC, Britton JE. Fishing for feelings: hooking viewers helps! *Journal of Consumer Psychology* 2004;14(1–2):105–14.

Erceg-Hurn DM, Steed LG. Does exposure to cigarette health warnings elicit psychological reactance in smokers? *Journal of Applied Psychology* 2011;41(1):219–37.

Etter JF, Ronchi A, Perneger T. Short-term impact of a university based smoke free campaign. *Journal of Epidemiology and Community Health* 1999;53(11):710–5.

Evans RI. Smoking in children: developing a social psychological strategy of deterrence. *Preventive Medicine* 1976;5(1):122–7.

Evans RI, Hansen WB, Mittelmark MB. Increasing the validity of self-reports of smoking behavior in children. *Journal of Applied Psychology* 1977;62(4):521–3.

Evans WD, Price S, Blahut S, Hersey J, Niederdeppe J, Ray S. Social imagery, tobacco independence, and the truthSM campaign. *Journal of Health Communication* 2004a;9(5):425–41.

Evans WD, Renaud J, Blitstein J, Hersey J, Ray S, Schieber B, Willett J. Prevention effects of an anti-tobacco brand on adolescent smoking initiation. *Social Marketing Quarterly* 2007;13(2):2–20.

Evans RI, Rozelle RM, Maxwell SE, Raines BE, Dill CA, Guthrie TJ. Social modeling films to deter smoking in adolescents: results of a three-year field investigation. *Journal of Applied Psychology* 1981;66(4):399–414.

Evans WD, Ulasevich A, Blahut S. Adult and group influences on participation in youth empowerment programs. *Health Education & Behavior* 2004b; 31(5):564–76.

Ewing GB, Selassie AW, Lopez CH, McCutcheon EP. Self-report of delivery of clinical preventive services by U.S. physicians: comparing specialty, gender, age, setting of practice, and area of practice. *American Journal of Preventive Medicine* 1999;17(1):62–72.

Fairbrother G, Scheinmann R, Osthimer B, Dutton MJ, Newell KA, Fuld J, Klein JD. Factors that influence adolescent reports of counseling by physicians on risky behavior. *Journal of Adolescent Health* 2005;37(6): 467–76.

Family Smoking Prevention and Tobacco Control Act, Public Law 111-13, 123 *U.S. Statutes at Large* 1776 (2009).

Farkas AJ, Gilpin EA, White MM, Pierce JP. Association between household and workplace smoking restrictions and adolescent smoking. *JAMA: the Journal of the American Medical Association* 2000;284(6):717–22.

Farrelly MC, Davis KC, Duke J, Messeri P. Sustaining 'truth': changes in youth tobacco attitudes and smoking intentions after 3 years of a national antismoking campaign. *Health Education Research* 2009;24(1): 42–8.

Farrelly MC, Davis KC, Haviland ML, Messeri P, Healton CG. Evidence of a dose-response relationship between "truth" antismoking ads and youth smoking prevalence. *American Journal of Public Health* 2005;95(3):425–31.

Farrelly MC, Healton CG, Davis KC, Messeri P, Hersey JC, Haviland ML. Getting to the truth: evaluating national tobacco countermarketing campaigns. *American Journal of Public Health* 2002;92(6):901–7.

Farrelly MC, Niederdeppe J, Yarsevich J. Youth tobacco prevention mass media campaigns: past, present, and future directions. *Tobacco Control* 2003a;12(Suppl 1):i35–i47.

Farrelly MC, Pechacek TF, Chaloupka FJ. The impact of tobacco control program expenditures on aggregate cigarette sales: 1981–2000. *Journal of Health Economics* 2003b;22(5):843–59.

Farrelly MC, Pechacek TF, Thomas KY, Nelson D. The impact of tobacco control programs on adult smoking. *American Journal of Public Health* 2008;98(2):304–9.

Federal Trade Commission. *Federal Trade Commission Cigarette Report for 2007 and 2008*. Washington: U.S. Federal Trade Commission, 2011; <http://www.ftc.gov/os/2011/07/110729cigarettereport.pdf>; accessed: September 20, 2011>.

Feighery E, Altman DG, Shaffer G. The effects of combining education and enforcement to reduce tobacco sales to minors: a study of four northern California communities. *JAMA: the Journal of the American Medical Association* 1991;266(22):3168–71.

Feinson JA, Chidekel AS. What physicians can do about the tobacco problem: best practice interventions for your practice and office. *Delaware Medical Journal* 2006;78(4):137–45.

Ferketich AK, Kwong K, Shek A, Lee M. Design and evaluation of a tobacco-prevention program targeting Chinese American youth in New York City. *Nicotine & Tobacco Research* 2007;9(2):249–56.

Fichtenberg CM, Glantz SA. Association of the California tobacco control program with declines in cigarette consumption and mortality from heart disease. *New England Journal of Medicine* 2000;343(24):1772–7.

Fichtenberg CM, Glantz SA. Youth access interventions do not affect youth smoking. *Pediatrics* 2002;109(6): 1088–92.

Fidler W, Lambert TW. A prescription for health: a primary care based intervention to maintain the non-smoking status of young people. *Tobacco Control* 2001; 10(1):23–6.

Figá-Talamanca I, Modolo MA. Evaluation of an antismoking educational programme among adolescents in Italy. *Hygie* 1989;8(3):24–8.

Finucane ML, Alhakami A, Slovic P, Johnson SM. The affect heuristic in judgments of risks and benefits. *Journal of Behavioral Decision Making* 2000;13(1):1–17.

Fiore MC, Bailey WC, Cohen SJ, Dorfman SF, Goldstein MG, Gritz ER, Heyman RB, Jaén CR, Kottke TE, Lando HA, et al. *Treating Tobacco Use and Dependence.* Clinical Practice Guideline. Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, 2000.

Fiore MC, Jaén CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, Dorfman SF, Froelicher ES, Goldstein MG, Healton CG, et al. *Treating Tobacco Use and Dependence: 2008 Update*. Clinical Practice Guideline. Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, 2008.

Fire Safety Standards for Cigarettes, N.Y. Comp. Codes R. & Regs. Title 19, §429.1 (2004).

Fischer PM, Richards JW Jr, Berman EJ, Krugman DM. Recall and eye tracking study of adolescents viewing tobacco advertisements. *JAMA: the Journal of the American Medical Association* 1989;261(1):84–9.

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

Fisher KJ, Severson HH, Christiansen S, Williams C. Using interactive technology to aid smokeless tobacco cessation: a pilot study. *American Journal of Health Education* 2001;32(6):332–40.

Flammer A. Self-regulation. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. II. New York: Garland Publishing, 1991:1001–3.

Flay BR. On improving the chances of mass media health promotion programs causing meaningful changes in behavior. In: Meyer M, editor. *Health Education by Television and Radio: Contributions to an International Conference with a Selected Bibliography.* New York: Saur, 1981:56–91.

Flay BR. Mass media and smoking cessation: a critical review. *American Journal of Public Health* 1987; 77(2):153–60.

Flay BR. Understanding environmental, situational and intrapersonal risk and protective factors for youth tobacco use: the Theory of Triadic Influence. *Nicotine & Tobacco Research* 1999;1(Suppl 2):S111–S114.

Flay BR. Approaches to substance use prevention utilizing school curriculum plus social environment change. *Addictive Behaviors* 2000;25(6):861–85.

Flay BR. Positive youth development requires comprehensive health promotion programs. *American Journal of Health Behavior* 2002;26(6):407–24.

Flay BR. The long-term promise of effective school-based smoking prevention programs. In: Bonnie RJ, Stratton K, Wallace RB, editors. *Ending the Tobacco Problem: A Blueprint for the Nation.* Washington: National Academies Press, 2007:449–77.

Flay BR. School-based smoking prevention programs with the promise of long-term effectiveness. *Tobacco Induced Diseases* 2009a;5:6.

Flay BR. The promise of long-term effectiveness of school-based smoking prevention programs: a critical review of reviews. *Tobacco Induced Diseases* 2009b;5:7.

Flay BR, Biglan A, Boruch RF, Castro FG, Gottfredson D, Kellam S, Mościcki EK, Schinke S, Valentine JC, Ji P. Standards of evidence: criteria for efficacy, effectiveness and dissemination. *Prevention Science* 2005;6(3): 151–75.

Flay BR, Brannon BR, Johnson CA, Hansen WB, Ulene AL, Whitney-Saltiel DA, Gleason LR, Sussman S, Gavin MD, Glowacz KM, et al. The television, school and family smoking prevention and cessation project. I: theoretical basis and program development. *Preventive Medicine* 1988;17(5):585–607.

Flay BR, Burton D. Effective mass media communication campaigns for public health. In: Atkin C, Wallack L, editors. *Mass Communication and Public Health*. Newberry Park (CA): Sage Publications, 1990:129–46.

Flay BR, Graumlich S, Segawa E, Burns JL, Holliday MY, Aban Aya Investigators. Effects of 2 prevention programs on high-risk behaviors among African American youth: a randomized trial. *Archives of Pediatrics & Adolescent Medicine* 2004;158(4):377–84.

Flay BR, Hu FB, Siddiqui O, Day LE, Hedeker D, Petraitis J, Richardson J, Sussman S. Differential influence of parental smoking and friends' smoking on adolescent initiation and escalation of smoking. *Journal of Health and Social Behavior* 1994;35(3):248–65.

Flay BR, Koepke D, Thomson SJ, Santi S, Best JA, Brown KS. Six-year follow-up of the first Waterloo school smoking prevention trial. *American Journal of Public Health* 1989;79(10):1371–6.

Flay BR, Miller TQ, Hedeker D, Siddiqui O, Britton CF, Brannon BR, Johnson CA, Hansen WB, Sussman S, Dent C. The television, school, and family smoking prevention and cessation project. VIII: student outcomes and mediating variables. *Preventive Medicine* 1995;24(1):29–40.

Flay BR, Petraitis J. The theory of triadic influence: a new theory of health behavior with implications for preventive interventions. In: Albrecht GI, editor. *Advances in Medical Sociology*: *A Reconsideration of Models of Health Behavior Change*. Vol. 4. Stamford (CT): JAI Press, 1994:19–44.

Flay BR, Snyder FJ, Petraitis J. The theory of triadic influence. In: DiClemente RJ, Kegler MC, Crosby RA, editors. *Emerging Theories in Health Promotion Practice and Research*. 2nd ed. San Francisco: Jossey-Bass, 2009:451–510.

Flynn BS, Worden JK, Bunn JY, Dorwaldt AL, Connolly SW, Ashikaga T. Youth audience segmentation strategies for smoking-prevention mass media campaigns based on message appeal. *Health Education & Behavior* 2007;34(4):578–93.

Flynn BS, Worden JK, Secker-Walker RH, Badger GJ, Geller BM. Cigarette smoking prevention effects of mass media and school interventions targeted to gender and age groups. *Journal of Health Education* 1995;26(2 Suppl):S45–S61.

Flynn BS, Worden JK, Secker-Walker RH, Badger GJ, Geller BM, Costanza MC. Prevention of cigarette smoking through mass media intervention and school programs. *American Journal of Public Health* 1992; 82(6):827–34.

Flynn BS, Worden JK, Secker-Walker RH, Pirie PL, Badger GJ, Carpenter JH. Long-term responses of higher and lower risk youths to smoking prevention interventions. *Preventive Medicine* 1997;26(3):389–94.

Flynn BS, Worden JK, Secker-Walker RH, Pirie PL, Badger GJ, Carpenter JH, Geller BM. Mass media and school interventions for cigarette smoking prevention: effects 2 years after completion. *American Journal of Public Health* 1994;84(7):1148–50.

Fong GT, Hammond D, Hitchman SC. The impact of pictures on the effectiveness of tobacco warnings. *Bulletin of the World Health Organization* 2009;87(8):640–3.

Forgas JP. Mood and judgment: the affect infusion model (AIM). *Psychological Bulletin* 1995;117(1):39–66.

Forman SG, Linney JA, Brondino MJ. Effects of coping skills training on adolescents at risk for substance abuse. *Psychology of Addictive Behaviors* 1990;4(2):67–76.

Forrester K, Biglan A, Severson HH, Smolkowski K. Predictors of smoking onset over two years. *Nicotine & Tobacco Research* 2007;9(12):1259–67.

Forster J, Chen V, Blaine T, Perry C, Toomey T. Social exchange of cigarettes by youth. *Tobacco Control* 2003;12(2):148–54.

Forster JL, Brokenleg I, Rhodes KL, Lamont GR, Poupart J. Cigarette smoking among American Indian youth in Minneapolis-St. Paul. *American Journal of Preventive Medicine* 2008;35(6 Suppl):S449–S456.

Forster JL, Murray DM, Wolfson M, Blaine TM, Wagenaar AC, Hennrikus DJ. The effects of community policies to reduce youth access to tobacco. *American Journal of Public Health* 1998;88(8):1193–8.

Forster JL, Wolfson M. Youth access to tobacco: policies and politics. *Annual Review of Public Health* 1998;19:203–35.

Fortmann SP, Flora JA, Winkleby MA, Schooler C, Taylor CB, Farquhar JW. Community intervention trials: reflections on the Stanford Five-City Project Experience. *American Journal of Epidemiology* 1995;142(6):576–86.

Foster EM, Dodge KA, Jones D. Issues in the economic evaluation of prevention programs. *Applied Developmental Science* 2003;7(2):76–86.

Foster-Clark FS, Blyth DA. Peer relations and influences. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. II. New York: Garland Publishing, 1991:767–71.

Frieden TR, Mostashari F, Kerker BD, Miller N, Hajat A, Frankel M. Adult tobacco use levels after intensive tobacco control measures: New York City, 2002–2003. *American Journal of Public Health* 2005;95(6): 1016–23.

Friend K, Levy DT. Reductions in smoking prevalence and cigarette consumption associated with mass-media campaigns. *Health Education Research* 2002;17(1): 85–98.

Gala S, Pesek F, Murray J, Kavanagh C, Graham S, Walsh M. Design and pilot evaluation of an Internet spit tobacco cessation program. *Journal of Dental Hygiene* 2008;82(1):11.

Galuska DA, Fulton JE, Powell KE, Burgeson CR, Pratt M, Elster A, Griesemer BA. Pediatrician counseling about preventive health topics: results from the Physicians' Practices Survey, 1998–1999. *Pediatrics* 2002; 109(5):e83.

Gansky SA, Ellison JA, Rudy D, Bergert N, Letendre MA, Nelson L, Kavanagh C, Walsh MM. Cluster-randomized controlled trial of an athletic trainer-directed spit (smokeless) tobacco intervention for collegiate baseball athletes: results after 1 year. *Journal of Athletic Training* 2005;40(2):76–87.

Garrison MM, Christakis DA, Ebel BE, Wiehe SE, Rivara FP. Smoking cessation interventions for adolescents: a systematic review. *American Journal of Preventive Medicine* 2003;25(4):363–7.

Gatta G, Malvezzi I, Sant M, Micheli A, Panico S, Ravasi G, Berrino F. Randomized trial of primary school education against smoking. *Tumori* 1991;77(5):367–71.

Gemson DH, Moats HL, Watkins BX, Ganz ML, Robinson S, Healton E. Laying down the law: reducing illegal tobacco sales to minors in central Harlem. *American Journal of Public Health* 1998;88(6):936–9.

Gentile B, Twenge JM, Campbell WK. Birth cohort differences in self-esteem, 1988–2008: a cross-temporal meta-analysis. *Review of General Psychology* 2010; 14(3):261–8.

Gerlach KK, Larkin MA. The SmokeLess States program. In: Isaacs SL, Knickman JR, editors. *To Improve Health and Health Care. Vol. VIII: The Robert Wood Johnson Foundation Anthology.* San Francisco: Jossey-Bass, 2005:29–46.

Gervais A, O'Loughlin J, Dugas E, Eisenberg MJ. A systematic review of randomized controlled trials of youth smoking cessation interventions. *Drugs, Health and Society* 2007;6(Suppl II):ii1–ii26.

Gilchrist LD, Schinke SP, Bobo JK, Snow WH. Self-control skills for preventing smoking. *Addictive Behaviors* 1986;11(2):169–74.

Gillies PA, Wilcox B. Reducing the risk of smoking amongst the young. *Public Health* 1984;98(1):49–54.

Giovino GA. The tobacco epidemic in the United States. *American Journal of Preventive Medicine* 2007;33(6 Suppl):S318–S326.

Glantz SA, Mandel LL. Since school-based tobacco prevention programs do not work, what should we do [editorial]? *Journal of Adolescent Health* 2005;36(3):157–9.

Glasgow RE, Strycker LA, Eakin EG, Boles SM, Whitlock EP. Concern about weight gain associated with quitting smoking: prevalence and association with outcome in a sample of young female smokers. *Journal of Consulting and Clinical Psychology* 1999;67(6):1009–11.

Global Advisors Smokefree Policy. Smoke-free vehicles when children are present [fact sheet], October 26, 2011; <http://www.njgasp.org/f_SF%20cars,kids,%20info,%20arguments.pdf>; accessed: November 7, 2011.

Glynn TJ. Essential elements of school-based smoking prevention programs. *Journal of School Health* 1989; 59(5):181–8.

Goldberg ME, Gorn GJ. Happy and sad TV programs: how they affect reactions to commercials. *Journal of Consumer Research* 1987;14(3):387–403.

Goldman LK, Glantz SA. Evaluation of antismoking advertising campaigns. *JAMA: the Journal of the American Medical Association* 1998;279(10):772–7.

Goldstein AO, Peterson AB, Ribisl KM, Steckler A, Linnan L, McGloin T, Patterson C. Passage of 100% tobacco-free school policies in 14 North Carolina school districts. *Journal of School Health* 2003;73(8):293–9.

Goodstadt MS. Alcohol and drug education: models and outcomes. *Health Education Monographs* 1978; 6(3):263–79.

Goodstadt MS. Drug education—a turn on or a turn off? *Journal of Drug Education* 1980;10(2):89–99.

Gordon DA. Parent training via CD-ROM: using technology to disseminate effective prevention practices. *Journal of Primary Prevention* 2000;21(2):227–51.

Gordon I, Whitear B, Guthrie D. Stopping them starting: evaluation of a community-based project to discourage teenage smoking in Cardiff. *Health Education Journal* 1997;56(1):42–50.

Gordon JS, Severson HH. Tobacco cessation through dental office settings. *Journal of Dental Education* 2001;65(4):354–63.

Gosin M, Marsiglia FF, Hecht ML. Keepin' it R.E.A.L.: a drug resistance curriculum tailored to the strengths and needs of pre-adolescents of the southwest. *Journal of Drug Education* 2003;33(2):119–42.

Gottlieb A, Pope SK, Rickert VI, Hardin BH. Patterns of smokeless tobacco use by young adolescents. *Pediatrics* 1993;91(1):75–8.

Graham JW, Johnson CA, Hansen WB, Flay BR, Gee M. Drug use prevention programs, gender, and ethnicity: evaluation of three seventh-grade project SMART cohorts. *Preventive Medicine* 1990;19(3):305–13.

Grandpre J, Alvaro EM, Burgoon M, Miller CH, Hall JR. Adolescent reactance and anti-smoking campaigns: a theoretical approach. *Health Communication* 2003; 15(3):349–66.

Green LW, Richard L. The need to combine health education and health promotion: the case of cardiovascular disease prevention. *Promotion & Education* 1993:11–8.

Greenberg JS, Deputat Z. Smoking intervention: comparing three methods in a high school setting. *Journal of School Health* 1978;48(8):498–502.

Grimshaw G, Stanton A. Tobacco cessation interventions for young people. *Cochrane Database of Systematic Reviews* 2006, Issue 4. Art. No.: CD003289. DOI: 10.1002/14651858.CD003289.pub4.

Gross CP, Soffer B, Bach PB, Rajkumar R, Forman HP. State expenditures for tobacco-control programs and the tobacco settlement. *New England Journal of Medicine* 2002;347(14):1080–6.

Gruber J, Zinman J. Youth smoking in the United States: evidence and implications. In: Gruber J, editor. *Risky Behavior among Youth: An Economic Analysis*. Chicago: University of Chicago Press, 2001: 69–120.

Hafstad A. Provocative anti-smoking appeals in mass-media campaigns: an intervention study on adolescent smoking [dissertation]. Oslo: University of Oslo, 1997.

Hafstad A, Aarø LE. Activating interpersonal influence through provocative appeals: evaluation of a mass media-based antismoking campaign targeting adolescents. *Health Communication* 1997;9(3):253–72.

Hafstad A, Aarø LE, Engeland A, Andersen A, Langmark F, Stray-Pedersen B. Provocative appeals in anti-smoking mass media campaigns targeting adolescents—the accumulated effect of multiple exposures. *Health Education Research* 1997a;12(2):227–36.

Hafstad A, Aarø LE, Langmark F. Evaluation of an anti-smoking mass media campaign targeting adolescents: the role of affective responses and interpersonal communication. *Health Education Research* 1996;11(1):29–38.

Hafstad A, Stray-Pedersen B, Langmark F. Use of provocative emotional appeals in a mass media campaign designed to prevent smoking among adolescents. *European Journal of Public Health* 1997b;7(2):122–7.

Hagan JF Jr, Shaw JS, Duncan P, editors. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents, Third Edition*. Elk Grove Village (IL): American Academy of Pediatrics, 2008.

Halpern-Felsher BL, Ozer EM, Millstein SG, Wibbelsman CJ, Fuster CD, Elster AB, Irwin CE Jr. Preventive services in a health maintenance organization: how well do pediatricians screen and educate adolescent patients? *Archives of Pediatrics & Adolescent Medicine* 2000;154(2):173–9.

Hamilton G, Cross D, Lower T, Resnicow K, Williams P. School policy: what helps to reduce teenage smoking? *Nicotine & Tobacco Research* 2003;5(4):507–13.

Hamilton G, Cross D, Resnicow K, Hall M. A school-based harm minimization smoking intervention trial: outcome results. *Addiction* 2005;100(5):689–700.

Hammond D. Health warning messages on tobacco products: a review. *Tobacco Control* 2011;20(5):327–37.

Hammond D, Fong GT, Borland R, Cummings KM, McNeill A, Driezen P. Text and graphic warnings on cigarette packages: findings from the International Tobacco Control Four Country Study. *American Journal of Preventive Medicine* 2007;32(3):202–9.

Hammond D, Fong GT, McDonald PW, Brown KS, Cameron R. Graphic Canadian cigarette warning labels and adverse outcomes: evidence from Canadian smokers. *American Journal of Public Health* 2004;94(8):1442–5.

Hammond D, Fong GT, McDonald PW, Cameron R, Brown KS. Impact of the graphic Canadian warning labels on adult smoking behaviour. *Tobacco Control* 2003;12(4):391–5.

Hammond D, Fong GT, McNeill A, Borland R, Cummings KM. Effectiveness of cigarette warning labels in informing smokers about the risks of smoking: findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control* 2006;15(Suppl 3):iii19–iii25.

Hancock L, Sanson-Fisher R, Perkins J, Girgis A, Howley P, Schofield M. The effect of a community action intervention on adolescent smoking rates in rural Australian towns: the CART Project. *Preventive Medicine* 2001;32(4):332–40.

Hansen WB. School-based substance use prevention: a review of the state of the art in curriculum, 1980–1990. *Health Education Research* 1992;7(3):403–30.

Hansen WB, Graham JW. Preventing alcohol, marijuana, and cigarette use among adolescents: peer pressure resistance training versus establishing conservative norms. *Preventive Medicine* 1991;20(3):414–30.

Hansen WB, Johnson CA, Flay BR, Graham JW, Sobel J. Affective and social influences approaches to the prevention of multiple substance abuse among seventh grade students: results from Project SMART. *Preventive Medicine* 1988a;17(2):135–54.

Hansen WB, Malotte CK, Fielding JE. Evaluation of a tobacco and alcohol abuse prevention curriculum for adolescents. *Health Education Quarterly* 1988b; 15(1):93–114.

Hanson K, Allen S, Jensen S, Hatsukami D. Treatment of adolescent smokers with the nicotine patch. *Nicotine & Tobacco Research* 2003;5(4):515–26.

Harrison PA, Fulkerson JA, Park E. The relative importance of social versus commercial sources in youth access to tobacco, alcohol, and other drugs. *Preventive Medicine* 2000;31(1):39–48.

Hatsukami DK, Severson HH. Oral spit tobacco: addiction, prevention and treatment. *Nicotine & Tobacco Research* 1999;1(1):21–44.

Haviland L. Introduction. *Health Education & Behavior* 2004;31(5):546–7.

Hawkins JD, Catalano RF, Kosterman R, Abbott R, Hill KG. Preventing adolescent health-risk behaviors by strengthening protection during childhood. *Archives of Pediatric & Adolescence Medicine* 1999;153(3):226–34.

Hawkins JD, Oesterle S, Brown EC, Monahan KC, Abbott RD, Arthur MW, Catalano RF. Sustained decreases in risk exposure and youth problem behaviors after installation of the Communities That Care prevention system in a randomized trial. *Archives of Pediatrics & Adolescent Medicine*, in press.

Hawthorne G, Garrard J, Dunt D. Does Life Education's drug education programme have a public health benefit? *Addiction* 1995;90(2):205–15.

Health Education Journal. Health warnings. *Health Education Journal* 1985;44(4):218–9.

Hecht ML, Graham JW, Elek E. The drug resistance strategies intervention: program effects on substance use. *Health Communication* 2006;20(3):267–76.

Hecht ML, Krieger JLR. The principle of cultural grounding in school-based substance abuse prevention: the Drug Resistance Strategies Project. *Journal of Language and Social Psychology* 2006;25(3):301–19.

Hecht ML, Marsiglia FF, Elek E, Wagstaff DA, Kulis S, Dustman P, Miller-Day M. Culturally grounded substance use prevention: an evaluation of the keepin' it R.E.A.L. curriculum. *Prevention Science* 2003; 4(4):233–48.

Heckman JJ, Flyer F, Loughlin C. An assessment of causal inference in smoking initiation research and a framework for future research. *Economic Inquiry* 2008;46(1):37–44.

Helme DW, Donohew RL, Baier M, Zittleman L. A classroom-administered simulation of a television campaign on adolescent smoking: testing an activation model of information exposure. *Journal of Health Communication* 2007;12(4):399–415.

Henriksen L, Dauphinee AL, Wang Y, Fortmann SP. Industry sponsored anti-smoking ads and adolescent reactance: test of a boomerang effect. *Tobacco Control* 2006;15(1):13–8.

Henriksen L, Fortmann SP. Young adults' opinions of Philip Morris and its television advertising. *Tobacco Control* 2002;11(3):236–40.

Hersey JC, Niederdeppe J, Evans WD, Nonnemaker J, Blahut S, Farrelly MC, Holden D, Messeri P, Haviland ML. The effects of state counterindustry media campaigns on beliefs, attitudes, and smoking status among teens and young adults. *Preventive Medicine* 2003;37(6 Pt 1):544–52.

Hersey JC, Niederdeppe J, Evans WD, Nonnemaker J, Blahut S, Holden D, Messeri P, Haviland ML. The theory of "truth": how counterindustry campaigns affect smoking behavior among teens. *Health Psychology* 2005a;24(1):22–31.

Hersey JC, Niederdeppe J, Ng SW, Mowery P, Farrelly M, Messeri P. How state counter-industry campaigns help prime perceptions of tobacco industry practices to promote reductions in youth smoking. *Tobacco Control* 2005b;14(6):377–83.

Higgins ET. Self-discrepancy: a theory relating self and affect. *Psychological Review* 1987;94(3):319–40.

Hill D. New cigarette-packet warnings: are they getting through? *Medical Journal of Australia* 1988;148(9): 478–80.

Hill D. Why we should tackle adult smoking first. *Tobacco Control* 1999;8(3):333–5.

Hinnant LW, Nimsch C, Stone-Wiggins B. Examination of the relationship between community support and tobacco control activities as a part of youth empowerment programs. *Health Education & Behavior* 2004;31(5):629–40.

Hodgson TA. Cigarette smoking and lifetime medical expenditures. *Milbank Quarterly* 1992;70(1):81–125.

Holden DJ, Crankshaw E, Nimsch C, Hinnant LW, Hund L. Quantifying the impact of participation in local tobacco control groups on the psychological empowerment of involved youth. *Health Education & Behavior* 2004a;31(5):615–28.

Holden DJ, Evans WD, Hinnant LW, Messeri P. Modeling psychological empowerment among youth involved in local tobacco control efforts. *Health Education & Behavior* 2005;32(2):264–78.

Holden DJ, Messeri P, Evans WD, Crankshaw E, Ben-Davies M. Conceptualizing youth empowerment within tobacco control. *Health Education & Behavior* 2004b;31(5):548–63.

Hollis JF, Polen MR, Whitlock EP, Lichtenstein E, Mullooly JP, Velicer WF, Redding CA. Teen Reach: outcomes from a randomized, controlled trial of a tobacco reduction program for teens seen in primary medical care. *Pediatrics* 2005;115(4):981–9.

Hopkins DP, Briss PA, Ricard CJ, Husten CG, Carande-Kulis VG, Fielding JE, Alao MO, McKenna JW, Sharp DJ, Harris DJ, et al. Reviews of evidence regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke. *American Journal of Preventive Medicine* 2001;20(2 Suppl):S16–S66.

Horn K, Dino G, Hamilton C, Noerachmanto N. Efficacy of an emergency department-based motivational teenage smoking intervention. *Preventing Chronic Disease* 2007;4(1); <http://www.cdc.gov/pcd/issues/2007/jan/ 06_0021.htm>; accessed: December 22, 2010.

Horn K, Dino G, Kalsekar I, Mody R. The impact of Not on Tobacco on teen smoking cessation: end-of-program evaluation results, 1998 to 2003. *Journal of Adolescent Research* 2005a;20(16):640–61.

Horn K, McGloin T, Dino G, Manzo K, Lowry-Chavis L, Shorty L, McCracken L, Noerachmanto N. Quit and reduction rates for a pilot study of the American Indian Not On Tobacco (N-O-T) program. *Preventing Chronic Disease* 2005b, serial online; <http://www.cdc.gov/pcd/issues/2005/oct/05_0001.htm>; accessed: June 24, 2009.

Hornik R. *Public Health Communication: Evidence for Behavior Change*. Mahwah (NJ): Lawrence Erlbaum Associates, 2002.

Horswell L, Horton SA. *Telling Our Story: "PITS" – Pack in Those Smokes—A Teen Support Group Quit Smoking Program*. Vancouver (Canada): Canadian Cancer Society, 1997.

Hotte A, McCulloch R, Welch L, Lindsay L, Bordeau D, Meloche A. *Dissemination and Evaluation of the Quit-4-Life Cessation Program in Ottawa-Carleton High Schools: Final Report.* Ottawa (Canada): Ottawa-Carleton Lung Association, University of Ottawa, Ottawa-Carleton Health Department, 1997.

Hovell MF, Jones JA, Adams MA. The feasibility and efficacy of tobacco use prevention in orthodontics. *Journal of Dental Education* 2001;65(4):348–53.

Hovell MF, Lessov-Schlaggar CN, Ding D. Smokefree community policies promote home smoking bans: unknown mechanisms and opportunities for preventive medicine. *American Journal of Preventive Medicine* 2011;41(6):650–2.

Hovell MF, Slymen DJ, Jones JA, Hofstetter CR, Burkham-Kreitner S, Conway TL, Rubin B, Noel D. An adolescent tobacco-use prevention trial in orthodontic offices. *American Journal of Public Health* 1996;86(12):1760–6.

Hurd PD, Johnson CA, Pechacek T, Bast LP, Jacobs DR, Luepker RV. Prevention of cigarette smoking in seventh grade students. *Journal of Behavioral Medicine* 1980;3(1):15–28.

Hurt RD, Croghan GA, Beede SD, Wolter TD, Croghan IT, Patten CA. Nicotine patch therapy in 101 adolescent smokers: efficacy, withdrawal symptom relief, and carbon monoxide and plasma cotinine levels. *Archives of Pediatrics & Adolescent Medicine* 2000;154(1):31–7.

Hwang MS, Yeagley KL, Petosa R. A meta-analysis of adolescent psychosocial smoking prevention programs published between 1978 and 1997 in the United States. *Health Education & Behavior* 2004;31(6):702–19.

Hymowitz N, Pyle SA, Haddock CK, Schwab JV. The Pediatric Residency Training on Tobacco Project: year-four parent outcome findings. *Preventive Medicine* 2008;47(2):221–4.

Hymowitz N, Schwab J, Haddock CK, Burd KM, Pyle S. The Pediatric Residency Training on Tobacco Project: a baseline findings from the residence tobacco survey and observed structured clinical examinations. *Preventive Medicine* 2004;39(3):507–16.

Hymowitz N, Schwab JV, Haddock CK, Pyle SA, Schwab LM. The Pediatric Residency Training on Tobacco Project: four-year resident outcome findings. *Preventive Medicine* 2007;45(6):481–90.

Ibrahim JK, Glantz SA. Tobacco industry litigation strategies to oppose tobacco control media campaigns. *Tobacco Control* 2006;15(1):50–8.

Ibrahim JK, Glantz SA. The rise and fall of tobacco control media campaigns, 1967–2006. *American Journal of Public Health* 2007;97(8):1383–96.

Ibrahim JK, Tsoukalas TH, Glantz SA. Public health foundations and the tobacco industry: lessons from Minnesota. *Tobacco Control* 2004;13(3):228–36.

Igra V, Millstein SG. Current status and approaches to improving preventive services for adolescents. *JAMA: the Journal of the American Medical Association* 1993;269(11):1408–12.

Independent Evaluation Consortium. *Final Report of the Independent Evaluation of the California Tobacco Control Prevention and Education Program: Wave 1, 2, and 3 (1996–2000)*. Rockville (MD): The Gallup Organization, 2002.

International Agency for Research on Cancer. *Evaluating the Effectiveness of Smoke-Free Policies*. IARC Handbooks of Cancer Prevention. Vol. 13. Lyon (France): International Agency for Research on Cancer, 2009.

International Agency for Research on Cancer. *Effectiveness of Tax and Price Policies for Tobacco Control*. IARC Handbooks of Cancer Prevention in Tobacco Control, Volume 14. Lyon (France): International Agency for Research on Cancer, 2011.

Iwasaki N, Tremblay CH, Tremblay VJ. Advertising restrictions and cigarette smoking: evidence from myopic and rational addiction models. *Contemporary Economic Policy* 2006;24(3):370–81.

Jackson C, Dickinson D. Can parents who smoke socialise their children against smoking: results from the Smoke-free Kids intervention trial. *Tobacco Control* 2003;12(1):52–9.

Jackson C, Dickinson D. Enabling parents who smoke to prevent their children from initiating smoking: results from a 3-year intervention evaluation. *Archives of Pediatrics & Adolescent Medicine* 2006;160(1):56–62.

Jason LA, Mollica M, Ferrone L. Evaluating an early secondary smoking prevention intervention. *Preventive Medicine* 1982;11(1):96–102.

Jason LA, Pokorny SB, Schoeny ME. It is premature to abandon youth access to tobacco programs. *Pediatrics* 2003;111(4 Pt 1):920–1.

Jepson R, Harris F, Rowa-Dewar N, MacGillivray S, Hastings G, Kearney N, Walker S, Glanville J. *A Review of the Effectiveness of Mass Media Interventions Which Both Encourage Quit Attempts and Reinforce Current and Recent Attempts to Quit Smoking.* Stirling (Scotland): University of Stirling Cancer Care Research Centre and The Centre for Social Marketing, and University of Abertay, The Alliance for Self Care Research, 2006.

Johnson CA, Cen S, Gallaher P, Palmer PH, Xiao L, Ritt-Olson A, Unger JB. Why smoking prevention programs sometimes fail: does effectiveness depend on sociocultural context and individual characteristics? *Cancer Epidemiology, Biomarkers & Prevention* 2007;16(6):1043–9.

Johnson CA, Pentz MA, Weber MD, Dwyer JH, Baer N, MacKinnon DP, Hansen WB, Flay BR. Relative effectiveness of comprehensive community programming for drug abuse prevention with high-risk and low-risk adolescents. *Journal of Consulting and Clinical Psychology* 1990;58(4):447–56.

Johnson CA, Unger JB, Ritt-Olson A, Palmer PH, Cen SY, Gallaher P, Chou CP. Smoking prevention for ethnically diverse adolescents: 2-year outcomes of a multicultural, school-based smoking prevention curriculum in Southern California. *Preventive Medicine* 2005;40(6):842–52.

Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume I, Secondary School Students*. Bethesda (MD): U.S. Department of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse, 2007a. NIH Publication No. 07-6205.

Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume II, College Students and Adults Ages 19–45*. Bethesda (MD): U.S. Department of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse, 2007b. NIH Publication No. 07-6206.

Johnston LD, Terry-McElrath YM, O'Malley PM, Wakefield M. Trends in recall and appraisal of anti-smoking advertising among American youth: national survey results, 1997–2001. *Prevention Science* 2005;6(1):1–19.

Jones SE, Fisher CJ, Greene BZ, Hertz MF, Pritzl J. Healthy and safe school environment, part I: results from the School Health Policies and Programs Study 2006. *Journal of School Health* 2007;77(8):522–43.

Jøsendal O, Aarø LE, Bergh IH. Effects of a school-based smoking prevention program among subgroups of adolescents. *Health Education Research* 1998;13(2):215–24.

Jøsendal O, Aarø LE, Torsheim T, Rasbash J. Evaluation of the school-based smoking-prevention program "BE smokeFREE." *Scandinavian Journal of Psychology* 2005;46(2):189–99.

Journal of the National Cancer Institute. Community Intervention Trial for Smoking Cessation (COMMIT): summary of design and intervention, COMMIT Research Group. *Journal of the National Cancer Institute* 1991;83(22):1620–8.

Katz E, Lazarsfeld PF. *Personal Influence: The Part Played by People in the Flow of Mass Media*. Glencoe (IL): Free Press, 1955.

Katzman B, Markowitz S, McGeary KA. An empirical investigation of the social market for cigarettes. *Health Economics* 2007;16(10):1025–39.

Kaufman JS, Jason LA, Sawlski LM, Halpert JA. A comprehensive multi-media program to prevent smoking among black students. *Journal of Drug Education* 1994;24(2):95–108.

Kellam SG, Anthony JC. Targeting early antecedents to prevent tobacco smoking: findings from an epidemiologically based randomized field trial. *American Journal of Public Health* 1998;88(10):1490–5.

Kentala J, Utriainen P, Pahkala K, Mattila K. Can brief intervention through community dental care have an effect on adolescent smoking? *Preventive Medicine* 1999;29(2):107–11.

Kickbusch I. Approaches to an ecological base for public health. *Health Promotion International* 1989;4(4):265–8.

Killen JD, Robinson TN, Ammerman S, Hayward C, Rogers J, Stone C, Samuels D, Levin SK, Green S, Schatzberg AF. Randomized clinical trial of the efficacy of bupropion combined with nicotine patch in the treatment of adolescent smokers. *Journal of Consulting and Clinical Psychology* 2004;72(4):729–35.

Killen JD, Telch MJ, Robinson TN, Maccoby N, Taylor CB, Farquhar JW. Cardiovascular disease risk reduction for tenth graders: a multiple-factor school-based approach. *JAMA: the Journal of the American Medical Association* 1988;260(12):1728–33.

Kim YJ. The role of regulatory focus in message framing in antismoking advertisements for adolescents. *Journal of Advertising* 2006;35(1):143–51.

Kim S, Crutchfield C, Williams C, Hepler N. Toward a new paradigm in substance abuse and other problem behavior prevention for youth: youth development and empowerment approach. *Journal of Drug Education* 1998;28(1):1–17.

Klein EG, Forster JL, Erickson DJ, Lytle LA, Schillo B. The relationship between local clean indoor air policies and smoking behaviours in Minnesota youth. *Tobacco Control* 2009;18(2):132–7.

Klein JD, Allan MJ, Elster AB, Stevens D, Cox C, Hedberg VA, Goodman RA. Improving adolescent preventive care in community health centers. *Pediatrics* 2001a;107(2):318–27.

Klein JD, Camenga DR. Tobacco prevention and cessation in pediatric patients. *Pediatrics in Review* 2004;25(1):17–26.

Klein JD, Levine LJ, Allan MJ. Delivery of smoking prevention and cessation services to adolescents. *Archives of Pediatrics & Adolescent Medicine* 2001b;155(5):597–602.

Klepp K-I, Tell GS, Vellar OD. Ten-year follow-up of the Oslo Youth Study Smoking Prevention Program. *Preventive Medicine* 1993;22(4):453–62.

Klonoff EA, Landrine H. Acculturation and cigarette smoking among African Americans: replication and implications for prevention and cessation programs. *Journal of Behavioral Medicine* 1999;22(2):195–204.

Kohler CL, Schoenberger YM, Beasley TM, Phillips MM. Effectiveness evaluation of the N-O-T smoking cessation program for adolescents. *American Journal of Health Behavior* 2008;32(4):368-79.

Konopka G. Adolescence, concept of, and requirements for a healthy development. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. I. New York: Garland Publishing, 1991:10–3.

Koval JJ, Aubut J-AL, Pederson LL, O'Hegarty M, Chan SS. The potential effectiveness of warning labels on cigarette packages: the perceptions of young adult Canadians. *Canadian Journal of Public Health* 2005; 96(5):353–6.

Krowchuk HV. Effectiveness of adolescent smoking prevention strategies. *MCN: the American Journal of Maternal Child Nursing* 2005;30(6):366–72.

Krugman DM, Fox RJ, Fletcher JE, Fischer PM, Rojas TH. Do adolescents attend to warnings in cigarette advertising: an eye-tracking approach. *Journal of Advertising Research* 1994;34(6):39–52.

Kulig JW, American Academy of Pediatrics Committee on Substance Abuse. Tobacco, alcohol, and other drugs: the role of the pediatrician in prevention, identification, and management of substance abuse. *Pediatrics* 2005;115(3):816–21.

Kumar R, O'Malley PM, Johnston LD. School tobacco control policies related to students' smoking and attitudes toward smoking: national survey results, 1999–2000. *Health Education & Behavior* 2005;32(6):780–94.

Kumpfer KL, Alvarado R, Smith P, Bellamy N. Cultural sensitivity in universal family-based prevention interventions. *Prevention Science* 2002;3(3):241–6.

Kumpfer KL, Molgaard V, Spoth R. The Strengthening Families Program for the prevention of delinquency and drug use in special populations. In: Peters RD, McMahon RJ, editors. *Preventing Childhood Disorders, Substance Abuse, and Delinquency*. Thousand Oaks (CA): Sage Publications, 1996:241–67.

Kumpfer KL, Smith P, Summerhays JF. A wake-up call to the prevention field: are prevention programs for substance use effective for girls? *Substance Use & Misuse* 2008;43(8–9):978–1001.

La Torre G, Chiaradia G, Ricciardi G. School-based smoking prevention in children and adolescents: review of the scientific literature. *Journal of Public Health* 2005;13(6):285–90.

LaFromboise T, Coleman HL, Gerton J. Psychological impact of biculturalism: evidence and theory. *Psychological Bulletin* 1993;114(3):395–412.

Lancaster AR, Lancaster KM. The economics of tobacco advertising: spending, demand, and the effects of bans. *International Journal of Advertising* 2003;22(1):41–65.

Lando HA, Hennrikus D, Boyle R, Lazovich D, Stafne E, Rindal B. Promoting tobacco abstinence among older adolescents in dental clinics. *Journal of Smoking Cessation* 2007;2(1):23–30.

Landrine H, Corral I, Klonoff EA, Jensen J, Kashima K, Hickman N, Martinez J. Ethnic disparities in youth access to tobacco: California statewide results, 1999–2003. *Health Promotion Practice* 2008, DOI: 10.1177/1524839908317230.

Landrine H, Klonoff EA, Alcaraz R. Asking age and identification may decrease minors' access to tobacco. *Preventive Medicine* 1996;25(3):301–6.

Landsbaum JB, Willis RH. Conformity in early and late adolescence. *Developmental Psychology* 1971;4(3):334–7.

Lang A. Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages. *Journal of Communication* 2006;56(Suppl s1):S57–S80.

Lantz PM, Jacobson PD, Warner KE, Wasserman J, Pollack HA, Berson J, Ahlström A. Investing in youth tobacco control: a review of smoking prevention and control strategies. *Tobacco Control* 2000;9(1):47–63.

Lazarsfeld PF, Berelson B, Gaudet H. *The People's Choice: How the Voter Makes Up His Mind in a Presidential Campaign*. New York: Duell, Sloan & Pearce, 1944.

Lazovich D, Ford J, Forster J, Riley B. A pilot study to evaluate a tobacco diversion program. *American Journal of Public Health* 2001;91(11):1790–1.

Lenhart A, Madden M. Social Networking Websites and Teens: An Overview. Washington: Pew Internet & American Life Project, 2007; <http://www.pewinternet.org/media//Files/Reports/2007/PIP_SNS_Data_Memo_Jan_2007.pdf.pdf>; accessed: June 4, 2009.

Lenhart A, Ling R, Campbell S, Purcell K. Teens and Mobile Phones. Washington: Pew Internet & American Life Project, 2010; <http://pewinternet.org/Reports/2010/Teens-and-Mobile-Phones.aspx.>; accessed: June 7, 2011.

Lerner RM. Nature, nurture, and dynamic interactionism. *Human Development* 1978;21(1):1–20.

Lerner RM. Developmental science, developmental systems, and contemporary theories of human development. In: Damon W, Lerner RM, editors-in-chief. *Handbook of Child Psychology, Vol. 1: Theoretical Models of Human Development*. 6th ed. Hoboken (NJ): Wiley & Sons, 2006:1–17.

Lerner RM, Abo-Zena MM, Bebiroglu N, Brittian A, Lynch AD, Issac SS. Positive youth development: contemporary theoretical perspectives. In: DiClemente R, Santelli JS, Crosby RA, editors. *Adolescent Health: Understanding and Preventing Risk Behaviors*. San Francisco: Jossey-Bass, 2009:115–28.

LeRoy L, Benet DJ, Mason T, Austin WD, Mills S. Empowering organizations: approaches to tobacco control through youth empowerment programs. *Health Education & Behavior* 2004;31(5):577–96.

Les Études de Marché Créatec. *Quantitative Study of Canadian Youth Smokers and Vulnerable Non-Smokers: Effects of Modified Packaging Through Increasing the Size of Warnings on Cigarette Packages.* Montreal (Quebec, Canada): Les Études de Marché Créatec, 2008.

Leshner G, Bolls P, Wise K. Motivated processing of fear appeal and disgust images in televised anti-tobacco ads. *Journal of Media Psychology* 2011;23(2):77–89.

Leshner G, Vultee F, Bolls PD, Moore J. When a fear appeal isn't just a fear appeal: the effects of graphic anti-tobacco message. *Journal of Broadcasting & Electronic Media* 2010;54(3):485–507.

Levenson PM, Marrow JR Jr, Pfefferbaum BJ. Attitudes toward health and illness: a comparison of adolescent, physician, teacher, and school nurse views. *Journal of Adolescent Health Care* 1984;5(4):254–60.

Levy D, Friend KB. Strategies for reducing youth access to tobacco: a framework for understanding empirical findings on youth access policies. *Drugs: Education, Prevention and Policy* 2002;9(3):285–303.

Lewit EM, Coate D, Grossman M. The effects of government regulation on teenage smoking. *Journal of Law and Economics* 1981;24(3):545–69.

Lewit E, Hyland A, Kerrebrock N, Cummings KM. Price, public policy, and smoking in young people. *Tobacco Control* 1997; 6(Suppl 2): S17–S24.

Liang L, Chaloupka F, Nichter M, Clayton R. Prices, policies and youth smoking, May 2001. *Addiction* 2003;98(Suppl 1):S105–S122.

Lichtenstein E, Hymowitz N, Nettekoven L. Community Intervention Trial for Smoking Cessation (COMMIT): adapting a standardized protocol for diverse settings. In: Richmond R, editor. *Interventions for Smokers: An International Perspective.* Baltimore: Williams & Wilkins, 1994:259–91.

Liddle HA, Santisteban DA, Levant RF, Bray JH. *Family Psychology: Science-Based Interventions*. Washington: American Psychological Association, 2002.

Liefeld JP. *The Relative Importance of the Size, Content & Pictures on Cigarette Package Warning Messages*. Ottawa (Canada): Health Canada, 1999.

Lightwood J, Glantz S. Effect of the Arizona tobacco control program on cigarette consumption and healthcare expenditures. *Social Science & Medicine* 2011; 72(2):166–72.

Lightwood JM, Dinno A, Glantz SA. Effect of the California tobacco control program on personal health care expenditures. *PLoS Medicine* 2008;5(8):e178. DOI:10.1371.journal.pmed.0050178.

Lin CA, Hullman GA. Tobacco-prevention messages online: social marketing via the Web. *Health Communication* 2005;18(2):177–93.

Ling PM, Landman A, Glantz SA. It is time to abandon youth access tobacco programmes. *Tobacco Control* 2002;11(1):3–6.

Lipkus IM, McBride CM, Pollak KI, Schwartz-Bloom RD, Tilson E, Bloom PN. A randomized trial comparing the effects of self-help materials and proactive telephone counseling on teen smoking cessation. *Health Psychology* 2004;23(4):397–406.

Litrownik AJ, Elder JP, Campbell NR, Ayala GX, Slymen DJ, Parra-Medina D, Zavala FB, Lovato CY. Evaluation of a tobacco and alcohol use prevention program for Hispanic migrant adolescents: promoting the protective factor of parent-child communication. *Preventive Medicine* 2000;31(2 Pt 1):124–33.

Little SJ, Stevens VJ, Severson HH, Lichtenstein E. Effective smokeless tobacco intervention for dental hygiene patients. *Journal of Dental Hygiene* 1992;66(4):185–90.

Lober Aquilino M, Lowe JB. Approaches to tobacco control: the evidence base. *European Journal of Dental Education* 2004;8(Suppl 4):11–7.

Lotecka L, MacWhinney M. Enhancing decision behavior in high school "smokers." *International Journal of the Addictions* 1983;18(4):479–90.

Lotrean LM, Dijk F, Mesters I, Ionut C, De Vries H. Evaluation of a peer-led smoking prevention programme for Romanian adolescents. *Health Education Research* 2010;25(5):803–14.

Lovato CY, Sabiston CM, Hadd V, Nykiforuk CI, Campbell HS. The impact of school smoking policies and student perceptions of enforcement on school smoking prevalence and location of smoking. *Health Education Research* 2007;22(6):782–93.

Lowenthal M, Thurnher M, Chiriboga D. *Four Stages of Life*. San Francisco: Jossey-Bass, 1975.

Lynagh M, Schofield M, Sanson-Fisher R. School health promotion programs over the past decade: a review of the smoking, alcohol and solar protection literature. *Health Promotion International* 1997;12(1):43–60.

Lynam DR, Milich R, Zimmerman R, Novak SP, Logan TK, Martin C, Leukefeld C, Clayton R. Project DARE: no effects at 10-year follow-up. *Journal of Consulting and Clinical Psychology* 1999;67(4):590–3.

Lynch BS, Bonnie RJ, editors. *Growing Up Tobacco Free: Preventing Nicotine Addiction in Children and Youths*. Washington: National Academies Press, 1994.

Makni H, O'Loughlin JL, Tremblay M, Gervais A, Lacroix C, Déry V, Paradis G. Smoking prevention counseling practices of Montreal general practitioners. *Archives of Pediatrics & Adolescent Medicine* 2002;156(12): 1263–7.

Malouff J, Gabrilowitz D, Schutte N. Readability of health warnings on alcohol and tobacco products [letter]. *American Journal of Public Health* 1992;82(3):464.

Marcell AV, Halpern-Felsher BL. Adolescents' beliefs about preferred resources for help vary depending on the health issue. *Journal of Adolescent Health* 2007;41(1):61–8.

Marks A, Fisher M, Lasker S. Adolescent medicine in pediatric practice. *Journal of Adolescent Health Care* 1990;11(2):149–53.

Marr-Lyon L, Young K, Quintero G. An evaluation of youth empowerment tobacco prevention programs in the Southwest. *Journal of Drug Education* 2008;38(1): 39–53.

McAlister A, Perry C, Killen J, Slinkard LA, Maccoby N. Pilot study of smoking, alcohol and drug abuse prevention. *American Journal of Public Health* 1980;70(7):719–21.

McCombs ME, Shaw DL. The agenda-setting function of mass media. *Public Opinion Quarterly* 1972;36(2): 176–87.

McDonald P, Colwell B, Backinger CL, Husten C, Maule CO. Better practices for youth tobacco cessation: evidence of review panel. *American Journal of Health Behavior* 2003;27(Suppl 2):S144–S158.

McGuire WJ. Some contemporary approaches. *Advances in Experimental Social Psychology* 1964;1:191–229.

McMullen KM, Brownson RC, Luke D, Chriqui J. Strength of clean indoor air laws and smoking related outcomes in the USA. *Tobacco Control* 2005;14(1):43–8.

Mejia AB, Ling PM, Glantz SA. Quantifying the effects of promoting smokeless tobacco as a harm reduction strategy in the USA. *Tobacco Control* 2010;19(4): 297–305.

Mermelstein R. Teen smoking cessation. *Tobacco Control* 2003;12(Suppl 1):i25–i34.

Mermelstein R, Turner L. Web-based support as an adjunct to group-based smoking cessation for adolescents. *Nicotine & Tobacco Research* 2006;8(Suppl 1):S69–S76.

Merzenich MM. Cortical plasticity contributing to child development. In: McClelland JL, Siegler R, editors. *Mechanisms of Cognitive Development: Behavioral and Neural Perspectives*. Mahwah (NJ): Lawrence Erlbaum Associates, 2001:67–95.

Meshack AF, Hu S, Pallonen UE, McAlister AL, Gottlieb N, Huang P. Texas Tobacco Prevention Pilot Initiative: processes and effects. *Health Education Research* 2004;19(6):657–68.

Mills AL, White MM, Pierce JP, Messer K. Home smoking bans among U.S. households with children and smokers: opportunities for intervention. *American Journal of Preventive Medicine* 2011;41(6):559–65.

Millstein SG. Health beliefs. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. I. New York: Garland Publishing, 1991:445–9.

Miranda J, Bernal G, Lau A, Kohn L, Hwang WC, LaFromboise T. State of the science on psychological intervention for ethnic minorities. *Annual Review of Clinical Psychology* 2005;1:113–42.

Montemayor R, Flannery DJ. Parent-adolescent relations in middle and late adolescence. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. II. New York: Garland Publishing, 1991:729–34.

Moolchan ET, Robinson ML, Ernst M, Cadet JL, Pickworth WB, Heishman SJ, Schroeder JR. Safety and efficacy of the nicotine patch and gum for the treatment of adolescent tobacco addiction. *Pediatrics* 2005;115(4): e407–e414.

Morton TA, Duck JM. Communication and health beliefs: mass and interpersonal influences on perception of risk to self and others. *Communication Research* 2001;28(5):602–26.

Moyer-Gusé E, Nabi RL. Explaining the effects of narrative in an entertainment television program: overcoming resistance to persuasion. *Human Communication Research* 2010;36(1):26–52.

Mullan F. Don Quixote, Machiavelli, and Robin Hood: public health practice, past and present. *American Journal of Public Health* 2000;90(5):702–6.

Mulye TP, Park MJ, Nelson CD, Adams SH, Irwin CE Jr, Brindis CD. Trends in adolescent and young adult health in the United States. *Journal of Adolescent Health* 2009;45(1):8–24.

Muramoto ML, Leischow SJ, Sherrill D, Matthews E, Strayer LJ. Randomized, double-blind, placebo-controlled trial of 2 dosages of sustained-release bupropion for adolescent smoking cessation. *Archives of Pediatrics & Adolescent Medicine* 2007;161(11):1068–74.

Murnaghan DA, Leatherdale ST, Sihvonen M, Kekki P. A multilevel analysis examining the association between school-based smoking policies, prevention programs and youth smoking behavior: evaluating a provincial tobacco control strategy. *Health Education Research* 2008;23(6):1016–28.

Murnaghan DA, Sihvonen M, Leatherdale ST, Kekki P. The relationship between school-based smoking policies and prevention programs on smoking behavior among grade 12 students in Prince Edward Island: a multilevel analysis. *Preventive Medicine* 2007;44(4):317–22.

Murphy RL. Development of a low-budget tobacco prevention media campaign. *Journal of Public Health Management and Practice* 2000;6(3):45–8.

Murray DM, Perry CL. The measurement of substance use among adolescents: when is the 'bogus pipeline' method needed? *Journal of Addictive Behaviors* 1987;12(3):225–33.

Murray DM, Pirie P, Luepker RV, Pallonen U. Five- and six-year follow-up results from four seventh-grade smoking prevention strategies. *Journal of Behavioral Medicine* 1989b;12(2):207–18.

Murray DM, Prokhorov AV, Harty KC. Effects of a statewide antismoking campaign on mass media messages and smoking beliefs. *Preventive Medicine* 1994;23(1):54–60.

Murray DM, Roche LM, Goldman AI, Whitbeck J. Smokeless tobacco use among ninth graders in a north-central metropolitan population: cross-sectional and prospective associations with age, gender, race, family structure, and other drug use. *Preventive Medicine* 1988;17(4):449–60.

My Last Dip. Home page, 2010; <http://www.mylastdip.com>; accessed: March 16, 2010.

Myers MG, Brown SA. A controlled study of a cigarette smoking cessation intervention for adolescents in substance abuse treatment. *Psychology of Addictive Behaviors* 2005;19(2):230–3.

Nabi RL. The case for emphasizing discrete emotions in communication research. *Communication Monographs* 2010;77(2):153–9.

National Cancer Institute. *Strategies to Control Tobacco Use in the United States: A Blueprint for Public Health Action in the 1990's.* Smoking and Tobacco Control Monograph No. 1. Bethesda (MD): U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, 1991. NIH Publication No. 92-3316.

National Cancer Institute. *Tobacco and the Clinician: Interventions for Medical and Dental Practice.* Smoking and Tobacco Control Monograph No. 5. Bethesda (MD): U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 1994. NIH Publication No. 94-3693.

National Cancer Institute. *Changing Adolescent Smoking Prevalence*. Smoking and Tobacco Control Monograph No. 14. Bethesda (MD): U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 2001. NIH Publication No. 02-5086.

National Cancer Institute. *ASSIST: Shaping the Future of Tobacco Prevention and Control.* Tobacco Control Monograph No. 16. Bethesda (MD): U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, 2005. NIH Publication No. 05-5645.

National Cancer Institute. *Promoting Healthy Lifestyles: Policy, Program, and Personal Recommendations for Reducing Cancer Risk.* 2006–2007 Annual Report President's Cancer Panel. Bethesda (MD): U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, 2007.

National Cancer Institute. *The Role of the Media in Promoting and Reducing Tobacco Use.* Tobacco Control Monograph No. 19. Bethesda (MD): U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, 2008. NIH Publication No. 07-6242.

Naum GP 3rd, Yarian DO, McKenna JP. Cigarette availability to minors. *Journal of the American Osteopathic Association* 1995;95(11):663–5.

Nelson DE, Mowery P, Tomar S, Marcus S, Giovino G, Zhao L. Trends in smokeless tobacco use among adults and adolescents in the United States. *American Journal of Public Health* 2006;96(5):897–905.

New York State Department of Health. *Cigarette Fire Safety Act,* July 2009; <http://www.nyhealth.gov/prevention/tobacco_control/current_policies.htm>; accessed: March 16, 2010.

Niederdeppe JD. Syntactic indeterminacy, perceived message sensation value-enhancing features, and message processing in the context of anti-tobacco advertisements. *Communication Monographs* 2005;72(3):324–44.

Niederdeppe J, Davis KC, Farrelly MC, Yarsevich J. Stylistic features, need for sensation, and confirmed recall of national smoking prevention advertisements. *Journal of Communication* 2007;57(2):272–92.

Niederdeppe J, Farrelly MC, Haviland ML. Confirming "truth": more evidence of a successful tobacco countermarketing campaign in Florida. *American Journal of Public Health* 2004;94(2):255–7.

Niederdeppe J, Farrelly MC, Hersey JC, Davis KC. Consequences of dramatic reductions in state tobacco control funds: Florida, 1998–2000. *Tobacco Control* 2008;17(3):205–10.

Niederdeppe J, Hersey JC, Farrelly MC, Haviland ML, Healton CG. Comparing adolescent reactions to national tobacco countermarketing advertisements using Web TV. *Social Marketing Quarterly* 2005;11(1):3–18.

Niederhofer H, Huber M. Bupropion may support psychosocial treatment of nicotine-dependent adolescents: preliminary results. *Pharmacotherapy* 2004; 24(11):1524–8.

NIH State-of-the-Science Panel. National Institutes of Health State-of-the-Science Conference Statement: Tobacco Use: Prevention, Cessation, and Control. *Annals of Internal Medicine* 2006;145(1):839–44.

Nilsson T. *Legibility and Visual Effectives of Some Proposed and Current Health Warnings on Cigarette Packages.* Charlottetown (Canada): University of Prince Edward Island, 1999.

Noland MP, Kryscio RJ, Riggs RS, Linville LH, Ford VY, Tucker TC. The effectiveness of a tobacco prevention program with adolescents living in a tobacco-producing region. *American Journal of Public Health* 1998;88(12):1862–5.

Nutbeam D, Macaskill P, Smith C, Simpson JM, Catford J. Evaluation of two school smoking education programmes under normal classroom conditions. *BMJ (British Medical Journal)* 1993;306(6870):102–7.

O'Hegarty M, Pederson LL, Nelson DE, Mowery P, Gable JM, Wortley P. Reactions of young adult smokers to warning labels on cigarette packages. *American Journal of Preventive Medicine* 2006;30(6):467–73.

Orr DP, Ingersoll G. Cognition and health. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. I. New York: Garland Publishing, 1991:130–2.

Orzechowski and Walker. *The Tax Burden on Tobacco: Historic Compilation 2010.* Arlington (VA): Orzechowski and Walker, 2010.

Oscós-Sánchez MA, White D, Bajorek E, Dahlman M, Albright T, Treviño J, Bauge SK. SAFE TEENS: facilitators of and barriers to adolescent preventive care discussions. *Family Medicine* 2008;40(2):125–31.

Ozer EM, Adams SH, Gardner LR, Mailloux DE, Wibbelsman CJ, Irwin CE Jr. Provider self-efficacy and the screening of adolescents for risky health behaviors. *Journal of Adolescent Health* 2004;35(2):101–7.

Ozer EM, Adams SH, Lustig JL, Gee S, Garber AK, Gardner LR, Rehbein M, Addison L, Irwin CE Jr. Increasing the screening and counseling of adolescents for risky health behaviors: a primary care intervention. *Pediatrics* 2005;115(4):960–8.

Ozer EM, Adams SH, Lustig JL, Millstein SG, Camfield K, El-Diwany S, Volpe S, Irwin CE Jr. Can it be done: implementing adolescent clinical preventive services. *Health Services Research* 2001;36(6 Pt 2):150–65.

Park E. School-based smoking prevention programs for adolescents in South Korea: a systematic review. *Health Education Research* 2006;21(3):407–15.

Parlove AE, Cowdery JE, Hoerauf SL. Acceptability and appeal of a Web-based smoking prevention intervention for adolescents. *International Electronic Journal of Health Education* 2004;7:1–8.

Patten CA, Croghan IT, Meis TM, Decker PA, Pingree S, Colligan RC, Dornelas EA, Offord KP, Boberg EW, Baumberger RK, et al. Randomized clinical trial of an Internet-based versus brief office intervention for adolescent smoking cessation. *Patient Education and Counseling* 2006;64(1–3):249–58.

Patterson GR. Performance models for antisocial boys. *American Psychologist* 1986;41(4):432–44.

Pbert L, Osganian SK, Gorak D, Druker S, Reed G, O'Neill KM, Sheetz A. A school nurse-delivered adolescent smoking cessation intervention: a randomized controlled trial. *Preventive Medicine* 2006;43(4):312–20.

Pechmann C. Does anti-smoking advertising combat underage smoking: a review of past practices and research. In: Goldberg ME, Fishbein M, Middlestadt SE, editors. *Social Marketing: Theoretical and Practical Perspectives*. Mahwah (NJ): Lawrence Erlbaum Associates, 1997:189–216.

Pechmann C. Changing adolescent smoking prevalence: impact of advertising interventions. In: *Changing Adolescent Smoking Prevalence*. Tobacco Control Monograph No. 14. Bethesda (MD): U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 2001. NIH Publication No. 02-5086.

Pechmann C, Reibling ET. Anti-smoking advertising campaigns targeting youth: case studies from USA and Canada. *Tobacco Control* 2000a;9(Suppl 2):ii18–ii31.

Pechmann C, Reibling ET. Planning an effective anti-smoking mass media campaign targeting adolescents. *Journal of Public Health Management and Practice* 2000b;6(3):80–94.

Pechmann C, Reibling ET. Antismoking advertisements for youths: an independent evaluation of health, counter-industry, and industry approaches. *American Journal of Public Health* 2006;96(5):906–13.

Pechmann C, Zhao G, Goldberg ME, Reibling ET. What to convey in antismoking advertisements for adolescents: the use of protection motivation theory to identify effective message themes. *Journal of Marketing* 2003;67(2):1–18.

Pederson LL, Baskerville JC, Lefcoe NM. Change in smoking status among school-aged youth: impact of a smoking-awareness curriculum, attitudes, knowledge and environmental factors. *American Journal of Public Health* 1981;71(12):1401–4.

Pederson LL, Blumenthal DS, Dever A, McGrady G. A Web-based smoking cessation and prevention curriculum for medical students: why, how, what, and what next. *Drug and Alcohol Review* 2006;25(1):39–47.

Pentz MA. Effective prevention programs for tobacco use. *Nicotine & Tobacco Research* 1999;1(Suppl 2):S99–S107.

Pentz MA, Brannon BR, Charlin VL, Barrett EJ, MacKinnon DP, Flay BR. The power of policy: the relationship of smoking policy to adolescent smoking. *American Journal of Public Health* 1989a;79(7):857–62.

Pentz MA, Dwyer JH, MacKinnon DP, Flay BR, Hansen WB, Wang EY, Johnson CA. A multicommunity trial for primary prevention of adolescent drug abuse: effects on drug use prevalence. *JAMA: the Journal of the American Medical Association* 1989b;261(22):3259–66.

Pentz MA, Johnson A, Dwyer JH, MacKinnon DM, Hansen WB, Flay BR. A comprehensive community approach to adolescent drug abuse prevention: effects on cardiovascular disease risk behaviors. *Annals of Medicine* 1989c;21(3):219–22.

Pentz MA, MacKinnon DP, Dwyer JH, Wang EY, Hansen WB, Flay BR, Johnson CA. Longitudinal effects of the Midwestern Prevention Project on regular and experimental smoking in adolescents. *Preventive Medicine* 1989d;18(2):304–21.

Pentz MA, MacKinnon DP, Flay BR, Hansen WB, Johnson CA, Dwyer JH. Primary prevention of chronic diseases in adolescence: effects of the Midwestern Prevention Project on tobacco use. *American Journal of Epidemiology* 1989e;130(4):713–24.

Perry C, Killen J, Telch M, Slinkard LA, Danaher BG. Modifying smoking behavior of teenagers: a school-based intervention. *American Journal of Public Health* 1980;70(7):722–5.

Perry CD, Kenney GM. Differences in pediatric preventive care counseling by provider type. *Ambulatory Pediatrics* 2007;7(5):390–5.

Perry CL, Kelder SH, Klepp KI. Community-wide cardiovascular disease prevention in young people: long-term outcomes of the Class of 1989 Study. *European Journal of Public Health* 1994;4(3):188–94.

Perry CL, Kelder SH, Murray DM, Klepp KI. Communitywide smoking prevention: long-term outcomes of the Minnesota Heart Health Program and the Class of 1989 Study. *American Journal of Public Health* 1992;82(9):1210–6.

Perry CL, Klepp KI, Sillers C. Community-wide strategies for cardiovascular health: the Minnesota Heart Health Program youth program. *Health Education Research* 1989;4(1):87–101.

Perry CL, Komro KA, Veblen-Mortenson S, Bosma LM, Farbakhsh K, Munson KA, Stigler MH, Lytle LA. A randomized controlled trial of the middle and junior high school D.A.R.E. and D.A.R.E. Plus Programs. *Archives of Pediatrics & Adolescent Medicine* 2003;157(2): 178–84.

Perry CL, Komro KA, Veblen-Mortenson S, Bosma L, Munson K, Stigler M, Lytle LA, Forster JL, Welles SL. The Minnesota DARE PLUS Project: creating community partnerships to prevent drug use and violence. *Journal of School Health* 2000;70(3):84–8.

Perry CL, Stigler MH, Arora M, Reddy KS. Preventing tobacco use among young people in India: Project MYTRI. *American Journal of Public Health* 2009; 99(5):899–906.

Peterson AJ, Clark AW. Using group decision to reduce adolescent girls' smoking. *Psychological Reports* 1986;58(1):179–85.

Peterson AV Jr, Kealey KA, Mann SL, Marek PM, Sarason IG. Hutchinson Smoking Prevention Project: long-term randomized trial in school-based tobacco use prevention—results on smoking. *Journal of the National Cancer Institute* 2000;92(24):1979–91.

Petraitis J, Flay BR, Miller TQ. Reviewing theories of adolescent substance use: organizing pieces in the puzzle. *Psychological Bulletin* 1995;117(1):67–86.

Petraitis J, Flay BR, Miller TQ, Torpy EJ, Greiner B. Illicit substance use among adolescents: a matrix of prospective predictors. *Substance Use & Misuse* 1998; 33(13):2561–604.

Petrie J, Bunn F, Byrne G. Parenting programmes for preventing tobacco, alcohol or drugs misuse in children <18: a systematic review. *Health Education Research* 2007;22(2):177–91.

Petrosino A. Standards for evidence and evidence for standards: the case of school-based drug prevention. *Annals of the American Academy of Political and Social Science* 2003;587(1):180–207.

Petrosino A, Turpin-Petrosino C, Finckenauer JO. Well-meaning programs can have harmful effects: lessons from experiments of programs such as Scared Straight. *Crime & Delinquency* 2000;46(3):354–79.

Petty RE, Cacioppo JT. The elaboration likelihood model of persuasion. In: Berkowitz L, editor. *Advances in Experimental and Social Psychology*. Vol. 19. New York: Academic Press, 1986:123–205.

Pierce JP. Tobacco industry marketing, population-based tobacco control, and smoking behavior. *American Journal of Preventive Medicine* 2007;33(6 Suppl): S327–S334.

Pierce JP, White MM, Gilpin EA. Adolescent smoking decline during California's tobacco control programme. *Tobacco Control* 2005;14(3):207–12.

Piper DL, Moberg DP, King MJ. The Healthy for Life Project: behavioral outcomes. *Journal of Primary Prevention* 2000;21(1):47–73.

Popham WJ, Potter LD, Hetrick MA, Muthén LK, Duerr JM, Johnson MD. Effectiveness of the California 1990–1991 tobacco education media campaign. *American Journal of Preventive Medicine* 1994;10(6):319–26.

Portillo F, Antoñanzas F. Information disclosure and smoking risk perceptions: potential short-term impact on Spanish students of the new European Union directive on tobacco products. *European Journal of Public Health* 2002;12(4):295–301.

Powell LM, Tauras JA, Ross H. The importance of peer effects, cigarette prices and tobacco control policies for youth smoking behavior. *Journal of Health Economics* 2005;24(5):950–68.

Pride Surveys. Parents, kids, alcohol and drugs: a disconnect?, June 20, 2006; <www.pridesurveys.com/newsletters/archive/062006.htm>; accessed: May 15, 2009.

Pro-Children Act of 1994, Public Law 103-227, 108 *U.S. Statutes at Large* 125.

Prokhorov AV, Hudmon KS, Marani S, Foxhall L, Ford KH, Luca NS, Wetter DW, Cantor SB, Vitale F, Gritz ER. Engaging physicians and pharmacists in providing smoking cessation counseling. *Archives of Internal Medicine* 2010;170(18):1640–6.

Prokhorov AV, Kelder SH, Shegog R, Murray N, Peters R Jr, Agurcia-Parker C, Cinciripini PM, de Moor C, Conroy JL, Hudmon KS, Ford KH, et al. Impact of A Smoking Prevention Interactive Experience (ASPIRE), an interactive, multimedia smoking prevention and cessation curriculum for culturally diverse high-school students. *Nicotine & Tobacco Research* 2008;10(9):1477–85.

Quinlan KB, McCaul KD. Matched and mismatched interventions with young adult smokers: testing a stage theory. *Health Psychology* 2000;19(2):165–71.

Quit Victoria. New set of graphic health warnings on cigarettes to hit the shelves, as data shows confronting images increase Quitline calls, Feb. 28, 2007; <http://www.quit.org.au/media.asp?ContentID=19175>; accessed: May 15, 2008.

Rabius Y, McAlister AL, Geiger A, Huang P, Todd R. Telephone counseling increases cessation rates among young adult smokers. *Health Psychology* 2004;23(5):539–41.

Ramesh S. Smokers heed graphic warnings on cigarette packs, May 17, 2006; <http://www.act.tobaccochina.net/englishnew/content.aspx?id=23879>; accessed: May 15, 2009.

Rand CM, Auinger P, Klein JD, Weitzman M. Preventive counseling at adolescent ambulatory visits. *Journal of Adolescent Health* 2005;37(2):87–93.

Ranney L, Melvin C, Lux L, McClain E, Morgan L, Lohr KN. *Tobacco Use: Prevention, Cessation, and Control.* Evidence Report/Technology Assessment No. 140. Research Triangle Park (NC): RTI International-University of North Carolina Evidence-based Practice Center, 2006. AHRQ Publication No. 06-E015.

Reinert B, Carver V, Range LM. Anti-tobacco messages from different sources make a difference with secondary school students. *Journal of Public Health Management and Practice* 2004;10(6):518–23.

Resnicow K, Baranowski T, Ahluwalia JS, Braithwaite RL. Cultural sensitivity in public health: defined and demystified. *Ethnicity & Disease* 1999;9(1):10–21.

Ribisl KM, Steckler A, Linnan L, Patterson CC, Pevzner ES, Markatos E, Goldstein AO, McGloin T, Peterson AB, North Carolina Youth Empowerment Study. The North Carolina Youth Empowerment Study (NCYES): a participatory research study examining the impact of youth empowerment for tobacco use prevention. *Health Education & Behavior* 2004;31(5):597–614.

Richards JI, Curran CM. Oracles on "advertising": searching for a definition. *Journal of Advertising* 2002;31(2):63–77.

Richardson L, Allen P, McCullough L, Bauld L, Assanand S, Greaves L, Amos A, Hemsing N, Humphries K. *Interventions to Prevent the Uptake of Smoking in Children and Young People.* Vancouver (Canada): Centre of Excellence for Women's Health, 2007.

Rigotti NA. Youth access to tobacco. *Nicotine & Tobacco Research* 1999;1(Suppl 2):S93–S97.

Rigotti NA, DiFranza JR, Chang Y, Tisdale T, Kemp B, Singer DE. The effect of enforcing tobacco-sales laws on adolescents' access to tobacco and smoking behavior. *New England Journal of Medicine* 1997;37(15):1044–51.

Rigotti NA, Regan S, Majchrzak NE, Knight JR, Wechsler H. Tobacco use by Massachusetts public college students: long term effect of the Massachusetts Tobacco Control Program. *Tobacco Control* 2002;11(Suppl 2):ii20–ii24.

Riley WT, Barenie JT, Mabe PA, Myers DR. The role of race and ethnic status on the psychosocial correlates of smokeless tobacco use in adolescent males. *Journal of Adolescent Health* 1991;12(1):15–21.

Ringel JS, Wasserman J, Andreyeva T. Effects of public policy on adolescents' cigar use: evidence from the National Youth Tobacco Survey. *American Journal of Public Health* 2005;95(6):995–8.

R.J. Reynolds Tobacco Co. v. U.S. Food and Drug Administration, Civil Case No. 11-1482 (D.D.C. 2011).

Robinson LA, Vander Weg MW, Riedel BW, Klesges RC, McLain-Allen B. "Start to stop": results of a randomised controlled trial of a smoking cessation programme for teens. *Tobacco Control* 2003;12(Suppl 4):iv26–iv33.

Robinson TN, Killen JD. Do cigarette warning labels reduce smoking: paradoxical effects among adolescents. *Archives of Pediatrics & Adolescent Medicine* 1997;151(3):267–72.

Roddy E, Romilly N, Challenger A, Lewis S, Britton J. Use of nicotine replacement therapy in socioeconomically deprived young smokers: a community-based pilot randomised controlled trial. *Tobacco Control* 2006;15(5):373–6.

Rodgers A, Corbett T, Bramley D, Riddell T, Wills M, Lin RB, Jones M. Do u smoke after txt: results of a randomised trial of smoking cessation using mobile phone text messaging. *Tobacco Control* 2005;14(4):255–61.

Rogers EM. Diffusion of drug abuse prevention programs: spontaneous diffusion, agenda setting, and reinvention. In: Backer TE, David SL, Saucy G, editors. *Reviewing the Behavioral Science Knowledge Base on Technology Transfer*. NIDA Research Monograph 155. Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, 1995a:90–105. NIH Publication No. 95-4035.

Rogers EM. *Diffusion of Innovations.* 4th ed. New York: Free Press, 1995b.

Rooney BL, Murray DM. A meta-analysis of smoking prevention programs after adjustment for errors in the unit of analysis. *Health Education Quarterly* 1996;23(1):48–64.

Rootman I, Flay BR. *A Study on Youth Smoking: Plain Packaging, Health Warnings, Event Marketing and Price Reductions*. Key Findings. Toronto (Canada): University of Toronto, University of Illinois at Chicago, York University, Ontario Tobacco Research Unit, Addiction Research Foundation, 1995.

Rosenbaum DP, Flewelling RL, Bailey SL, Ringwalt CL, Wilkinson DL. Cops in the classroom: a longitudinal evaluation of Drug Abuse Resistance Education (D.A.R.E.). *Journal of Research in Crime and Delinquency* 1994;31(1):3–31.

Rosenbaum DP, Hanson GS. Assessing the effects of school-based drug education: a six-year multilevel analysis of Project D.A.R.E. *Journal of Research in Crime and Delinquency* 1998;35(4):381–412.

Rosenberg M. Self-concept and psychological well-being in adolescence. In: Leahy RL, editor. *The Development of the Self*. Orlando (FL): Academic Press, 1985:205–46.

Rosenstock IM. The health belief model and preventive health behavior. *Health Education Monographs* 1974;2(4):354–86.

Rosenthal R. *Meta-Analytic Procedures for Social Research*. Beverly Hills (CA): Sage Publications, 1984.

Ross H, Chaloupka FJ. The effect of cigarette prices on youth smoking. *Health Economics* 2003;12(3):217–30.

Ross H, Chaloupka FJ. The effect of public policies and prices on youth smoking. *Southern Economic Journal* 2004;70(4):796–815.

Ross H, Powell LM, Bauer JE, Levy DT, Peck RM, Lee HR. Community-based youth tobacco control interventions: cost effectiveness of the Full Court Press project. *Applied Health Economics and Health Policy* 2006;5(3):167–76.

Ross H, Powell LM, Tauras JA, Chaloupka FJ. New evidence on youth smoking behavior based on experimental price increases. *Contemporary Economic Policy* 2005;23(2):195–210.

RTI International. *First Annual Independent Evaluation of New York's Tobacco Control Program: Final Report*. Research Triangle Park (NC): RTI International, 2004.

RTI International. *Second Annual Independent Evaluation of New York's Tobacco Control Program: Final Report*. Research Triangle Park (NC): RTI International, 2005.

RTI International. *Fourth Annual Independent Evaluation of New York's Tobacco Control Program: Final Report*. Research Triangle Park (NC): RTI International, 2007.

Saffer H, Chaloupka F. The effect of tobacco advertising bans on tobacco consumption. *Journal of Health Economics* 2000;19(6):1117–37.

Sanders JL, Colson YL. Leveraging primary care in the fight against lung cancer. *Journal of General Internal Medicine* 2008;23(3):344–7.

Schar E, Gutierrez K, Murphy-Hoefer R, Nelson DE. *Tobacco Use Prevention Media Campaigns: Lessons Learned from Youth in Nine Countries.* Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006.

Schinke SP, Botvin GJ, Orlandi MA, Schilling RF, Gordon AN. African-American and Hispanic-American adolescents, HIV infection and preventive intervention. *AIDS Education and Prevention* 1990;2(4):305–12.

Schinke SP, Gilchrist LD, Schilling RF II, Walker RD, Locklear VS, Bobo JK, Maxwell JS, Trimble JE, Cvetkovich GT. Preventing substance abuse among American Indian and Alaska Native youth. *Journal of Social Service Research* 1987;9(4):53–67.

Schincke SP, Gilchrist LD. Preventing substance abuse with children and adolescents. *Journal of Consulting and Clinical Psychology* 1985;53(5):596–602.

Schinke SP, Gilchrist LD. Preventing tobacco use among young people. *Health and Social Work* 1986;11(1):59–65.

Schinke SP, Gilchrist LD, Schilling RF II, Senechal VA. Smoking and smokeless tobacco use among adolescents: trends and intervention results. *Public Health Reports* 1986;101(4):373–8.

Schinke SP, Orlandi MA, Botvin GJ, Gilchrist LD, Trimble JE, Locklear VS. Preventing substance abuse among American-Indian adolescents: a bicultural competence skills approach. *Journal of Counseling Psychology* 1988;35(1):87–90.

Schinke SP, Schwinn TM, Di Noia J, Cole KC. Reducing the risks of alcohol use among urban youth: three-year effects of a computer-based intervention with and without parent involvement. *Journal of Studies on Alcohol* 2004;65(4):443–9.

Schinke SP, Tepavac L, Cole KC. Preventing substance use among Native American youth: three-year results. *Addictive Behaviors* 2000;25(3):387–97.

Schmitt CL, Malarcher AM, Clark PI, Bombard JM, Strauss W, Stillman FA. Community guide recommendations and state level tobacco control programmes: 1999–2004. *Tobacco Control* 2007;16(5):318–24.

Schofield MJ, Redman S, Sanson-Fisher RW. A community approach to smoking prevention: a review. *Behaviour Change* 1991;8(1);17–25.

Seghers T, Foland S. Anti-tobacco media campaign for young people. *Tobacco Control* 1998;7(Suppl 1): S29–S30.

Severson HH, Andrews JA, Lichtenstein E, Gordon JS, Barckley MF. Using the hygiene visit to deliver a tobacco cessation program: results of a randomized clinical trial. *Journal of the American Dental Association* 1998;129(7):993–9.

Severson HH, Ary DV. Sampling bias due to consent procedures with adolescents. *Addictive Behaviors* 1983; 8(4):433–7.

Severson HH, Biglan A. Rationale for the use of passive consent in smoking prevention research: politics, policy, and pragmatics. *Preventive Medicine* 1989; 18(2):267–79.

Severson HH, Danaher BG. An Internet-Based Smokeless Tobacco Cessation Program for Teens, October 6, 2009; <http://clinicaltrials.gov/ct2/show/NCT00680615>; accessed: March 16, 2010.

Severson HH, Forrester K, Biglan A. Use of smokeless tobacco is a risk factor for cigarette smoking. *Nicotine & Tobacco Research* 2007;9(12):1331–7.

Severson HH, Glasgow R, Wirt R, Brozovsky P, Zoref L, Black C, Biglan A, Ary D, Weissman W. Preventing the use of smokeless tobacco and cigarettes by teens: results of a classroom intervention. *Health Education Research* 1991;6(1):109–20.

Severson HH, Gordon JS, Danaher BG, Akers LA. ChewFree.com: evaluation of a Web-based cessation program for smokeless tobacco users. *Nicotine & Tobacco Research* 2008;10(2):381–91.

Severson HH, Hatsukami D. Smokeless tobacco cessation. *Primary Care* 1999;26(3):529–51.

Severson HH, Klein K, Lichtensein E, Kaufman N, Orleans CT. Smokeless tobacco use among professional baseball players: survey results, 1998 to 2003. *Tobacco Control* 2005;14(1):31–6.

Shaffer H, Beck JC, Boothroyd P. The primary prevention of smoking onset: an inoculation approach. *Journal of Psychoactive Drugs* 1983;15(3):177–84.

Sharma A. Recall of television commercials as a function of viewing context: the impact of program-commercial congruity on commercial messages. *Journal of General Psychology* 2000;127(4):383–96.

Shean RE, de Klerk NH, Armstrong BK, Walker NR. Seven-year follow-up of a smoking-prevention program for children. *Australian Journal of Public Health* 1994;18(2):205–8.

Shelley D, Fahs M, Scheinmann R, Swain S, Qu J, Burton D. Acculturation and tobacco use among Chinese Americans. *American Journal of Public Health* 2004;94(2):300–7.

Shen L, Monahan JL, Rhodes N, Roskos-Ewoldsen D. The impact of attitude accessibility and decision style on adolescents' biased processing of health-related public service announcements. *Communication Research* 2009;36(1);104–28.

Shope JT, Copeland LA, Kamp ME, Lang SW. Twelfth grade follow-up of the effectiveness of a middle school-based substance abuse prevention program. *Journal of Drug Education* 1998;28(3):185–97.

Siahpush M, Wakefield M, Spittal M, Durkin S. Antismoking television advertising and socioeconomic variations in calls to Quitline. *Journal of Epidemiology and Community Health* 2007;61(4):298–301.

Siddiqui O, Flay BR, Hu FB. Factors affecting attrition in a longitudinal smoking prevention study. *Preventive Medicine* 1996;25(5):554–60.

Siegel M. Mass media antismoking campaigns: a powerful tool for health promotion. *Annals of Internal Medicine* 1998;129(2):128–32.

Siegel M. The effectiveness of state-level tobacco control interventions: a review of program implementation and behavioral outcomes. *Annual Review of Public Health* 2000;23:45–71.

Siegel M. Antismoking advertising: figuring out what works. *Journal of Health Communication* 2002; 7(2):157–62.

Siegel M, Albers AB, Cheng DM, Biener L, Rigotti NA. Effect of local restaurant smoking regulations on progression to established smoking among youths. *Tobacco Control* 2005;14(5):300–6.

Siegel M, Albers AB, Cheng DM, Hamilton WL, Biener L. Local restaurant smoking regulations and the adolescent smoking initiation process: results of a multilevel contextual analysis among Massachusetts youth. *Archives of Pediatrics & Adolescent Medicine* 2008;162(5):477–83.

Siegel M, Biener L. The impact of an antismoking media campaign on progression to established smoking: results of a longitudinal youth study. *American Journal of Public Health* 2000;90(3):380–6.

Sirichotiratana N, Techatraisakdi C, Sujirarat D, Rahman K, Warren CW, Jones NR, Asma S, Lee J. *Linking Global Youth Tobacco Survey (GYTS) Data to the WHO Framework Convention on Tobacco Control: The Case for Thailand*. Bangkok (Thailand): Mahidol University, 2005.

Sithole EGV. *Global School–Based Health Survey Zimbabwe 2003*. Harare (Zimbabwe): Ministry of Health and Child Welfare, 2003.

Skara S, Sussman S. A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive Medicine* 2003;37(5):451–74.

Skeer M, George S, Hamilton WL, Cheng DM, Siegel M. Town-level characteristics and smoking policy adoption in Massachusetts: are local restaurant smoking regulations fostering disparities in health protection? *American Journal of Public Health* 2004;94(2):286–92.

Slater MD, Kelly KJ, Edwards RW, Thurman PJ, Plested BA, Keefe TJ, Lawrence FR, Henry KL. Combining in-school and community-based media efforts: reducing marijuana and alcohol uptake among younger adolescents. *Health Education Research* 2006;21(1):157–67.

Sloan FA, Carlisle ES, Rattliff JR, Trogdon J. Determinants of states' allocations of the master settlement agreement payments. *Journal of Health Politics, Policy and Law* 2005;30(4):643–86.

Sloan FA, Trogdon JG. The impact of the master settlement agreement on cigarette consumption. *Journal of Policy Analysis and Management* 2004;23(4):843–55.

Sloboda Z, Stephens P, Pyakuryal A, Teasdale B, Stephens RC, Hawthorne RD, Marquette J, Williams JE. Implementation fidelity: the experience of the Adolescent Substance Abuse Prevention Study. *Health Education Research* 2009;24(3):394–406.

Slovic P. Cigarette smokers: rational actors or rational fools? In: Slovic P, editor. *Smoking: Risk, Perception & Policy*. Thousand Oaks (CA): Sage Publications, 2001:97–124.

Sly DF, Arheart K, Dietz N, Trapido EJ, Nelson D, Rodriguez R, McKenna J, Lee D. The outcome consequences of defunding the Minnesota youth tobacco-use prevention program. *Preventive Medicine* 2005;41(2):503–10.

Sly DF, Heald GR, Ray S. The Florida "truth" anti-tobacco media evaluation: design, first year results, and implications for planning future state media evaluations. *Tobacco Control* 2001a;10(1):9–15.

Sly DF, Hopkins RS, Trapido E, Ray S. Influence of a counteradvertising media campaign on initiation of smoking: the Florida "truth" campaign. *American Journal of Public Health* 2001b;91(2):233–8.

Sly DF, Trapido E, Ray S. Evidence of the dose effects of an antitobacco counteradvertising campaign. *Preventive Medicine* 2002;35(5):511–18.

Smith KH, Stutts MA. Effects of short-term cosmetic versus long-term health fear appeals in anti-smoking advertisements on the smoking behaviour of adolescents. *Journal of Consumer Behaviour* 2006;3(2):157–77.

Smith TA, House RF Jr, Croghan IT, Gauvin TR, Colligan RC, Offord KP, Gomez-Dahl LC, Hurt RD. Nicotine patch therapy in adolescent smokers. *Pediatrics* 1996;98(4 Pt 1):659–67.

Soldz S, Clark TW, Stewart E, Celebucki C, Walker DK. Decreased youth tobacco use in Massachusetts 1996 to 1999: evidence of tobacco control effectiveness. *Tobacco Control* 2002;11(Suppl 2):ii14–ii19.

Soldz S, Kreiner P, Clark TW, Krakow M. Tobacco use among Massachusetts youth: is tobacco control working? *Preventive Medicine* 2000;31(4):287–95.

Solomon LJ, Bunn JY, Flynn BS, Pirie PL, Worden JK, Ashikaga T. Mass media for smoking cessation in adolescents. *Health Education & Behavior* 2009;36(4):642–59.

Southwell BG, Yzer MC. The roles of interpersonal communication in mass media campaigns. In: Beck CS, editor. *Communication Yearbook.* New York: Lawrence Erlbaum Associates, 2008;31:420–62.

Sowden AJ. Mass media interventions for preventing smoking in young people. *Cochrane Database of Systematic Reviews* 1998, Issue 4. Art. No.: CD001006. DOI: 10.1002/14651858.CD001006.

Sowden AJ, Stead LF. Community interventions for preventing smoking in young people. *Cochrane Database of Systematic Reviews* 2003, Issue 1. Art. No.: CD001291, DOI: 10.1002/14651858.CD001291.

Spoth R, Redmond C, Shin C, Greenberg M, Clair S, Feinberg M. Substance abuse outcomes at 18 months past baseline: the PROSPER Community-University Partnership Trial. *American Journal of Preventive Medicine* 2007;32(5):395–402.

Spoth RL, Redmond C, Shin C. Randomized trial of brief family interventions for general populations: adolescent substance use outcomes 4 years following baseline. *Journal of Consulting and Clinical Psychology* 2001;69(4):627–42.

Spoth RL, Redmond C, Trudeau L, Shin C. Longitudinal substance initiation outcomes for a universal preventive intervention combining family and school programs. *Psychology of Addictive Behaviors* 2002;16(2):129–34.

St. Pierre T, Kaltreider DL, Mark MM, Aikin KJ. Drug prevention in a community setting: a longitudinal study of the relative effectiveness of a 3-year primary prevention program in Boys & Girls Clubs across the nation. *American Journal of Community Psychology* 1992;20(6):673–706.

Stark E, Kim A, Miller C, Borgida E. Effects of including a graphic warning label in advertisements for reduced-exposure products: implications for persuasion and policy. *Journal of Applied Social Psychology* 2008;38(2):281–93.

Stead LF, Lancaster T. Interventions for preventing tobacco sales to minors. *Cochrane Database of Systematic Reviews* 2005, Issue 1. Art. No.: CD001497. DOI: 10.1002/14651858.CD001497.pub2.

Stead M, Hastings G, Tudor-Smith C. Preventing adolescent smoking: a review of options. *Health Education Journal* 1996;55(1):31–54.

Steinberg L. Parent-adolescent relations. In: Lerner RM, Petersen AC, Brooks-Gunn J, editors. *Encyclopedia of Adolescence*. Vol. II. New York: Garland Publishing, 1991:724–8.

Steinberg L, Dahl R, Keating D, Kupfer DJ, Masten AS, Pine DS. The study of developmental psychopathology in adolescence: integrating affective neuroscience with the study of context. In: Cicchetti D, Cohen DJ, editors. *Developmental Psychopathology Vol. 2: Developmental Neuroscience*. 2nd ed. Hoboken (NJ): John Wiley & Sons, 2006:710–41.

Steinberg L, Morris AS. Adolescent development. *Annual Review of Psychology* 2001;52:83–110.

Stephens T, Kaiserman MJ, McCall DJ, Sutherland-Brown C. School-based smoking prevention: economic costs versus benefits. *Chronic Diseases in Canada* 2000;21(2):62–7.

Stevens MM, Olson AL, Gaffney CA, Tosteson TD, Mott LA, Starr P. A pediatric, practice-based, randomized trial of drinking and smoking prevention and bicycle helmet, gun, and seatbelt safety promotion. *Pediatrics* 2002;109(3):490–7.

Stoddard AM, Fagan P, Sorensen G, Hunt MK, Frazier L, Girod K. Reducing cigarette smoking among working adolescents: results from the SMART Study. *Cancer Causes & Control* 2005;16(10):1159–64.

Storr CL, Ialongo NS, Kellam SG, Anthony JC. A randomized controlled trial of two primary school intervention strategies to prevent early onset tobacco smoking. *Drug and Alcohol Dependence* 2002;66(1):51–60.

Stotts RC, Roberson PK, Hanna EY, Jones SK, Smith CK. A randomised clinical trial of nicotine patches for treatment of spit tobacco addiction among adolescents. *Tobacco Control* 2003;12(Suppl 4):iv11–iv15.

Strahan EJ, White K, Fong GT, Fabrigar LR, Zanna MP, Cameron R. Enhancing the effectiveness of tobacco package warning labels: a social psychological perspective. *Tobacco Control* 2002;11(3):183–90.

Substance Abuse and Mental Health Services Administration. FFY 2010 Annual Synar Reports: Youth Tobacco Sales, 2011. Rockville (MD): U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. <http://store.samhsa.gov/shin/content/SYNAR-11/SYNAR-11.pdf>.

Suedfeld P, Landon PB, Pargament R, Epstein YM. An experimental attack on smoking (Attitude Manipulation in Restricted Environments, III). *Substance Use & Misuse* 1972;7(4):721–33.

Sussman S. School-based tobacco use prevention and cessation: where are we going? *American Journal of Health Behavior* 2001;25(3):191–9.

Sussman S. Effects of sixty six adolescent tobacco use cessation trials and seventeen prospective studies of self-initiated quitting. *Tobacco Induced Diseases* 2002;1(1):35–81.

Sussman S, Dent CW, Brannon BR, Glowacz K, Gleason LR, Ullery S, Hansen WB, Johnson CA, Flay BR. The television, school and family smoking prevention/cessation project. IV: Controlling for program success expectancies across experimental and control conditions. *Addictive Behaviors* 1989;14(6):601–10.

Sussman S, Dent CW, Burton D, Stacy AW, Flay BR. *Developing School-Based Tobacco Use Prevention and Cessation Programs*. Thousand Oaks (CA): Sage Publications, 1995.

Sussman S, Dent CW, Lichtman KL. Project EX: outcomes of a teen smoking cessation program. *Addictive Behaviors* 2001;26(3):425–38.

Sussman S, Dent CW, Stacy AW. Project Towards No Drug Abuse: a review of the findings and future directions. *American Journal of Health Behavior* 2002;26(5):354–65.

Sussman S, Dent CW, Stacy AW, Craig S. One-year outcomes of Project Towards No Drug Abuse. *Preventive Medicine* 1998;27(4):632–42.

Sussman S, Dent CW, Stacy AW, Hodgson CS, Burton D, Flay BR. Project Towards No Tobacco Use: implementation, process and post-test knowledge evaluation. *Health Education Research* 1993a;8(1):109–23.

Sussman S, Dent CW, Stacy AW, Sun P, Craig S, Simon TR, Burton D, Flay BR. Project Towards No Tobacco Use: 1-year behavior outcomes. *American Journal of Public Health* 1993b;83(9):1245–50.

Sussman S, Lichtman K, Ritt A, Pallonen UE. Effects of thirty-four adolescent tobacco use cessation and prevention trials on regular users of tobacco products. *Substance Use & Misuse* 1999;34(11):1469–1503.

Sussman S, McCuller WJ, Zheng H, Pfingston YM, Miyano J, Dent CW. Project EX: a program of empirical research on adolescent tobacco use cessation. *Tobacco Induced Diseases* 2004;2(3):119–32.

Sussman S, Miyano J, Rohrbach LA, Dent CW, Sun P. Six-month and one-year effects of Project EX-4: a classroom-based smoking prevention and cessation intervention program. *Addictive Behaviors* 2007;32(12):3005–14.

Sussman S, Sun P. Youth tobacco use cessation: 2008 update. *Tobacco Induced Diseases* 2009;5:3.

Sussman S, Sun P, Dent CW. A meta-analysis of teen cigarette smoking cessation. *Health Psychology* 2006; 25(5):549–57.

Sussman S, Yang D, Baezconde-Garbanati L, Dent CW. Drug abuse prevention program development: results among Latino and non-Latino white adolescents. *Evaluation & the Health Professions* 2003;26(4):355–79.

Sutfin EL, Szykman LR, Moore MC. Adolescents' responses to anti-tobacco advertising: exploring the role of adolescents' smoking status and advertisement theme. *Journal of Health Communication* 2008;13(5):480–500.

Sutton CD. A hard road: finding ways to reduce teen tobacco use [editorial]. *Tobacco Control* 2000;9(1):1–2.

Swart D, Reddy P, Pitt B, Panday S. *The Prevalence & Determinants of Tobacco-Use Among Grade 8 – 10 Learners in South Africa*. Cape Town (South Africa): National Health Promotion Research & Development Group, Medical Research Council, 2001.

Szczypka G, Wakefield M, Emery S, Flay B, Chaloupka F, Slater S, Terry-McElrath Y, Saffer H. *Population Exposure to State Funded Televised Anti-Tobacco Advertising in the United States - 37 States and the District of Columbia, 1999–2003.* Chicago: University of Illinois at Chicago, 2005.

Tandemar Research. *Cigarette Packaging Study: The Evaluation of New Health Warning Messages*. Toronto (Canada): Tandemar Research, 1996.

Tang KC, Rissel C, Bauman A, Dawes A, Porter S, Fay J, Steven B. Evaluation of Kickbutts—a school and community-based smoking prevention program among a sample of year 7 and 8 students. *Health Promotion Journal of Australia* 1997;7(2):122–7.

Tangari AH, Burton S, Andrews JC, Netemeyer RG. How do antitobacco campaign advertising and smoking status affect beliefs and intentions: some similarities and differences between adults and adolescents. *Journal of Public Policy & Marketing* 2007;26(1):60–74.

Tanti C, Stukas A, Halloran MJ, Foddy M. Social identity change: shifts in social identity during adolescence. *Journal of Adolescence* 2011;34(3):555–67.

Task Force on Community Preventive Services. Recommendations regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke. *American Journal of Preventive Medicine* 2001;20(2 Suppl):S10–S15.

Task Force on Community Preventive Services. Tobacco. In: Zaza S, Briss PA, Harris KW, editors. *Preventive Services: What Works to Promote Health?* New York: Oxford University Press, 2005:3–79. <http://www.thecommunityguide.org/tobacco/Tobacco.pdf>

Tauras JA. Public policy and smoking cessation among young adults in the United States. *Health Policy* 2004; 68(3):321–32.

Tauras JA. Can public policy deter smoking escalation among young adults? *Journal of Policy Analysis and Management* 2005;24(4):771–84.

Tauras J, Powell L, Chaloupka F, Ross H. The demand for smokeless tobacco among male high school students in the United States: the impact of taxes, prices and policies. *Applied Economics* 2007;39(1):31–41.

Tauras JA, Chaloupka FJ. Determinants of smoking cessation: an analysis of young adult men and women. In: Grossman M, Hsieh C-R, editors. *Economic Analysis of Substance Use and Abuse: The Experience of Developed Countries and Lessons for Developing Countries*. Cheltenham (England): Edward Elgar Publishing, 2001:337–64.

Tauras JA, Chaloupka FJ, Farrelly MC, Giovino GA, Wakefield M, Johnston LD, O'Malley PM, Kloska DD, Pechacek TF. State tobacco control spending and youth smoking. *American Journal of Public Health* 2005a;95(2):338–44.

Tauras JA, Markowitz S, Cawley J. Tobacco control policies and youth smoking: evidence from a new era. *Advances in Health Economics and Health Services Research* 2005b;16:277–91.

Tauras JA, O'Malley PM, Johnston LD. *Effects Of Price And Access Laws On Teenage Smoking Initiation: A National Longitudinal Analysis*. Working Paper No. 8331. Cambridge (MA): National Bureau of Economic Research, 2001.

Teeboom Y. *Waarschuwende Teksten op Sigarettenpakjes* (Warning Texts on Cigarette Packs) [Dutch]. Amsterdam: Dutch Institute for Public Opinion and Market Research, 2002.

Teenage Research Unlimited. *Counter-Tobacco Advertising Exploratory Summary Report January-March 1999*. Northbrook (IL): Teenage Research Unlimited, 1999.

Telch MJ, Killen JD, McAlister AL, Perry CL, Maccoby N. Long term follow-up of a pilot project on smoking prevention with adolescents. *Journal of Behavioral Medicine* 1982;5(1):1–8.

Tell GS, Vellar OD. Noncommunicable disease risk factor intervention in Norwegian adolescents: the Oslo Youth Study. In: Hetzel BS, Berenson GS, eds. *Cardiovascular Risk Factors in Childhood: Epidemiology and Prevention*. Amsterdam (Netherlands): Elsevier Science Publishers BV;1987:203–17.

Tellis GJ. *Effective Advertising: Understanding When, How, and Why Advertising Works*. Thousand Oaks (CA): Sage Publications, 2004.

Tengs TO. Enormous variation in the cost-effectiveness of prevention: implications for public policy. *Current Issues in Public Health* 1996;2:13–7.

Tengs TO, Adams M, Pliskin J, Safran DG, Siegel JE, Weinstein MC, Graham JD. Five-hundred life-saving interventions and their cost-effectiveness. *Risk Analysis* 1995;15(3):369–90.

Tengs TO, Osgood ND, Chen LL. The cost-effectiveness of intensive national school-based anti-tobacco education: results from the tobacco policy model. *Preventive Medicine* 2001;33(6):558–70.

Tercyak KP, Peshkin BN, Abraham A, Wine L, Walker LR. Interest in genetic counseling and testing for adolescent nicotine addiction susceptibility among a sample of adolescent medicine providers attending a scientific conference on adolescent health. *Journal of Adolescent Health* 2007;41(1):42–50.

Terry-McElrath Y, Wakefield MA, Emery S, Saffer H, Szczypka G, O'Malley P, Johnston LD, Chaloupka FJ, Flay BR. State anti-smoking advertising and smoking outcomes by gender and race/ethnicity. *Ethnicity and Health* 2007;12(4):339–62.

Terry-McElrath Y, Wakefield M, Ruel E, Balch GI, Emery S, Szczypka G, Clegg-Smith K, Flay B. The effect of antismoking advertisement executional characteristics on youth comprehension, appraisal, recall, and engagement. *Journal of Health Communication* 2005;10(2):127–43.

Texas Department of State Health Services. *Texas Tobacco Prevention Initiative: Infrastructure and Baseline Data*. Texas Department of Health, Austin(TX): 2001; <http://www.dshs.state.tx.us/tobacco/ttpireps.shtm>; accessed: November 16, 2011.

The Community Guide. Home page, 2011; <http://www.thecommunityguide.org/index.html>; accessed: December 29, 2011.

The Truth. Home page, 2010; <http://www.thetruth.com>; accessed: March 16, 2010.

Thomas RE, Baker PRA, Lorenzetti D. Family-based programmes for preventing smoking by children and adolescents (Protocol). *Cochrane Database of Systematic Reviews* 2003, Issue 4. Art. No.: CD004493. DOI: 10.1002/14651858.CD004493.

Thomas RE, Baker PRA, Lorenzetti D. Family-based programmes for preventing smoking by children and adolescents. *Cochrane Database of Systematic Reviews* 2007, Issue 1. Art. No.: CD004493. DOI: 10.1002/14651858.CD004493.pub2.

Thomas RE, Perera R. School-based programmes for preventing smoking. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD001293. DOI: 10.1002/14651858.CD001293.pub2.

Thompson EL. Smoking education programs 1960–1976. *American Journal of Public Health* 1978;68(3):250–7.

Thrasher JF, Hammond D, Fong GT, Arillo-Santillán E. Smokers' reactions to cigarette package warnings with graphic imagery and with only text: a comparison between Mexico and Canada. *Salud Pública de México* 2007;49(Suppl 2):S233–S240.

Thrasher JF, Niederdeppe J, Farrelly MC, Davis KC, Ribisl KM, Haviland ML. The impact of anti-tobacco industry prevention messages in tobacco producing regions: evidence from the US truth campaign. *Tobacco Control* 2004;13(3):283–8.

Thrasher JF, Niederdeppe JD, Jackson C, Farrelly MC. Using anti-tobacco industry messages to prevent smoking among high-risk adolescents. *Health Education Research* 2006;21(3):325–37.

Tingle LR, DeSimone M, Covington B. A meta-evaluation of 11 school-based smoking prevention programs. *Journal of School Health* 2003;73(2):64–7.

Tobacco Labelling Resource Centre. Camel Filters, 2011a; <http://www.tobaccolabels.ca/gallery/canadapacks/camelfilterscanadaapr2007jpg>; accessed: January 20, 2011.

Tobacco Labelling Resource Centre. Large (Marlboro package), 2011b; <http://www.tobaccolabels.ca/gallery/emission/usconsti/large>; accessed: January 20, 2011.

Tobacco Labelling Resource Centre. Original (Australian warning), 2011c; <http://www.tobaccolabels.ca/gallery/australi/aussi!~76/original>; accessed: January 20, 2011.

Tobler NS, Roona MR, Ochshorn P, Marshall DG, Streke AV, Stackpole KM. School-based adolescent drug prevention programs: 1998 meta-analysis. *Journal of Primary Prevention* 2000;20(4):275–336.

Tobler NS, Stratton HH. Effectiveness of school-based drug prevention programs: a meta-analysis of the research. *Journal of Primary Prevention* 1997;18(1):71–128.

Twenge JM. *Generation Me: Why Today's Young Americans Are More Confident, Assertive, Entitled—and More Miserable Than Ever Before*. New York: Free Press, 2006.

U.K. Department of Health. *Consultation on the Introduction of Picture Warnings on Tobacco Packs*. London: U.K. Department of Health, 2006.

Unger JB, Cruz TB, Schuster D, Flora JA, Johnson CA. Measuring exposure to pro- and anti-tobacco marketing among adolescents: intercorrelations among measures and associations with smoking status. *Journal of Health Communication* 2001;6(1):11–29.

Unger JB, Rohrbach LA, Howard KA, Cruz TB, Johnson CA, Chen X. Attitudes toward anti-tobacco policy among California youth: associations with smoking status, psychosocial variables and advocacy actions. *Health Education Research* 1999;14(6):751–63.

University of Colorado at Boulder. Program Matrix, 2010; <http://www.colorado.edu/cspv/blueprints/matrixfiles/matrix.pdf>; accessed: March 16, 2010.

U.S. Department of Health and Human Services. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*. Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1989. DHHS Publication No. (CDC) 89-8411.

U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Young People. A Report of the Surgeon General.* Atlanta (GA): U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.

U.S. Department of Health and Human Services. *State Oversight of Tobacco Sales to Minors*. Rockville (MD): U.S. Department of Health and Human Services, Office of the Inspector General, 1995. OEI-02-94-00270.

U.S. Department of Health and Human Services. *Put Prevention into Practice.* Clinician's Handbook of Preventive Services, 2nd ed. Washington: U.S. Government Printing Office, 1998.

U.S. Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington: U.S. Government Printing Office, 2000a.

U.S. Department of Health and Human Services. *Reducing Tobacco Use. A Report of the Surgeon General.* Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000b.

U.S. Department of the Treasury. Federal Excise Tax Increase and Related Provisions, 2009; http://www.ttb.gov/main_pages/schip-summary.shtml; accessed: May 24, 2011.

U.S. Food and Drug Administration. Cigarette health warnings, 2011; <http://www.fda.gov/TobaccoProducts/Labeling/CigaretteWarningLabels/default.htm>; accessed: July 6, 2011.

U.S. Preventive Services Task Force. *Counseling to Prevent Tobacco Use and Tobacco-Caused Disease. Recommendation Statement.* Rockville (MD): Agency for Healthcare Research and Quality, 2003.

U.S. Preventive Services Task Force. Counseling and interventions to prevent tobacco use and tobacco-caused disease in adults and pregnant women: U.S. Preventive services Task Force reaffirmation recommendation statement. *Annals of Internal Medicine* 2009;150(8):551–5.

Vallone D. Media and social marketing: the next generation of NCI state and community tobacco control policy research and dissemination. Presentation at the Society for Research on Nicotine and Tobacco; February 23, 2007; Austin (TX).

Vartiainen E, Fallonen U, McAlister AL, Puska P. Eight-year follow-up results of an adolescent smoking prevention program: the North Karelia Youth Project. *American Journal of Public Health* 1990;80(1):78–9.

Vartiainen E, Paavola M, McAlister A, Puska P. Fifteen-year follow-up of smoking prevention effects in the North Karelia Youth Project. *American Journal of Public Health* 1998;88(1):81–5.

Vartiainen E, Pallonen U, McAlister A, Koskela K, Puska P. Effect of two years of educational intervention on adolescent smoking (the North Karelia Youth Project). *Bulletin of the World Health Organization* 1983;61(3):529–32.

Vartiainen E, Pallonen U, McAlister A, Koskela K, Puska P. Four-year follow-up results of the smoking prevention program in the North Karelia Youth Project. *Preventive Medicine* 1986;15(6):692–8.

Vélez MB. The role of public social control in urban neighborhoods: a multilevel analysis of victimization risk. *Criminology* 2001;39(4):837–64.

Vickers KS, Thomas JL, Patten CA, Mrazek DA. Prevention of tobacco use in adolescents: review of current findings and implications for healthcare providers. *Current Opinion in Pediatrics* 2002;14(6):708–12.

Viswanath K, Breen N, Meissner H, Moser RP, Hesse B, Steele WR, Rakowski W. Cancer knowledge and disparities in the information age. *Journal of Health Communication* 2006;11(Suppl 1):S1–S17.

Wakefield M, Balch GI, Ruel E, Terry-McElrath Y, Szczypka G, Flay B, Emery S, Clegg-Smith K. Youth responses to anti-smoking advertisements from tobacco control agencies, tobacco companies, and pharmaceutical companies. *Journal of Applied Social Psychology* 2005a; 35(9):1894–910.

Wakefield M, Chaloupka F. Effectiveness of comprehensive tobacco control programmes in reducing teenage smoking in the USA. *Tobacco Control* 2000;9(2):177–86.

Wakefield M, Durrant R, Terry-McElrath Y, Ruel E, Balch GI, Anderson S, Szczypka G, Emery S, Flay B. Appraisal of anti-smoking advertising by youth at risk for regular smoking: a comparative study in the United States, Australia, and Britain. *Tobacco Control* 2003a;12(Suppl 2):ii82–ii86.

Wakefield M, Flay B, Nichter M, Giovino G. Effects of anti-smoking advertising on youth smoking: a review. *Journal of Health Communication* 2003b;8(3):229–47.

Wakefield M, Flay B, Nichter M, Giovino G. Role of the media in influencing trajectories of youth smoking. *Addiction* 2003c;98(Suppl 1):S79–S103.

Wakefield M, Forster J. Growing evidence for new benefit of clean indoor air laws: reduced adolescent smoking [editorial]. *Tobacco Control* 2005;14(5):292–3.

Wakefield M, Giovino G. Teen penalties for tobacco possession, use, and purchase: evidence and issues. *Tobacco Control* 2003;12(Suppl 1):i6–i13.

Wakefield M, Szczypka G, Terry-McElrath Y, Emery S, Flay B, Chaloupka F, Saffer H. Mixed messages on tobacco: comparative exposure to public health, tobacco company- and pharmaceutical company-sponsored tobacco-related television campaigns in the United States, 1999–2003. *Addiction* 2005b;100(12):1875–83.

Wakefield M, Terry-McElrath Y, Emery S, Saffer H, Chaloupka FJ, Szczypka G, Flay B, O'Malley PM, Johnston LD. Effect of televised, tobacco company-funded smoking prevention advertising on youth smoking-related beliefs, intentions, and behavior. *American Journal of Public Health* 2006;96(12):2154–60.

Wakefield MA, Chaloupka FJ, Kaufman NJ, Orleans CT, Barker DC, Ruel EE. Effect of restrictions on smoking at home, at school, and in public places on teenage smoking: cross sectional study. *BMJ (British Medical Journal)* 2000;321(7257):333–7.

Walsh MM, Ellison J, Hilton JF, Chesney M, Ernster VL. Spit (smokeless) tobacco use by high school baseball athletes in California. *Tobacco Control* 2000;9(Suppl 2):ii32–ii39.

Walsh MM, Hilton JF, Ellison JA, Gee L, Chesney MA, Tomar SL, Ernster VL. Spit (smokeless) tobacco intervention for high school athletes: results after 1 year. *Addictive Behaviors* 2003;28(6):1095–113.

Walsh MM, Hilton JF, Masouredis CM, Gee L, Chesney MA, Ernster VL. Smokeless tobacco cessation intervention for college athletes: results after 1 year. *American Journal of Public Health* 1999;89(2):228–34.

Walter HJ. Primary prevention of chronic disease among children: the School-Based "Know Your Body" Intervention Trials. *Health Education Quarterly* 1989; 16(2):201–14.

Wang LY, Crossett LS, Lowry R, Sussman S, Dent CW. Cost-effectiveness of a school-based tobacco-use prevention program. *Archives of Pediatrics & Adolescent Medicine* 2001;155(9):1043–50.

Warner KE. Clearing the airwaves: the cigarette ad ban revisited. *Policy Analysis* 1979;5(4):435–50.

Warner KE. Charting the science of the future: where tobacco-control research must go. *American Journal of Preventive Medicine* 2007a;33(6 Suppl):S314–S317.

Warner KE. To educate or not to educate: is that the question? *Addiction* 2007b;102(9):1352–3.

Warner KE, Jacobson PD, Kaufman NJ. Innovative approaches to youth tobacco control: introduction and overview. *Tobacco Control* 2003;12(Suppl 1):i1–i15.

Warren CW, Riley L, Asma S, Eriksen MP, Green L, Blanton C, Loo C, Batchelor S, Yach D. Tobacco use by youth: a surveillance report from the Global Youth Tobacco Survey project. *Bulletin of the World Health Organization* 2000;78(7):868–76.

Warren JR, Hecht ML, Wagstaff DA, Elek E, Ndiaye K, Dustman P, Marsiglia FF. Communicating prevention: the effects of the *keepin' it REAL* classroom videotapes and televised PSAs on middle-school students' substance use. *Journal of Applied Communication Research* 2006;34(2):209–27.

Wechsler H, Kelley K, Seibring M, Kuo M, Rigotti NA. College smoking policies and smoking cessation programs: results of a survey of college health center directors. *Journal of American College Health* 2001;49(5): 205–12.

Weiss CH, Murphy-Graham E, Birkeland S. An alternate route to policy influence: how evaluations affect D.A.R.E. *American Journal of Evaluation* 2005;26(1):12–30.

Weiss JW, Cen S, Schuster DV, Unger JB, Johnson CA, Mouttapa M, Schreiner WS, Cruz TB. Longitudinal effects of protobacco and anti-tobacco messages on adolescent smoking susceptibility. *Nicotine & Tobacco Research* 2006;8(3):455–65.

West SL, O'Neal KK. Project D.A.R.E. outcome effectiveness revisited. *American Journal of Public Health* 2004;49(6):1027–9.

White V, Tan N, Wakefield M, Hill D. Do adult focused anti-smoking campaigns have an impact on adolescents? The case of the Australian National Tobacco Campaign. *Tobacco Control* 2003;12(Suppl 2):ii23–ii29.

White V, Webster B, Wakefield M. Do graphic health warning labels have an impact on adolescents' smoking-related beliefs and behaviours? *Addiction* 2008a;103(9):1562–71.

White VM, Hayman J, Hill D. Can population-based tobacco-control policies change smoking behaviors of adolescents from all socioeconomic groups: findings from Australia: 1987–2005. *Cancer Causes & Control* 2008b;19(6):631–40.

Whittaker R, Borland R, Bullen C, Lin RB, McRobbie H, Rodgers A. Mobile phone-based interventions for smoking cessation. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD006611. DOI: 10.1002/14651858.CD006611.pub2.

Widome R, Forster JL, Hannan PJ, Perry CL. Longitudinal patterns of youth access to cigarettes and smoking progression: Minnesota Adolescent Community Cohort (MACC) study (2000–2003). *Preventive Medicine* 2007; 45(6):442–6.

Wiehe SE, Garrison MM, Christakis DA, Ebel BE, Rivara FP. A systematic review of school-based smoking prevention trials with long-term follow-up. *Journal of Adolescent Health* 2005;36(3):162–9.

Wilderdom. ZCalc, 2012. <http://www.wilderdom.com/research/ZCalc.xls>; accessed: January 30, 2012.

Willemsen MC. The new EU cigarette health warnings benefit smokers who want to quit the habit: results from the Dutch Continuous Survey of Smoking Habits. *European Journal of Public Health* 2005;15(4):389–92.

Willemsen MC, Simons C, Zeeman G. Impact of the new EU health warnings on the Dutch quit line. *Tobacco Control* 2002;11(4):381–2.

Williams CL, Perry CL, Dudovitz B, Veblen-Mortenson S, Anstine PS, Komro KA, Toomey T. A home-based prevention program for sixth grade alcohol use: results from Project Northland. *Journal of Primary Prevention* 1995;16(2):125–47.

Wilson KM, Klein JD, Blumkin AK, Gottlieb M, Winickoff JP. Tobacco-smoke exposure in children who live in multiunit housing. *Pediatrics* 2011;127(1):85–92.

Winickoff JP, Gottlieb M, Mello MM. Regulation of smoking in public housing. *New England Journal of Medicine* 2010;362(24):2319–25.

Winkleby MA, Feighery E, Dunn M, Kole S, Ahn D, Killen JD. Effects of an advocacy intervention to reduce smoking among teenagers. *Archives of Pediatrics & Adolescent Medicine* 2004;158(3):269–75.

Winkleby MA, Fortmann SP, Rockhill B. Cigarette smoking trends in adolescents and young adults: the Stanford Five-City Project. *Preventive Medicine* 1993;22(3): 325–34.

Winkleby MA, Taylor CB, Jatulis D, Fortmann SP. The long-term effects of a cardiovascular disease prevention trial: the Stanford Five-City Project. *American Journal of Public Health* 1996;86(12):1773–9.

Wolfson M, Forster JL, Claxton AJ, Murray DM. Adolescent smokers' provision of tobacco to other adolescents. *American Journal of Public Health* 1997;87(4):649–51.

Worden JK, Flynn BS, Geller BM, Chen M, Shelton LG, Secker-Walker RH, Solomon DS, Solomon LJ, Couchey S, Constanza MC. Development of a smoking prevention mass media program using diagnostic and formative research. *Preventive Medicine* 1988;17(5):531–58.

Worden JK, Flynn BS, Secker-Walker RH, Balch GI, Rudman G, Goldman LK, Glantz SA. Antismoking advertising campaigns for youth [letter]. *JAMA: the Journal of the American Medical Association* 1998;280(4):323–4.

Worden JK, Flynn BS, Solomon LJ, Secker-Walker RH, Badger GJ, Carpenter JH. Using mass media to prevent cigarette smoking among adolescent girls. *Health Education Quarterly* 1996;23(4):453–68.

World Health Organization. WHO Framework Convention on Tobacco Control, 2003; <http://www.who.int/fctc/text_download/en/index.html>; accessed: January 31, 2012.

Wu Y, Stanton BF, Galbraith J, Kaljee L, Cottrell L, Li X, Harris CV, D'Alessandri D, Burns JM. Sustaining and broadening intervention impact: a longitudinal randomized trial of 3 adolescent risk reduction approaches. *Pediatrics* 2003;111(1):e32–e38.

Yanovitzky I, Stryker J. Mass media, social norms, and health promotion efforts: a longitudinal study of media effects on youth binge drinking. *Communication Research* 2001;28(2):208–39.

YouTube. Thanks, Tobacco: You Killed My Mom, April 13, 2007; <http://www.youtube.com/watch?v=u_8BerrJg0M>; accessed: March 16, 2010.

Zack SL, Hoffman J, Nemes S, Weil J, Hess L. Participation in a successful and multifaceted teen cessation program. Paper presented at the National Conference on Tobacco or Health; May 5, 2005; Chicago.

Zaza S, Briss PA, Harris, KW, editors. Tobacco. In: *The Guide to Community Preventive Services: What Works to Promote Health?* Atlanta (GA): Oxford University Press; 2005:3–79.

Zavela, Harrison, Owens. APHHA 119th meeting poster presentation, 1991.

Zhao G, Pechmann C. The impact of regulatory focus on adolescents' response to antismoking advertising campaigns. *Journal of Marketing Research* 2007;44(4): 671–87.

Zheng H, Sussman S, Chen X, Wang Y, Xia J, Gong J, Liu C, Shan J, Unger J, Anderson Johnson C. Project EX: a teen smoking cessation initial study in Wuhan, China. *Addictive Behaviors* 2004;29(9):1725–33.

Table 6.9 Studies of the effectiveness of school-based interventions to reduce tobacco use

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hurd et al. 1980 (Not reported) 8 month (m) intervention Greatest: group nonrandomized trial Fair (4 limitations) Schools (junior high schools: 7th grade)	Minneapolis-St. Paul, Minnesota School-based education 3 arms; resist social pressures; immediate harmful effects; model behavior-nonsmoking peer leaders and older role models; commitment activity; videotapes, role-playing; 5 class sessions in health and science classes Compared with usual care	All junior high schools in district: n = 4 1: control 2: monitored control 3: curriculum + monitor 4: curriculum + monitor + other activities 7th-grade students n = 1,636 (99%) n = 1,245 (76%) with pre + post data 1: 440 2: 332 3: 365 4: 389	(1) Student self-reported smoker (not an experimenter)	I-3 13.7%	I-3 20.3%	+6.6 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hurd et al. 1980 (Not reported) 8 month (m) intervention Greatest: group nonrandomized trial Fair (4 limitations) Schools (junior high schools: 7th grade)	Minneapolis-St. Paul, Minnesota School-based education 3 arms; resist social pressures; immediate harmful effects; model behavior-nonsmoking peer leaders and older role models; commitment activity; videotapes, role-playing; 5 class sessions in health and science classes Compared with usual care	All junior high schools in district: n = 4 1: control 2: monitored control 3: curriculum + monitor 4: curriculum + monitor + other activities 7th-grade students n = 1,636 (99%) n = 1,245 (76%) with pre + post data 1: 440 2: 332 3: 365 4: 389	(1) Student self-reported smoker (not an experimenter)	I-4 4.9%	I-4 5.9%	+1.0 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hurd et al. 1980 (Not reported) 8 month (m) intervention Greatest: group nonrandomized trial Fair (4 limitations) Schools (junior high schools: 7th grade)	Minneapolis-St. Paul, Minnesota School-based education 3 arms; resist social pressures; immediate harmful effects; model behavior-nonsmoking peer leaders and older role models; commitment activity; videotapes, role-playing; 5 class sessions in health and science classes Compared with usual care	All junior high schools in district: n = 4 1: control 2: monitored control 3: curriculum + monitor 4: curriculum + monitor + other activities 7th-grade students n = 1,636 (99%) n = 1,245 (76%) with pre + post data 1: 440 2: 332 3: 365 4: 389	(1) Student self-reported smoker (not an experimenter)	C-1 5.7%	C-1 9.6%	+3.9 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hurd et al. 1980 (Not reported) 8 month (m) intervention Greatest: group nonrandomized trial Fair (4 limitations) Schools (junior high schools: 7th grade)	Minneapolis-St. Paul, Minnesota School-based education 3 arms; resist social pressures; immediate harmful effects; model behavior-nonsmoking peer leaders and older role models; commitment activity; videotapes, role-playing; 5 class sessions in health and science classes Compared with usual care	All junior high schools in district: n = 4 1: control 2: monitored control 3: curriculum + monitor 4: curriculum + monitor + other activities 7th-grade students n = 1,636 (99%) n = 1,245 (76%) with pre + post data 1: 440 2: 332 3: 365 4: 389	(1) Student self-reported smoker (not an experimenter)	C-2 9.0%	C-2 21.1%	+12.1 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hurd et al. 1980 (Not reported) 8 month (m) intervention Greatest: group nonrandomized trial Fair (4 limitations) Schools (junior high schools: 7th grade)	Minneapolis-St. Paul, Minnesota School-based education 3 arms; resist social pressures; immediate harmful effects; model behavior-nonsmoking peer leaders and older role models; commitment activity; videotapes, role-playing; 5 class sessions in health and science classes Compared with usual care	All junior high schools in district: n = 4 1: control 2: monitored control 3: curriculum + monitor 4: curriculum + monitor + other activities 7th-grade students n = 1,636 (99%) n = 1,245 (76%) with pre + post data 1: 440 2: 332 3: 365 4: 389	(1) Student self-reported smoker (not an experimenter)	Consolidated I 3-4 9.2%	I 3-4 12.9%	-3.7 percentage points not reported	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hurd et al. 1980 (Not reported) 8 month (m) intervention Greatest: group nonrandomized trial Fair (4 limitations) Schools (junior high schools: 7th grade)	Minneapolis-St. Paul, Minnesota School-based education 3 arms; resist social pressures; immediate harmful effects; model behavior-nonsmoking peer leaders and older role models; commitment activity; videotapes, role-playing; 5 class sessions in health and science classes Compared with usual care	All junior high schools in district: n = 4 1: control 2: monitored control 3: curriculum + monitor 4: curriculum + monitor + other activities 7th-grade students n = 1,636 (99%) n = 1,245 (76%) with pre + post data 1: 440 2: 332 3: 365 4: 389	(1) Student self-reported smoker (not an experimenter)	Consolidated C 1-2 7.1%	C 1-2 14.5%		6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1980 (1978) Greatest: group randomized trial Fair (4 limitations) Schools (high schools; 10th grade)	Stanford area, California School-based education, smoking prevention/cessation curriculum, 4 45-minute sessions delivered by trained teachers in health class; social pressures, selling strategies, modeled counter self-verbalizations, resisting peer pressures; cessation procedures; physiological measures-health effects Compared with usual care	All high schools in 2 districts: n = 5 I: n = 3 C: n = 2 10th-grade students in study schools I: 498 C: 399	(1) Student self-reported smoking (%) (prevalence)	I Day 13.9 Week 19.5 Month 29.2	Day 9.7 Week 16.3 Month 23.6	Day-2.8 percentage points not significant Week –3.5 percentage points Post $p < 0.05$ Month –9.7 percentage points Post $p < 0.05$	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1980 (1978) Greatest: group randomized trial Fair (4 limitations) Schools (high schools; 10th grade)	Stanford area, California School-based education, smoking prevention/cessation curriculum, 4 45-minute sessions delivered by trained teachers in health class; social pressures, selling strategies, modeled counter self-verbalizations, resisting peer pressures; cessation procedures; physiological measures-health effects Compared with usual care	All high schools in 2 districts: n = 5 I: n = 3 C: n = 2 10th-grade students in study schools I: 498 C: 399	(1) Student self-reported smoking (%) (prevalence)	C Day14.5 Week 21.6 Month 26.3	Day 21.9 Week 30.4	Day-2.8 percentage points not significant Week –3.5 percentage points Post $p < 0.05$ Month –9.7 percentage points Post $p < 0.05$	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1980 (1978) Greatest: group randomized trial Fair (4 limitations) Schools (high schools; 10th grade)	Stanford area, California School-based education, smoking prevention/cessation curriculum, 4 45-minute sessions delivered by trained teachers in health class; social pressures, selling strategies, modeled counter self-verbalizations, resisting peer pressures; cessation procedures; physiological measures-health effects Compared with usual care	All high schools in 2 districts: n = 5 I: n = 3 C: n = 2 10th-grade students in study schools I: 498 C: 399	(3) Student self-reported “general opinion about smoking”	I Not reported	I 68%	+3 percentage points not significant	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1980 (1978) Greatest: group randomized trial Fair (4 limitations) Schools (high schools; 10th grade)	Stanford area, California School-based education, smoking prevention/cessation curriculum, 4 45-minute sessions delivered by trained teachers in health class; social pressures, selling strategies, modeled counter self-verbalizations, resisting peer pressures; cessation procedures; physiological measures-health effects Compared with usual care	All high schools in 2 districts: n = 5 I: n = 3 C: n = 2 10th-grade students in study schools I: 498 C: 399	(3) Student self-reported "general opinion about smoking"	C Not reported	C 65%	+3 percentage points not significant	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1980 (1978) Greatest: group randomized trial Fair (4 limitations) Schools (high schools; 10th grade)	Stanford area, California School-based education, smoking prevention/cessation curriculum, 4 45-minute sessions delivered by trained teachers in health class; social pressures, selling strategies, modeled counter self-verbalizations, resisting peer pressures; cessation procedures; physiological measures-health effects Compared with usual care	All high schools in 2 districts: n = 5 I: n = 3 C: n = 2 10th-grade students in study schools I: 498 C: 399	(4) Student knowledge (9 survey questions)	I various	I various	Increased. 7 of 9 questions with statistically significant difference	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1980 (1978) Greatest: group randomized trial Fair (4 limitations) Schools (high schools; 10th grade)	Stanford area, California School-based education, smoking prevention/cessation curriculum, 4 45-minute sessions delivered by trained teachers in health class; social pressures, selling strategies, modeled counter self-verbalizations, resisting peer pressures; cessation procedures; physiological measures-health effects Compared with usual care	All high schools in 2 districts: n = 5 I: n = 3 C: n = 2 10th-grade students in study schools I: 498 C: 399	(4) Student knowledge (9 survey questions)	C various	C various	Increased. 7 of 9 questions with statistically significant difference	6 months
Denson and Stretch 1981 (1976–78) Greatest: group randomized trial Fair (3 limitations) Schools (elementary schools)	Saskatoon, Canada School-based education for 6th or 7th grades; 4 sessions; film, lectures, discussion; harmful effects of smoking/ addiction	Elementary schools (n = 6) Matched pairs with assignment	1) Student self-reported tobacco use—regular smoking at end of grade 8 (prevalence)	1976 I 25.7%	1978 I 17.5%	-6.5 percentage points	2 years (post)

Table 6.9 **Continued**

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Denson and Stretch 1981 (1976–78) Greatest: group randomized trial Fair (3 limitations) Schools (elementary schools)	Saskatoon, Canada School-based education for 6th or 7th grades; 4 sessions; film, lectures, discussion; harmful effects of smoking/ addiction	Elementary schools (n = 6) Matched pairs with assignment	1) Student self-reported tobacco use—regular smoking at end of grade 8 (prevalence)	1976 C 27.8%	1978 C 26.1% p <0.01		2 years (post)
Denson and Stretch 1981 (1976–78) Greatest: group randomized trial Fair (3 limitations) Schools (elementary schools)	Saskatoon, Canada School-based education for 6th or 7th grades; 4 sessions; film, lectures, discussion; harmful effects of smoking/ addiction	8th graders in annual surveys (90% response rates)	(1) Interval self-reported uptake of smoking (Initiation between 7th and 8th grades)	1976 I 14.1%	1978 I 17.5%	-12.3 percentage points p <0.001	2 years (post)
Denson and Stretch 1981 (1976–78) Greatest: group randomized trial Fair (3 limitations) Schools (elementary schools)	Saskatoon, Canada School-based education for 6th or 7th grades; 4 sessions; film, lectures, discussion; harmful effects of smoking/ addiction	8th graders in annual surveys (90% response rates)	(1) Interval self-reported uptake of smoking (Initiation between 7th and 8th grades)	1976 C 10.4%	1978 C 26.1%	-12.3 percentage points p <0.001	2 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Denson and Stretch 1981 (1976–78) Greatest: group randomized trial Fair (3 limitations) Schools (elementary schools)	Compared with usual care	I 1976 pre 315 1978 post 292	(4) Student responses (yes) "do you believe smoking is a form of drug addiction?" (knowledge)	1976 I Not reported	1978 I 62%	More (post) +23 percentage points $p < 0.05$	2 years (post)
Denson and Stretch 1981 (1976–78) Greatest: group randomized trial Fair (3 limitations) Schools (elementary schools)	Compared with usual care	C 1976 pre 273 1978 post 307	(4) Student responses (yes) "do you believe smoking is a form of drug addiction?" (knowledge)	1976 C Not reported	1978 C 39%	More (post) +23 percentage points $p < 0.05$	2 years (post)
Evans et al. 1981 (Not reported) Greatest: other design with a concurrent comparison group Fair (4 limitations) Schools (middle schools; 7th grade)	Houston, Texas School-based education; delivered during physical education time with graduate + undergraduate coordinators; social learning theory, immediate consequences of smoking, social pressure coping Compared with usual care	Selected, matched junior high schools N = 13 schools assigned to 1 of 6 study conditions	(1) Student self-reported regular/frequent tobacco use (2 or more cigarettes per day) (prevalence) E1 versus C1 arms	I1 2.8%	I1 9.5%	-5.1 percentage points	3 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Evans et al. 1981 (Not reported) Greatest: other design with a concurrent comparison group Fair (4 limitations) Schools (middle schools; 7th grade)	Houston, Texas School-based education; delivered during physical education time with graduate + undergraduate coordinators; social learning theory, immediate consequences of smoking, social pressure coping Compared with usual care	Selected, matched junior high schools N = 13 schools assigned to 1 of 6 study conditions	(1) Student self-reported regular/ frequent tobacco use (2 or more cigarettes per day) (prevalence) E1 versus C1 arms	C1 2.4%	C1 14.2% Post differences p <0.001	-5.1 percentage points	3 years (post)
Evans et al. 1981 (Not reported) Greatest: other design with a concurrent comparison group Fair (4 limitations) Schools (middle schools; 7th grade)	Houston, Texas School-based education; delivered during physical education time with graduate + undergraduate coordinators; social learning theory, immediate consequences of smoking, social pressure coping Compared with usual care	Selected, matched junior high schools N = 13 schools assigned to 1 of 6 study conditions	3) Student self-reported intentions to smoke-median intention scores (lower score=greater intention to smoke) (attitudes)	I1 4.91	I1-2-3 4.86	Lower intentions to smoke (not statistically significant)	3 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Evans et al. 1981 (Not reported) Greatest: other design with a concurrent comparison group Fair (4 limitations) Schools (middle schools; 7th grade)	Houston, Texas School-based education; delivered during physical education time with graduate + undergraduate coordinators; social learning theory, immediate consequences of smoking, social pressure coping Compared with usual care	Selected, matched junior high schools N = 13 schools assigned to 1 of 6 study conditions	3) Student self-reported intentions to smoke-median intention scores (lower score=greater intention to smoke) (attitudes)	C1 4.89	C1-2-3 4.79 Post differences p=0.21	Lower intentions to smoke (not statistically significant)	3 years (post)
Evans et al. 1981 (Not reported) Greatest: other design with a concurrent comparison group Fair (4 limitations) Schools (middle schools; 7th grade)	Houston, Texas School-based education; delivered during physical education time with graduate + undergraduate coordinators; social learning theory, immediate consequences of smoking, social pressure coping Compared with usual care	Students (consent) participating I 7th pre 284 9th post 995	(4) Student level of knowledge about smoking	I1 Not Reported	I1 Not Reported	Not reported (scores related to smoking intention and behavior)	3 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Evans et al. 1981 (Not reported) Greatest: other design with a concurrent comparison group Fair (4 limitations) Schools (middle schools; 7th grade)	Houston, Texas School-based education; delivered during physical education time with graduate + undergraduate coordinators; social learning theory, immediate consequences of smoking, social pressure coping Compared with usual care	Students (consent) participating C 7th pre 165 9th post 408	(4) Student level of knowledge about smoking	C1 Not Reported	C1 Not Reported	Not reported (scores related to smoking intention and behavior)	3 years (post)
Pederson et al. 1981 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 4–6)	London, Canada School-based education; 12 classroom hours; curriculum based on ALA publication Compared with usual care Note: subset of a larger study	Selected public school classrooms N = 8 classrooms I: n = 4 C: n = 4 Students in study classrooms N = 99 4th graders N = 101 6th graders	(1) Student self-reported smoking behaviors (prevalence) “Regular”	Not Reported	Not Reported	No significant effect	Post intervention

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Pederson et al. 1981 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 4–6)	London, Canada School-based education; 12 classroom hours; curriculum based on ALA publication Compared with usual care Note: subset of a larger study	Selected public school classrooms N = 8 classrooms I: n = 4 C: n = 4 Students in study classrooms N = 99 4th graders N = 101 6th graders	"Experimental"	Not Reported	Not Reported	No significant effect	Post intervention
Pederson et al. 1981 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 4–6)	London, Canada School-based education; 12 classroom hours; curriculum based on ALA publication Compared with usual care Note: subset of a larger study	Selected public school classrooms N = 8 classrooms I: n = 4 C: n = 4 Students in study classrooms N = 99 4th graders N = 101 6th graders	(3) Student self-reported attitudes (attitudes)	Not Reported	Not Reported	Attitudes of I group became less negative $p < 0.10$	Post intervention

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Pederson et al. 1981 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 4–6)	London, Canada School-based education; 12 classroom hours; curriculum based on ALA publication Compared with usual care Note: subset of a larger study	Selected public school classrooms N = 8 classrooms I: n = 4 C: n = 4 Students in study classrooms N = 99 4th graders N = 101 6th graders	(4) Student mean knowledge scores (estimated from chart) (knowledge)	I 8.9	I 11.8	Increased 11.6%; F(1,196) = 13.67 p <0.01	Post intervention
Pederson et al. 1981 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 4–6)	London, Canada School-based education; 12 classroom hours; curriculum based on ALA publication Compared with usual care Note: subset of a larger study	Selected public school classrooms N = 8 classrooms I: n = 4 C: n = 4 Students in study classrooms N = 99 4th graders N = 101 6th graders	(4) Student mean knowledge scores (estimated from chart) (knowledge)	C 12.1	C 10.4	Increased 11.6%; F(1,196) = 13.67 p <0.01	Post intervention

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Coe et al. 1982 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (public middle)	St. Louis, Missouri School-based education, 8 1-hour sessions delivered by trained medical students, peer pressures, mass media advertising, class incentive awards Compared with usual care	Selected public middle schools: 2 One class in each school I: n = 2 classes C: n = 2 classes 7th or 8th graders School A/School B I Pre 39/63 1 year 28/38 C Pre 52/72 1 year 41/43	(1) Student self-reported smoking (at least one cigarette in past 30 days) (prevalence)	I A 17.9% B 2.6%	I A 14.3% B 10.3%	A -20.7 B -1.4	1 year
Coe et al. 1982 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (public middle)	St. Louis, Missouri School-based education, 8 1-hour sessions delivered by trained medical students, peer pressures, mass media advertising, class incentive awards Compared with usual care	Selected public middle schools: 2 One class in each school I: n = 2 classes C: n = 2 classes 7th or 8th graders School A/School B I Pre 39/63 1 year 28/38 C Pre 52/72 1 year 41/43	(1) Student self-reported smoking (at least one cigarette in past 30 days) (prevalence)	C A 9.8% B 9.5	C A 34.1% B 18.6%	percentage points (Not Reported)	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Coe et al. 1982 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (public middle)	St. Louis, Missouri School-based education, 8 1-hour sessions delivered by trained medical students, peer pressures, mass media advertising, class incentive awards Compared with usual care	Selected public middle schools: 2 One class in each school I: n = 2 classes C: n = 2 classes 7th or 8th graders School A/School B I Pre 39/63 1 year 28/38 C Pre 52/72 1 year 41/43	(3) Student self-reported attitude toward smoking (less favorable)	I A Not reported B Not reported	I A 22.8% B 37.0%	A -9.1 B -1.4	1 year
Coe et al. 1982 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (public middle)	St. Louis, Missouri School-based education, 8 1-hour sessions delivered by trained medical students, peer pressures, mass media advertising, class incentive awards Compared with usual care	Selected public middle schools: 2 One class in each school I: n = 2 classes C: n = 2 classes 7th or 8th graders School A/School B I Pre 39/63 1 year 28/38 C Pre 52/72 1 year 41/43	(3) Student self-reported attitude toward smoking (less favorable)	C A Not Reported B Not reported	C A 31.9% B 30.0%	Percentage points (Not Reported)	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Telch et al. 1982; McAlister et al. 1980 (1977–79) Greatest: group nonrandomized trial Fair (4 limitations) Schools: (junior high schools: 7th grade) Project CLASP (Counseling Leadership Against Smoking Pressure)	San Jose, California School-based education, (drug abuse prevention); social pressures training; 6 class sessions in year 1; 2 45-minute sessions in year 2 (smoking focus in first session); peer-led trained teams of high school students Compared with school-based education (school health curriculum project with no special resistance skills training)	Selected junior high school (2) I school matched to C school on demographics 7th-grade students I Baseline 353% 21 m 340 33 m 82.5% C Baseline 217 21 m 186 33 m 80.2%	(1) Student self-reported smoking during the preceeding week (proxy of weekly) (prevalence)	Estimated from graph: I (2%)	I 21 m 7.1% 33 m 5%	At 33 months -11 percentage points (post difference -10 percentage points $x^2 = 12.2$ $p < 0.001$)	33 months (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Telch et al. 1982; McAlister et al. 1980 (1977–79) Greatest: group nonrandomized trial Fair (4 limitations) Schools: (junior high schools: 7th grade) Project CLASP (Counseling Leadership Against Smoking Pressure)	San Jose, California School-based education, (drug abuse prevention); social pressures training; 6 class sessions in year 1; 2 45-minute sessions in year 2 (smoking focus in first session); peer-led trained teams of high school students Compared with school-based education (school health curriculum project with no special resistance skills training)	Selected junior high school (2) I school matched to C school on demographics 7th-grade students I Baseline 353% 21 m 340 33 m 82.5% C Baseline 217 21 m 186 33 m 80.2%	(1) Student self-reported smoking during the preceeding week (proxy of weekly) (prevalence)	Estimated from graph: C (1%)	C 21 m 18.8% 33 m 15%	At 33 months -11 percentage points (post difference -10 percentage points $x^2 = 12.2$ $p < 0.001$)	33 months (9th grade)
Alexander et al. 1983 (1979–80) Greatest: group randomized trial Fair (4 limitations) Schools (years 5-6)	New South Wales, Australia School-based education; 9 weeks x 1.5 hours/week led by class teacher (1-day training); increase knowledge, recognize pressures to smoke Compared with usual care	Schools: n = 88 Students in years 5–6 (aged 10–12 years) with complete data n = 5,616 (86%) at analysis I = 2,782 C = 2,904	(1) Self-reported smoker (any use in the last 4 weeks) Monthly Note: Recalculated totals from available data	I 10.39%	I 18.66%	-1.07 percentage points Not Reported (Not Significant subgroups)	6 months (post 1 year)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Alexander et al. 1983 (1979–80) Greatest: group randomized trial Fair (4 limitations) Schools (years 5-6)	New South Wales, Australia School-based education; 9 weeks x 1.5 hours/week led by class teacher (1-day training); increase knowledge, recognize pressures to smoke Compared with usual care	Schools: n = 88 Students in years 5–6 (aged 10–12 years) with complete data n = 5,616 (86%) at analysis I = 2,782 C = 2,904	(1) Self-reported smoker (any use in the last 4 weeks) Monthly Note: Recalculated totals from available data	C 9.12%	C 18.46%	-1.07 percentage points Not Reported (Not Significant subgroups)	6 months (post 1 year)
Alexander et al. 1983 (1979–80) Greatest: group randomized trial Fair (4 limitations) Schools (years 5-6)	New South Wales, Australia School-based education; 9 weeks x 1.5 hours/week led by class teacher (1-day training); increase knowledge, recognize pressures to smoke Compared with usual care	Schools: n = 88 Students in years 5–6 (aged 10–12 years) with complete data n = 5,616 (86%) at analysis I = 2,782 C = 2,904	(1) Self-reported initiation of tobacco use by baseline nonsmokers	14.5% in usual care group	14.3% across all intervention groups	-0.2 percentage points (initiation)	6 months (post 1 year)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Alexander et al. 1983 (1979–80) Greatest: group randomized trial Fair (4 limitations) Schools (years 5-6)	New South Wales, Australia School-based education; 9 weeks x 1.5 hours/week led by class teacher (1-day training); increase knowledge, recognize pressures to smoke Compared with usual care	Schools: n = 88 Students in years 5–6 (aged 10–12 years) with complete data n = 5,616 (86%) at analysis I = 2,782 C = 2,904	(2) Self-reported smoking cessation by baseline smokers at follow-up	42.8%	43.6%	+0.8 percentage points (cessation)	6 months (post 1 year)
Alexander et al. 1983 (1979–80) Greatest: group randomized trial Fair (4 limitations) Schools (years 5-6)	New South Wales, Australia School-based education; 9 weeks x 1.5 hours/week led by class teacher (1-day training); increase knowledge, recognize pressures to smoke Compared with usual care	Schools: n = 88 Students in years 5–6 (aged 10–12 years) with complete data n = 5,616 (86%) at analysis I = 2,782 C = 2,904	(3) Percentage of students expressing strong disapproval of tobacco use and cigarette advertising (attitudes)	Subgroup data Range: 41.3–50.1%	Subgroup data Range: 38.7–50.2%	Group differences were not significant but trend decrease	6 months (post 1 year)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Alexander et al. 1983 (1979–80) Greatest: group randomized trial Fair (4 limitations) Schools (years 5-6)	New South Wales, Australia School-based education; 9 weeks x 1.5 hours/week led by class teacher (1-day training); increase knowledge, recognize pressures to smoke Compared with usual care	Schools: n = 88 Students in years 5–6 (aged 10–12 years) with complete data n = 5,616 (86%) at analysis I = 2,782 C = 2,904	(4) Student tobacco knowledge scores (out of 28 responses)	Subgroup data 17.2 out of 28	Subgroup data 17.8 out of 28	+0.6 score p <0.001	6 months (post 1 year)
Shaffer et al. 1983 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (7th grade)	Cambridge, Massachusetts School-based education, skill acquisition and rehearsal; manual for instructors; 6 45-minute sessions; film and slideshows, skits/role-playing Compared with school-based education-single session	Selected public schools: n = 2 Selected classrooms n = 7 I: n = 5 C: n = 2 7th-grade students n = 114	(1) Student self-reported smoking (prevalence) Daily	I 8.9%	I 5.1%	-4.9 percentage points not reported (past day measure p <0.01 posttest)	3 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Shaffer et al. 1983 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (7th grade)	Cambridge, Massachusetts School-based education, skill acquisition and rehearsal; manual for instructors; 6 45-minute sessions; film and slideshows, skits/role-playing Compared with school-based education-single session	Selected public schools: n = 2 Selected classrooms n = 7 I: n = 5 C: n = 2 7th-grade students n = 114	(1) Student self-reported smoking (prevalence) Daily	C 8.6%	C 9.7%	-4.9 percentage points not reported (past day measure p <0.01 posttest)	3 months
Shaffer et al. 1983 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (7th grade)	Cambridge, Massachusetts School-based education, skill acquisition and rehearsal; manual for instructors; 6 45-minute sessions; film and slideshows, skits/role-playing Compared with school-based education-single session	Selected public schools: n = 2 Selected classrooms n = 7 I: n = 5 C: n = 2 7th-grade students n = 114	Past month	I 18%	I 10%	-13 percentage points	3 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Shaffer et al. 1983 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (7th grade)	Cambridge, Massachusetts School-based education, skill acquisition and rehearsal; manual for instructors; 6 45-minute sessions; film and slideshows, skits/role-playing Compared with school-based education-single session	Selected public schools: n = 2 Selected classrooms n = 7 I: n = 5 C: n = 2 7th-grade students n = 114	Past month	C 17%	C 22% p <0.01	-13 percentage points	3 months
Shaffer et al. 1983 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (7th grade)	Cambridge, Massachusetts School-based education, skill acquisition and rehearsal; manual for instructors; 6 45-minute sessions; film and slideshows, skits/role-playing Compared with school-based education-single session	Selected public schools: n = 2 Selected classrooms n = 7 I: n = 5 C: n = 2 7th-grade students n = 114	(2) Students reporting "used to smoke but quit" (proxy cessation)	I 5.1%	I 10.1%	(+18.5 percentage points) Post only +3.6 percentage points not reported	3 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Shaffer et al. 1983 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (7th grade)	Cambridge, Massachusetts School-based education, skill acquisition and rehearsal; manual for instructors; 6 45-minute sessions; film and slideshows, skits/role-playing Compared with school-based education-single session	Selected public schools: n = 2 Selected classrooms n = 7 I: n = 5 C: n = 2 7th-grade students n = 114	(2) Students reporting "used to smoke but quit" (proxy cessation)	C 20%	C 6.5%	(+18.5 percentage points) Post only +3.6 percentage points not reported	3 months
Best et al. 1984 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 6–8) Waterloo Smoking Prevention Project	Ontario, Canada School-based education, social-influences model; grade 6 with booster in grades 7 and 8. Compared with usual care (routine health education)	Participating schools in 2 districts N = 22 schools; 11 matched pairs 6th-grade students (consent) n = 654 n = 439 (67%) with complete data at 8th-grade follow-up	(1) Student self-reported smoker (prevalence compiled from stratified results regular + exp smoker=smoker versus nonsmoker)	I 9.7%	I 22.6%	-8.1 percentage points (no overall measure of significance)	2 years (post grade 6)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Best et al. 1984 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 6–8) Waterloo Smoking Prevention Project	Ontario, Canada School-based education, social-influences model; grade 6 with booster in grades 7 and 8. Compared with usual care (routine health education)	Participating schools in 2 districts N = 22 schools; 11 matched pairs 6th-grade students (consent) n = 654 n = 439 (67%) with complete data at 8th-grade follow-up	(1) Student self-reported smoker (prevalence compiled from stratified results regular + exp smoker=smoker versus nonsmoker)	C 13.6%	C 34.6%	-8.1 percentage points (no overall measure of significance)	2 years (post grade 6)
Best et al. 1984 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 6–8) Waterloo Smoking Prevention Project	Ontario, Canada School-based education, social-influences model; grade 6 with booster in grades 7 and 8. Compared with usual care (routine health education)	Participating schools in 2 districts N = 22 schools; 11 matched pairs 6th-grade students (consent) n = 654 n = 439 (67%) with complete data at 8th-grade follow-up	(1) Student self-reported smoker (any)-baseline nonsmokers (initiation)	I (0%)	I 40%	-13 percentage points $p < 0.08$	2 years (post grade 6)
Best et al. 1984 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 6–8) Waterloo Smoking Prevention Project	Ontario, Canada School-based education, social-influences model; grade 6 with booster in grades 7 and 8. Compared with usual care (routine health education)	Participating schools in 2 districts N = 22 schools; 11 matched pairs 6th-grade students (consent) n = 654 n = 439 (67%) with complete data at 8th-grade follow-up	(1) Student self-reported smoker (any)-baseline nonsmokers (initiation)	C (0%)	C 53%	-13 percentage points $p < 0.08$	2 years (post grade 6)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Best et al. 1984 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 6–8) Waterloo Smoking Prevention Project	Ontario, Canada School-based education, social-influences model; grade 6 with booster in grades 7 and 8. Compared with usual care (routine health education)	Participating schools in 2 districts N = 22 schools; 11 matched pairs 6th-grade students (consent) n = 654 n = 439 (67%) with complete data at 8th-grade follow-up	(2) Student self-reported quitter-baseline regular user (n = 13) (cessation)	I (100%)	I 40%	+15 percentage points not significant (very small quitter sample)	2 years (post grade 6)
Best et al. 1984 (Not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 6–8) Waterloo Smoking Prevention Project	Ontario, Canada School-based education, social-influences model; grade 6 with booster in grades 7 and 8. Compared with usual care (routine health education)	Participating schools in 2 districts N = 22 schools; 11 matched pairs 6th-grade students (consent) n = 654 n = 439 (67%) with complete data at 8th-grade follow-up	(2) Student self-reported quitter-baseline regular user (n = 13) (cessation)	C (100%)	C 25%	+15 percentage points not significant (very small quitter sample)	2 years (post grade 6)
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	(1) Student self-reported smoking (prevalence) Regular	I 4%	I 9%	+3 percentage points (not reported)	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	(1) Student self-reported smoking (prevalence) Regular	C 4%	C 6%	+3 percentage points (not reported)	2 years
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	Never	I 71%	I 46%	(+) 18 percentage points in retaining never smokers (not reported)	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	Never	C 77%	C 34%	(+) 18 percentage points in retaining never smokers (not reported)	2 years
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	(1) Student self-reported initiation of smoking in baseline nonsmokers (initiation)	I (0%)	I 36%	-19 percentage points RR 2.19, 95% confidence interval (1.2, 3.8) p <0.02	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	(1) Student self-reported initiation of smoking in baseline nonsmokers (initiation)	C (0%)	C 55%	-19 percentage points RR 2.19, 95% confidence interval (1.2, 3.8) p <0.02	2 years
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	(4) Student knowledge scores (knowledge)	I 6.4 (standard deviation 1.49)	I 8.6 (standard deviation 1.32)	No difference at 2 years t = 0.56 not significant	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gillies and Wilcox 1984 (1980) Greatest: group nonrandomized trial Fair (4 limitations) Schools (primary schools) My Body Project	Sheffield, United Kingdom School-based education (health education); respiratory health, cardiovascular health; antismoking component Compared with usual care	Selected primary schools matched N = 6 schools Students (aged 9–11 years) I Baseline 15 2-year follow-up 136(86%) C Baseline 161 2-year follow-up 134(83)	(4) Student knowledge scores (knowledge)	C 6.7 (standard deviagtion 1.59)	C 8.5 (1.29)	No difference at 2 years t = 0.56 not significant	2 years
Connell et al. 1985 (1982–84) Moderate: retrospective cohort (exposure assessment) Fair (4 limitations) Schools (4th–6th grades) School Health Education Evaluation of School Health Curriculum Project	United States School-based education Curricula for grades 4–6 (units for each grade). Compared with usual care	4 school districts Classrooms by exposure (n = 73) Exposed 4th 15 5th 27 Unexposed 4th 10 5th 22 Students in study classrooms (5th or 6th grade at follow-up) N = 1,397	(1) Average percentage of students self-reporting smoking activity by exposure	Exposure Two units (full)	1.6%	-5 percentage points	1-2 years post exposure

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Connell et al. 1985 (1982–84) Moderate: retrospective cohort (exposure assessment) Fair (4 limitations) Schools (4th–6th grades) School Health Education Evaluation of School Health Curriculum Project	United States School-based education Curricula for grades 4–6 (units for each grade). Compared with usual care	4 school districts Classrooms by exposure (n = 73) Exposed 4th 15 5th 27 Unexposed 4th 10 5th 22 Students in study classrooms (5th or 6th grade at follow-up) N = 1,397	(1) Average percentage of students self-reporting smoking activity by exposure	Exposure One unit (partial)	2.7%	-3.9 percentage points	1-2 years post exposure
Connell et al. 1985 (1982–84) Moderate: retrospective cohort (exposure assessment) Fair (4 limitations) Schools (4th–6th grades) School Health Education Evaluation of School Health Curriculum Project	United States School-based education Curricula for grades 4–6 (units for each grade). Compared with usual care	4 school districts Classrooms by exposure (n = 73) Exposed 4th 15 5th 27 Unexposed 4th 10 5th 22 Students in study classrooms (5th or 6th grade at follow-up) N = 1,397	(1) Average percentage of students self-reporting smoking activity by exposure	Exposure No units (unexposed)	6.6%	Reference $p < 0.05$ overall	1-2 years post exposure

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Connell et al. 1985 (1982–84) Moderate: retrospective cohort (exposure assessment) Fair (4 limitations) Schools (4th–6th grades) School Health Education Evaluation of School Health Curriculum Project	United States School-based education Curricula for grades 4–6 (units for each grade). Compared with usual care	4 school districts Classrooms by exposure (n = 73) Exposed 4th 15 5th 27 Unexposed 4th 10 5th 22 Students in study classrooms (5th or 6th grade at follow-up) N = 1,397	(3) Average percentage of students self-reporting intent to smoke by exposure	Exposure Two units (full)	7.3%	-7.2 percentage points	1-2 years post exposure
Connell et al. 1985 (1982–84) Moderate: retrospective cohort (exposure assessment) Fair (4 limitations) Schools (4th–6th grades) School Health Education Evaluation of School Health Curriculum Project	United States School-based education Curricula for grades 4–6 (units for each grade). Compared with usual care	4 school districts Classrooms by exposure (n = 73) Exposed 4th 15 5th 27 Unexposed 4th 10 5th 22 Students in study classrooms (5th or 6th grade at follow-up) N = 1,397	(3) Average percentage of students self-reporting intent to smoke by exposure	Exposure One unit (partial)	7.7%	-6.8 percentage points	1-2 years post exposure

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Connell et al. 1985 (1982–84) Moderate: retrospective cohort (exposure assessment) Fair (4 limitations) Schools (4th–6th grades) School Health Education Evaluation of School Health Curriculum Project	United States School-based education Curricula for grades 4–6 (units for each grade). Compared with usual care	4 school districts Classrooms by exposure (n = 73) Exposed 4th 15 5th 27 Unexposed 4th 10 5th 22 Students in study classrooms (5th or 6th grade at follow-up) N = 1,397	(3) Average percentage of students self-reporting intent to smoke by exposure	Exposure No units (unexposed)	14.5%	Reference Overall p <0.01	1-2 years post exposure
Dielman et al. 1985 (1981–82) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary schools)	Michigan School-based education; 4 sessions over 8 weeks led by research staff; resisting pressures to smoke films, discussion, role-playing Compared with usual care	1 district's elementary schools n = 10 I: 4 schools Mixed: 2 schools C: 4 schools 5^{th} and 6^{th} graders I Pre 301 Post 225 C Pre 291 Post 198	(1) Student self-reported smoking (prevalence) Past month	I 4%	I 8%	-10 percentage points p = 0.003	15 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dielman et al. 1985 (1981–82) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary schools)	Michigan School-based education; 4 sessions over 8 weeks led by research staff; resisting pressures to smoke films, discussion, role-playing Compared with usual care	1 district's elementary schools n = 10 I: 4 schools Mixed: 2 schools C: 4 schools 5th and 6th graders I Pre 301 Post 225 C Pre 291 Post 198	(1) Student self-reported smoking (prevalence) Past month	C 1%	C 15%	-10 percentage points p = 0.003	15 months
Dielman et al. 1985 (1981–82) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary schools)	Michigan School-based education; 4 sessions over 8 weeks led by research staff; resisting pressures to smoke films, discussion, role-playing Compared with usual care	1 district's elementary schools n = 10 I: 4 schools Mixed: 2 schools C: 4 schools 5th and 6th graders I Pre 301 Post 225 C Pre 291 Post 198	Ever	I 30%	I 50%	+1 percentage points not significant	15 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	**Intervention (I) and comparison (C)**	**Population; sample size**	**Effect measure**	**Reported baseline**	**Reported effect**	**Value used in summary**	**Follow-up time**
Dielman et al. 1985 (1981–82) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary schools)	Michigan School-based education; 4 sessions over 8 weeks led by research staff; resisting pressures to smoke films, discussion, role-playing Compared with usual care	1 district's elementary schools n = 10 I: 4 schools Mixed: 2 schools C: 4 schools 5th and 6th graders I Pre 301 Post 225 C Pre 291 Post 198	Ever	C 30%	C 49%	+1 percentage points not significant	15 months
Dielman et al. 1985 (1981–82) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary schools)	Michigan School-based education; 4 sessions over 8 weeks led by research staff; resisting pressures to smoke films, discussion, role-playing Compared with usual care	1 district's elementary schools n = 10 I: 4 schools Mixed: 2 schools C: 4 schools 5th and 6th graders I Pre 301 Post 225 C Pre 291 Post 198	(3) Student self-reported intention to smoke in the future (attitude)	I 9%	I 9%	-4 percentage points not significant	15 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dielman et al. 1985 (1981–82) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary schools)	Michigan School-based education; 4 sessions over 8 weeks led by research staff; resisting pressures to smoke films, discussion, role-playing Compared with usual care	1 district's elementary schools n = 10 I: 4 schools Mixed: 2 schools C: 4 schools 5th and 6th graders I Pre 301 Post 225 C Pre 291 Post 198	(3) Student self-reported intention to smoke in the future (attitude)	C 6%	C 10%	-4 percentage points not significant	15 months
Schinke and Gilchrist 1985 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (6th grade) Note: See Gilchrist et al. 1986, Schinke and Gilchrist 1986, Schinke et al. 1986 for similar studies. Unclear if overlapping reports	United States; Not reported School-based education (2 versions with overlap)-graduate student led Health information (info) curriculum: 10 1-hour weekly sessions: debates, film, homework Skills building curriculum: 10 1-hour weekly sessions; problem-solving, resisting smoking pressures Compared with usual care	Selected elementary schools (9) I-skills 3 schools I-info 3 schools C: 3 schools 6th-grade students n = 689 follow-up rates 91-94%	(1) Student self-reported tobacco use in the last week (proxy weekly) (prevalence)	I-Info 3.4%	I-Info 11.5%	-0.2 percentage points not significant	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke and Gilchrist 1985 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (6th grade) Note: See Gilchrist et al. 1986, Schinke and Gilchrist 1986, Schinke et al. 1986 for similar studies. Unclear if overlapping reports	United States; Not reported School-based education (2 versions with overlap)-graduate student led Health information (info) curriculum: 10 1-hour weekly sessions: debates, film, homework Skills building curriculum: 10 1-hour weekly sessions; problem-solving, resisting smoking pressures Compared with usual care	Selected elementary schools (9) I-skills 3 schools I-info 3 schools C: 3 schools 6th-grade students n = 689 follow-up rates 91-94%	(1) Student self-reported tobacco use in the last week (proxy weekly) (prevalence)	I-Skills 4%	I-Skills 7.8%	-4.5 percentage points (significant)	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect		Value used in summary	Follow-up time
Schinke and Gilchrist 1985 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (6th grade) Note: See Gilchrist et al. 1986, Schinke and Gilchrist 1986, Schinke et al. 1986 for similar studies. Unclear if overlapping reports	United States; Not reported School-based education (2 versions with overlap)-graduate student led Health information (info) curriculum: 10 1-hour weekly sessions: debates, film, homework Skills building curriculum: 10 1-hour weekly sessions; problem-solving, resisting smoking pressures Compared with usual care	Selected elementary schools (9) I-skills 3 schools I-info 3 schools C: 3 schools 6th-grade students n = 689 follow-up rates 91-94%	(1) Student self-reported tobacco use in the last week (proxy weekly) (prevalence)	C	3.7%	C	12.0%	Reference	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke and Gilchrist 1985 (Not reported) Greatest: group randomized trial Fair (3 limitations) Schools (6th grade) Note: See Gilchrist et al. 1986, Schinke and Gilchrist 1986, Schinke et al. 1986 for similar studies. Unclear if overlapping reports	United States; Not reported School-based education (2 versions with overlap)-graduate student led Health information (info) curriculum: 10 1-hour weekly sessions: debates, film, homework Skills building curriculum: 10 1-hour weekly sessions; problem-solving, resisting smoking pressures Compared with usual care	Selected elementary schools (9) I-skills 3 schools I-info 3 schools C: 3 schools 6th-grade students n = 689 follow-up rates 91-94%	(3) Student intentions to smoke cigarettes in high school (attitudes)	Not Reported	Not Reported	I-Skills and I-Info had lower scores than did C students	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke and Gilchrist 1985 (Not reported) Greatest: group randomized trial Fair (3 limitations) Schools (6th grade) Note: See Gilchrist et al. 1986, Schinke and Gilchrist 1986, Schinke et al. 1986 for similar studies. Unclear if overlapping reports	United States; Not reported School-based education (2 versions with overlap)-graduate student led Health information (info) curriculum: 10 1-hour weekly sessions: debates, film, homework Skills building curriculum: 10 1-hour weekly sessions; problem-solving, resisting smoking pressures Compared with usual care	Selected elementary schools (9) I-skills 3 schools I-info 3 schools C: 3 schools 6th-grade students n = 689 follow-up rates 91-94%	(4) Student smoking knowledge scores (knowledge)	Not Reported	Not Reported	I-Skills students had higher knowledge scores compared with I-Info and C	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gilchrist et al. 1986 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (5th- and 6th-grade students)	United States; not reported School-based education (2 arms)-both 8 60-minute sessions with homework; film; testimonials Self-control skills: communication and problem solving skills; role plays; videotape examples Health education: smoking effects; advertising impact Compared with usual care	Public elementary schools assigned to condition N = not reported Students (5th to 6th grade) in study schools N = 741 pre N = 701 (95%) follow-up	(1) Student self-reported smoking 1 or more cigarettes in the preceding week	Skills 4%	Skills 5.8%	-2.5 percentage points	13-month follow-up (15m after pre)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gilchrist et al. 1986 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (5th- and 6th-grade students)	United States; not reported School-based education (2 arms)- both 8 60-minute sessions with homework; film; testimonials Self-control skills: communication and problem solving skills; role plays; videotape examples Health education: smoking effects; advertising impact Compared with usual care	Public elementary schools assigned to condition N = not reported Students (5th to 6th grade) in study schools N = 741 pre N = 701 (95%) follow-up	(1) Student self-reported smoking 1 or more cigarettes in the preceding week	Education 3.5%	Education 9.6%	+1.8 percentage points	13-month follow-up (15m after pre)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gilchrist et al. 1986 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (5th- and 6th-grade students)	United States; not reported School-based education (2 arms)-both 8 60-minute sessions with homework; film; testimonials Self-control skills: communication and problem solving skills; role plays; videotape examples Health education: smoking effects; advertising impact Compared with usual care	Public elementary schools assigned to condition N = not reported Students (5th to 6th grade) in study schools N = 741 pre N = 701 (95%) follow-up	(1) Student self-reported smoking 1 or more cigarettes in the preceding week	C 4%	C 8.3%	Reference: skills versus other $F(2,697) = 3.52$ $p < 0.05$	13-month follow-up (15m after pre)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gilchrist et al. 1986 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (5th- and 6th-grade students)	United States; not reported School-based education (2 arms)-both 8 60-minute sessions with homework; film; testimonials Self-control skills: communication and problem solving skills; role plays; videotape examples Health education: smoking effects; advertising impact Compared with usual care	Public elementary schools assigned to condition N = not reported Students (5th to 6th grade) in study schools N = 741 pre N = 701 (95%) follow-up	(3) Student self-reported intentions to smoke (posttest mean score)	C 0.51	Skills 0.32 Education 0.30	Skills and education arms had lower intentions to smoke $p < 0.05$	Post test

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gilchrist et al. 1986 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (5th- and 6th-grade students)	United States; not reported School-based education (2 arms)-both 8 60-minute sessions with homework; film; testimonials Self-control skills: communication and problem solving skills; role plays; videotape examples Health education: smoking effects; advertising impact Compared with usual care	Public elementary schools assigned to condition N = not reported Students (5th to 6th grade) in study schools N = 741 pre N = 701 (95%) follow-up	(3) Skills-refusal skills score on survey items	C 2.09	Skills 3.36 Education 2.46	Refusal skill score higher in skill arm $p < 0.05$	Post test

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gilchrist et al. 1986 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (5th- and 6th-grade students)	United States; not reported School-based education (2 arms)-both 8 60-minute sessions with homework; film; testimonials Self-control skills: communication and problem solving skills; role plays; videotape examples Health education: smoking effects; advertising impact Compared with usual care	Public elementary schools assigned to condition N = not reported Students (5th to 6th grade) in study schools N = 741 pre N = 701 (95%) follow-up	(4) Student knowledge mean score	C 7.72	Skills 10.61 Education 11.13	Skills and education arms with higher score p <0.05	Post test
Schinke and Gilchrist 1986 (not reported) Greatest: group nonrandomized trial Fair (3 limitations) Schools (grades 5 and 6)	United States; not reported School-based education, I-full: education sessions and problem-solving exercises and media analysis I-info: education sessions-age relevant effects, use rates Compared with usual care	Selected public schools (n = 3) Participating students in grades 5 and 6 N = 214 N = 196 (92%) at 12-month follow-up	(1) Student self-reported smoking in the past week (proxy weekly) (prevalence)	I-Full 3.8%	I-Full (3.7%)	I-Full versus C -9.8 percentage points	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke and Gilchrist 1986 (not reported) Greatest: group nonrandomized trial Fair (3 limitations) Schools (grades 5 and 6)	United States; not reported School-based education, I-full: education sessions and problem-solving exercises and media analysis I-info: education sessions-age relevant effects, use rates Compared with usual care	Selected public schools (n = 3) Participating students in grades 5 and 6 N = 214 N = 196 (92%) at 12-month follow-up	(1) Student self-reported smoking in the past week (proxy weekly) (prevalence)	I-Info 2.9%	I-Info (11.5%)	F(2, 196) = 5.12 p <0.001	12 months
Schinke and Gilchrist 1986 (not reported) Greatest: group nonrandomized trial Fair (3 limitations) Schools (grades 5 and 6)	United States; not reported School-based education, I-full: education sessions and problem-solving exercises and media analysis I-info: education sessions-age relevant effects, use rates Compared with usual care	Selected public schools (n = 3) Participating students in grades 5 and 6 N = 214 N = 196 (92%) at 12-month follow-up	(1) Student self-reported smoking in the past week (proxy weekly) (prevalence)	C 3.4%	C (13.1%)	I-Info versus C-Comp 1.1 percentage points (not significant)	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke and Gilchrist 1986 (not reported) Greatest: group nonrandomized trial Fair (3 limitations) Schools (grades 5 and 6)	United States; not reported School-based education, I-full: education sessions and problem-solving exercises and media analysis I-info: education sessions-age relevant effects, use rates Compared with usual care	Selected public schools (n = 3) Participating students in grades 5 and 6 N = 214 N = 196 (92%) at 12-month follow-up	(4) Mean differences (pre to 12 month follow-up) in student knowledge scores (knowledge)		I-Full +11.9 I-Info +7.3 C +4.4	I-Full: Increased $p < 0.001$	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke et al. 1986 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (5th and 6th grades)	Western Washington state School-based education Tobacco use prevention (smoked and smokeless); 8 50-minute sessions led by adults delivered to 5th and 6th graders; both arms with homework Skills building arm: health effects education + communication and decision-making skills training and rehearsal; refusal skills Discussion (disc) arm: health effects education (films, testimonials, debates, games) Compared with usual care	Randomly selected elementary schools assigned to condition N = 12 5th–6th grade students n = 1,281 baseline loss to follow-up 10.8%	(1) Student self-reported smoking in the past week (prevalence)	I-Skills 4%	I-Skills 7%	-5 percentage points	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke et al. 1986 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (5th and 6th grades)	Western Washington state School-based education Tobacco use prevention (smoked and smokeless); 8 50-minute sessions led by adults delivered to 5th and 6th graders; both arms with homework Skills building arm: health effects education + communication and decision-making skills training and rehearsal; refusal skills Discussion (disc) arm: health effects education (films, testimonials, debates, games) Compared with usual care	Randomly selected elementary schools assigned to condition N = 12 5th–6th grade students n = 1,281 baseline loss to follow-up 10.8%	(1) Student self-reported smoking in the past week (prevalence)	I-Disc 3%	I-Disc 11%	0 percentage points	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke et al. 1986 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (5th and 6th grades)	Western Washington state School-based education Tobacco use prevention (smoked and smokeless); 8 50-minute sessions led by adults delivered to 5th and 6th graders; both arms with homework Skills building arm: health effects education + communication and decision-making skills training and rehearsal; refusal skills Discussion (disc) arm: health effects education (films, testimonials, debates, games) Compared with usual care	Randomly selected elementary schools assigned to condition N = 12 5th–6th grade students n = 1,281 baseline loss to follow-up 10.8%	(1) Student self-reported smoking in the past week (prevalence)	C 4%	C 12%	Reference (skills versus other $p < 0.05$)	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke et al. 1986 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (5th and 6th grades)	Western Washington state School-based education Tobacco use prevention (smoked and smokeless); 8 50-minute sessions led by adults delivered to 5th and 6th graders; both arms with homework Skills building arm: health effects education + communication and decision-making skills training and rehearsal; refusal skills Discussion (disc) arm: health effects education (films, testimonials, debates, games) Compared with usual care	Randomly selected elementary schools assigned to condition N = 12 5th–6th grade students n = 1,281 baseline loss to follow-up 10.8%	(1) Student self-reported smokeless tobacco use in the past week (prevalence)	I-Skills 3%	I-Skills 12%	-4 percentage points	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke et al. 1986 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (5th and 6th grades)	Western Washington state School-based education Tobacco use prevention (smoked and smokeless); 8 50-minute sessions led by adults delivered to 5th and 6th graders; both arms with homework Skills building arm: health effects education + communication and decision-making skills training and rehearsal; refusal skills Discussion (disc) arm: health effects education (films, testimonials, debates, games) Compared with usual care	Randomly selected elementary schools assigned to condition N = 12 5th–6th grade students n = 1,281 baseline loss to follow-up 10.8%	(1) Student self-reported smokeless tobacco use in the past week (prevalence)	I-Disc 3%	I-Disc 16%	0 percentage points	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Schinke et al. 1986 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (5th and 6th grades)	Western Washington state School-based education Tobacco use prevention (smoked and smokeless); 8 50-minute sessions led by adults delivered to 5th and 6th graders; both arms with homework Skills building arm: health effects education + communication and decision-making skills training and rehearsal; refusal skills Discussion (disc) arm: health effects education (films, testimonials, debates, games) Compared with usual care	Randomly selected elementary schools assigned to condition N = 12 5th–6th grade students n = 1,281 baseline loss to follow-up 10.8%	(1) Student self-reported smokeless tobacco use in the past week (prevalence)	C 2%	C 15%	Reference (skills versus other p <0.05)	24 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Biglan et al. 1987 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (middle + high schools)	Lane County, Oregon School-based education Refusal skills training: 4 sessions over 2 weeks Compared with usual care	Participating schools in two districts N = 3 high schools + 6 middle schools Classrooms random assignment 7th–10th graders N = 1,730 baseline n = 1,180 (68.2%) at 1-year follow-up	(1) Student self-reported tobacco use (smoking index)	I not reported	I not reported	None of the differences were significant on x^2	1 year
Biglan et al. 1987 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (middle + high schools)	Lane County, Oregon School-based education Refusal skills training: 4 sessions over 2 weeks Compared with usual care	Participating schools in two districts N = 3 high schools + 6 middle schools Classrooms random assignment 7th–10th graders N = 1,730 baseline n = 1,180 (68.2%) at 1-year follow-up	(1) Student self-reported tobacco use (smoking index)	C not reported	C not reported	None of the differences were significant on x^2	1 year
Biglan et al. 1987 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (middle + high schools)	Lane County, Oregon School-based education Refusal skills training: 4 sessions over 2 weeks Compared with usual care	Participating schools in two districts N = 3 high schools + 6 middle schools Classrooms random assignment 7th–10th graders N = 1,730 baseline n = 1,180 (68.2%) at 1-year follow-up	(2) Student self-reported smoking-baseline regular smokers (cessation)	I not reported	I 22.33 (mean)	(+) 28 ? analysis of covariation F = 4.55 p = 0.04	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Biglan et al. 1987 (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (middle + high schools)	Lane County, Oregon School-based education Refusal skills training: 4 sessions over 2 weeks Compared with usual care	Participating schools in two districts N = 3 high schools + 6 middle schools Classrooms random assignment 7th–10th graders N = 1,730 baseline n = 1,180 (68.2%) at 1-year follow-up	(2) Student self-reported smoking-baseline regular smokers (cessation)	C not reported	C 50.35 (mean)	(+) 28 ? analysis of covariation F = 4.55 p = 0.04	1 year
Hansen et al. 1988a (1981–83) Greatest: group nonrandomized trial Fair (3 limitations) Schools (6th and 7th grades) TAPP (Tobacco and Alcohol Prevention Project)	Los Angeles, California School-based education,(drug use prevention-alcohol and tobacco); trained teachers and peer opinion leaders; 15 50-minute sessions; pressure resistance training; discussion; role-playing; student workbooks; public commitments Compared with usual care	Participating districts/ schools (assigned) 2 student cohorts Cohort 1 Los Angeles county District A: 556 District B: 605 Note: follow-up resp %: I (54%), C (49%) Cohort 2 Other District A: 1,379 District C: 328	(1) Student self-reported cigarette smoking in the previous 30 days (monthly) (prevalence)	Cohort 1 7th grade (pre) I (8%)	Cohort 1 10th grade (follow-up) I 26%	Cohort 1 Overall difference -8 percentage points (not significant)	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988a (1981–83) Greatest: group nonrandomized trial Fair (3 limitations) Schools (6th and 7th grades) TAPP (Tobacco and Alcohol Prevention Project)	Los Angeles, California School-based education,(drug use prevention-alcohol and tobacco); trained teachers and peer opinion leaders; 15 50-minute sessions; pressure resistance training; discussion; role-playing; student workbooks; public commitments Compared with usual care	Participating districts/ schools (assigned) 2 student cohorts Cohort 1 Los Angeles county District A: 556 District B: 605 Note: follow-up resp %: I (54%), C (49%) Cohort 2 Other District A: 1,379 District C: 328	(1) Student self-reported cigarette smoking in the previous 30 days (monthly) (prevalence)	Cohort 1 7th grade (pre) C (9%)	Cohort 1 10th grade (follow-up) C 34% p=0.13	Cohort 1 Overall difference -8 percentage points (not significant)	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988a (1981–83) Greatest: group nonrandomized trial Fair (3 limitations) Schools (6th and 7th grades) TAPP (Tobacco and Alcohol Prevention Project)	Los Angeles, California School-based education,(drug use prevention-alcohol and tobacco); trained teachers and peer opinion leaders; 15 50-minute sessions; pressure resistance training; discussion; role-playing; student workbooks; public commitments Compared with usual care	Participating districts/ schools (assigned) 2 student cohorts Cohort 1 Los Angeles county District A: 556 District B: 605 Note: follow-up resp %: I (54%), C (49%) Cohort 2 Other District A: 1,379 District C: 328	(1) Student self-reported cigarette smoking in the previous 30 days (monthly) (prevalence)	6th grade District I A not reported C not reported	9th grade District I A not reported C 8.3%	No overall assessment Differences were not statistically significant	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988a (1981–83) Greatest: group nonrandomized trial Fair (3 limitations) Schools (6th and 7th grades) TAPP (Tobacco and Alcohol Prevention Project)	Los Angeles, California School-based education,(drug use prevention-alcohol and tobacco); trained teachers and peer opinion leaders; 15 50-minute sessions; pressure resistance training; discussion; role-playing; student workbooks; public commitments Compared with usual care	Participating districts/ schools (assigned) 2 student cohorts Cohort 1 Los Angeles county District A: 556 District B: 605 Note: follow-up resp %: I (54%), C (49%) Cohort 2 Other District A: 1,379 District C: 328	(1) Student self-reported cigarette smoking in the previous 30 days (monthly) (prevalence)	6th grade District C A not reported C not reported	9th grade District C A not reported not significant C 20.0% not significant	No overall assessment Differences were not statistically significant	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988b (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade) Project SMART (Self-Management and Resistance Training)	Los Angeles, California School-based education (drug use prevention); two curricula (social influences I-SI; affective education I-SE); trained teachers/school health staff delivered with recruited peer assistants; 1 session per week for 12 sessions Compared with usual care	Junior high schools N = 44 (70%) assigned 14 (32%) recruited and initial cohort report on 8 schools I-AE: School 2 Class 24 I-social influences: School 2 Class 25 C: School 4 Class 35 7th-grade students n = 2,863 with pre + post data 1,374 (48%)	(1) Student self-reported tobacco use-smoking index mean (prevalence)	I-AE not reported	I-AE 1.508	(Compared to C)	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988b (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade) Project SMART (Self-Management and Resistance Training)	Los Angeles, California School-based education (drug use prevention); two curricula (social influences I-social influences; affective education I-SE); trained teachers/ school health staff delivered with recruited peer assistants; 1 session per week for 12 sessions Compared with usual care	Junior high schools N = 44 (70%) assigned 14 (32%) recruited and initial cohort report on 8 schools I-AE: School 2 Class 24 I-social influences: School 2 Class 25 C: School 4 Class 35 7th-grade students n = 2,863 with pre + post data 1,374 (48%)	(1) Student self-reported tobacco use-smoking index mean (prevalence)	I-social influences not reported	I-social influences 0.544	Increased p <0.01	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect		Value used in summary	Follow-up time
Hansen et al. 1988b (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade) Project SMART (Self-Management and Resistance Training)	Los Angeles, California School-based education (drug use prevention); two curricula (social influences I-social influences; affective education I-SE); trained teachers/ school health staff delivered with recruited peer assistants; 1 session per week for 12 sessions Compared with usual care	Junior high schools N = 44 (70%) assigned 14 (32%) recruited and initial cohort report on 8 schools I-AE: School 2 Class 24 I-social influences: School 2 Class 25 C: School 4 Class 35 7th-grade students n = 2,863 with pre + post data 1,374 (48%)	(1) Student self-reported tobacco use-smoking index mean (prevalence)	C	not reported	C	0.888	Not significantly different p = 0.3	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988b (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade) Project SMART (Self-Management and Resistance Training)	Los Angeles, California School-based education (drug use prevention); two curricula (social influences I-social influences; affective education I-SE); trained teachers/ school health staff delivered with recruited peer assistants; 1 session per week for 12 sessions Compared with usual care	Junior high schools N = 44 (70%) assigned 14 (32%) recruited and initial cohort report on 8 schools I-AE: School 2 Class 24 I-social influences: School 2 Class 25 C: School 4 Class 35 7th-grade students n = 2,863 with pre + post data 1,374 (48%)	(1) Student self-reported onset of tobacco use	I-AE not reported	I-AE not reported	Increased +86.4% -6.0 percentage points $p < 0.05$	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988b (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade) Project SMART (Self-Management and Resistance Training)	Los Angeles, California School-based education (drug use prevention); two curricula (social influences I-social influences; affective education I-SE); trained teachers/ school health staff delivered with recruited peer assistants; 1 session per week for 12 sessions Compared with usual care	Junior high schools N = 44 (70%) assigned 14 (32%) recruited and initial cohort report on 8 schools I-AE: School 2 Class 24 I-social influences: School 2 Class 25 C: School 4 Class 35 7th-grade students n = 2,863 with pre + post data 1,374 (48%)	(1) Student self-reported onset of tobacco use	I-SI not reported	I-SI 11.8%	Increased +86.4% -6.0 percentage points p <0.05	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1988b (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade) Project SMART (Self-Management and Resistance Training)	Los Angeles, California School-based education (drug use prevention); two curricula (social influences I-social influences; affective education I-SE); trained teachers/ school health staff delivered with recruited peer assistants; 1 session per week for 12 sessions Compared with usual care	Junior high schools N = 44 (70%) assigned 14 (32%) recruited and initial cohort report on 8 schools I-AE: School 2 Class 24 I-social influences: School 2 Class 25 C: School 4 Class 35 7th-grade students n = 2,863 with pre + post data 1,374 (48%)	(1) Student self-reported onset of tobacco use	C not reported	C 17.8%	Increased +86.4% -6.0 percentage points $p < 0.05$	12 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(1) Student self-reported smoking behaviors-undefined (6-level scale) (prevalence) Boys	I 3.1 (1.3)	I 4.6 (2.1)	Overall treatment versus comparison group differences were significant p = 0.0001	2 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(1) Student self-reported smoking behaviors-undefined (6-level scale) (prevalence) Boys	C 3.2 (1.5)	C 3.3 (1.5)	Overall treatment versus comparison group differences were significant p = 0.0001	2 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(1) Student self-reported smoking behaviors-undefined (6-level scale) (prevalence) Girls	I 3.1 (1.3)	I 5.0 (1.7)	Overall treatment versus comparison group differences were significant p = 0.0001	2 months

Table 6.9 Continued

Author & year (study period) **Design suitability: design** **Quality of execution (number of limitations)** **Evaluation setting**	**Intervention (I) and comparison (C)**	**Population; sample size**	**Effect measure**	**Reported baseline**	**Reported effect**	**Value used in summary**	**Follow-up time**
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(1) Student self-reported smoking behaviors-undefined (6-level scale) (prevalence) Girls	C 3.2 (1.4)	C 3.6 (1.7)	Overall treatment versus comparison group differences were significant p = 0.0001	2 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(1) Student self-reported change in smoking status over study period (initiation)	I 0%	I 9.7%	-4.8 percentage points p = 0.25	2 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(1) Student self-reported change in smoking status over study period (initiation)	C 0%	C 14.5%	-4.8 percentage points p = 0.25	2 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(2) Student baseline smoker self-reporting cessation at 2m follow-up (cessation)	I 0%	I 3.5%	-5.8 percentage points NS	2 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Killen et al. 1988 (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	Northern California School-based education (cardiovascular disease prevention-including one module on cigarette smoking); 3 days/week x 7 weeks delivered by 8 special full-time instructors and 1 coordinator; information, behavioral skills and resisting social influences Compared with usual care	Selected high schools n = 4 I: 2 C: 2 All 10th graders in study schools N = 1,447 baseline N = 1,130 (78%) follow-up I: 622 C: 508	(2) Student baseline smoker self-reporting cessation at 2m follow-up (cessation)	C 0%	C 9.3% p=0.39	-5.8 percentage points not significant	2 months
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(1) Student self-reported smoking (prevalence) Past week	I 0.07	I not reported	not reported: logistic regression (log reg) not significant	Post (3.5 months)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(1) Student self-reported smoking (prevalence) Past week	C 0.09	C not reported	not reported: logistic regression (log reg) not significant	Post (3.5 months)
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(1) Student self-reported smoking (prevalence) Past month	I 0.09	I not reported	not reported log reg $p = 0.0618$ (NS)	Post (3.5 months)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(1) Student self-reported smoking (prevalence) Past month	C 0.12	C not reported	not reported log reg p = 0.0618 (NS)	Post (3.5 months)
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(1) Student self-reported smoking (prevalence) Past day	I 0.04	I not reported	not reported log reg not significant	Post (3.5 months)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(1) Student self-reported smoking (prevalence) Past day	C 0.06	C not reported	not reported log reg not significant	Post (3.5 months)
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(3) Student self-reported attitude regarding peer smoking (attitudes)	I 3.60 scale score	I 3.51	Improved Posttest $p < 0.01$	Post (3.5 months)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(3) Student self-reported attitude regarding peer smoking (attitudes)	C 3.61	C 4.05	Improved Posttest $p < 0.01$	Post (3.5 months)
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(4) Student knowledge-smoking prevalence (Knowledge)	I 0.59 scale score	I 0.91	Improved Posttest $p < 0.0001$	Post (3.5 months)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1989 (not reported) Greatest: group randomized trial Fair (3 limitations) Schools (7th grade public) LifeSkills training	New York, New York School-based education; smoking prevention and social resistance/competence enhancement; 15 sessions delivered by teachers using tailored lessons (reading level) Compared with usual care	8 schools from 6 school districts in New York, New Jersey metropolitan area Random assignment 7th-grade students in study schools I Pre 256 Analysis 189 (74) C Pre 215 Analysis 156 (73)	(4) Student knowledge-smoking prevalence (Knowledge)	C 0.52	C 0.51	Improved Posttest p <0.0001	Post (3.5 months)
Bush et al. 1989a,b (1983–85) Greatest: group randomized trial Fair (4 limitations) Schools (initiated grades 4–6 to grades 7–9) Know Your Body	Washington, D.C. School-based education + school-based health screening + parent education + parent activities (involvement in intervention) Compared with school-based health screening (parents notified of results)	Selected public elementary schools n = 9 Full I: n = 3 Partial I: n = 3 C: n = 3 Students in 4th–6th grades Baseline: 892 (72%) Follow-up: 431 (35%)	(1a) Percentage of screened students included in analysis with serum thiocyanate levels >100 micrometers per liter	I 5.2%	I 0.9%	-9.3 percentage points significant not reported	3 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Bush et al. 1989a,b (1983–85) Greatest: group randomized trial Fair (4 limitations) Schools (initiated grades 4–6 to grades 7–9) Know Your Body	Washington, D.C. School-based education + school-based health screening + parent education + parent activities (involvement in intervention) Compared with school-based health screening (parents notified of results)	Selected public elementary schools n = 9 Full I: n = 3 Partial I: n = 3 C: n = 3 Students in 4th–6th grades Baseline: 892 (72%) Follow-up: 431 (35%)	(1a) Percentage of screened students included in analysis with serum thiocyanate levels >100 micrometers per liter	C 0.0%	C 5.0%	-9.3 percentage points significant not reported	3 years (post)
Bush et al. 1989a,b (1983–85) Greatest: group randomized trial Fair (4 limitations) Schools (initiated grades 4–6 to grades 7–9) Know Your Body	Washington, D.C. School-based education + school-based health screening + parent education + parent activities (involvement in intervention) Compared with school-based health screening (parents notified of results)	Selected public elementary schools n = 9 Full I: n = 3 Partial I: n = 3 C: n = 3 Students in 4th–6th grades Baseline: 892 (72%) Follow-up: 431 (35%)	Observed mean differences in serum thiocyantate levels over study period (3 years)-adjusted results	Not available	Not available	-15.74 ± 2.85 micrometers per liter $p = 0.000$	3 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Bush et al. 1989a,b (1983–85) Greatest: group randomized trial Fair (4 limitations) Schools (initiated grades 4–6 to grades 7–9) Know Your Body	Washington, D.C. School-based education + school-based health screening + parent education + parent activities (involvement in intervention) Compared with school-based health screening (parents notified of results)	Selected public elementary schools n = 9 Full I: n = 3 Partial I: n = 3 C: n = 3 Students in 4th–6th grades Baseline: 892 (72%) Follow-up: 431 (35%)	(3) Mean differences in student self-reported attitudes toward cigarettes (negative)-adjusted	Not available	Not available	2.78 ± 1.10 p = 0.012	3 years (post)
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(1) Student self-reported smoking "regularly" (prevalence)	I-A 17.7%	I-A 20.4%	+4.0 percentage points not reported	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(1) Student self-reported smoking "regularly" (prevalence)	I-B 23.9%	I-B 24.2%	+1.6 percentage points not reported	1 year
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(1) Student self-reported smoking "regularly" (prevalence)	C 15.9%	C 17.2%	Reference	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(2) Student self-reported smoking status as "ex-smoker" (cessation)	I-A 15.7%	I-A 21.2%	+8.1 percentage points	1 year
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(2) Student self-reported smoking status as "ex-smoker" (cessation)	I-B 15.8%	I-B 18.9%	+5.7 percentage points	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(2) Student self-reported smoking status as "ex-smoker" (cessation)	C 12.5%	C 9.9%	Reference	1 year
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(4) Student responses on knowledge assessed as "good" (knowledge)	I-A 11.0%	I-A 27.6%	+16.8 percentage points* *$p \leq 0.01$	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(4) Student responses on knowledge assessed as “good” (knowledge)	I-B 16.2%	I-B 18.6%	+2.6 percentage points	1 year
Figa-Talamanca and Modolo (1989) (not reported) Greatest: group nonrandomized trial Fair (4 limitations) Schools (high schools)	5 cities, Italy School-based education; health educator-led; 3 consecutive days of sessions; smoking awareness, immediate health effects; spirometry demos (I-A intervention arm used spirometry demo; I-B arm did not) Compared with usual care	Selected classes in selected high schools in each city 6 classes per school randomly assigned to arm Students baseline I-A: n = 199 I-B: n = 195 C: n = 178 Response rate at follow-up: 93%	(4) Student responses on knowledge assessed as “good” (knowledge)	C 7.9%	C 7.7%	Reference	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Flay et al. 1989 (1979–80 [with 6-year follow-up]) Greatest: group randomized trial Fair (3 limitations) Schools (grade 6) Waterloo Trial	Waterloo, Canada School-based education; social influences model; information and skills development to resist social influences and improve decision making; 6 sessions in 6th grade with 2 booster sessions at end of 6th, in 7th , and 1 booster in 8th grade; research staff delivered Compared with usual care	N = 22 matched and randomly assigned schools I: n = 11 C: n = 11 Students (consent) N = 654 (94%) pre N = 551 (81%) responding at 12th-grade follow-up	(1) Self-reported regular smokers (once per week or more) (weekly) (prevalence) (estimated from graph) Logit model for 12th-grade regular smoking	Pre (6th) Post (8th) I (3%) 7.64% Note: At end of 8th grade–overall difference +0.51	Follow-up (12th) I 34%	+4 percentage points Odds ratio 1.24, 95% confidence interval (0.83, 1.86)	6 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Flay et al. 1989 (1979–80 [with 6-year follow-up]) Greatest: group randomized trial Fair (3 limitations) Schools (grade 6) Waterloo Trial	Waterloo, Canada School-based education; social influences model; information and skills development to resist social influences and improve decision making; 6 sessions in 6th grade with 2 booster sessions at end of 6th, in 7th , and 1 booster in 8th grade; research staff delivered Compared with usual care	N = 22 matched and randomly assigned schools I: n = 11 C: n = 11 Students (consent) N = 654 (94%) pre N = 551 (81%) responding at 12th-grade follow-up	(1) Self-reported regular smokers (once per week or more) (weekly) (prevalence) (estimated from graph) Logit model for 12th-grade regular smoking	Pre (6th) Post (8th) C (5%) 9.13% Note: At end of 8th grade–overall difference +0.51	Follow-up (12th) C 32%	+4 percentage points Odds ratio 1.24, 95% confidence interval (0.83, 1.86)	6 years
Walter 1989 (1979–85) Greatest: group randomized trial Fair (4 limitations) Schools (elementary; 4th grade) Know Your Body	New York School-based education (cardiovascular disease risk factor reduction); teacher-led; 2 hours per week throughout 4th grade; Curriculum continued through 9th grade Compared with usual care	Participating elementary schools Schools Bronx 22 West 15 Students at analysis Bronx 1,036 West 593 Bronx (66%) West (65%) Westchester follow-up was 6 yrs with smoking results	(1) School means of students with biochemical indications of cigarette smoking at 9th grade (prevalence)	I 0.0	I 3.5 ± 4.3	-9.6 percentage points Note: No significant differences at 5 yrs	6 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Walter 1989 (1979–85) Greatest: group randomized trial Fair (4 limitations) Schools (elementary; 4th grade) Know Your Body	New York School-based education (cardiovascular disease risk factor reduction); teacher-led; 2 hours per week throughout 4th grade; Curriculum continued through 9th grade Compared with usual care	Participating elementary schools Schools Bronx 22 West 15 Students at analysis Bronx 1,036 West 593 Bronx (66%) West (65%) Westchester follow-up was 6 yrs with smoking results	(1) School means of students with biochemical indications of cigarette smoking at 9th grade (prevalence)	C 0.0	C 13.1 ± 5.p <0.005	-9.6 percentage points Note: No significant differences at 5 yrs	6 years
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(1) Student self-reported smoking (subset of responders to both follow-up surveys) Girls P 215 T 275	I P 23.7%	I P 49.3%	-3.8 percentage points	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(1) Student self-reported smoking (subset of responders to both follow-up surveys) Girls P 215 T 275	I T 28.7%	I T 49.5%	-8.6 percentage points	2 years
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(1) Student self-reported smoking (subset of responders to both follow-up surveys) Girls P 215 T 275	C 29.9%	C 59.3%	Reference (I-both versus C p = 0.03)	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(1) Student self-reported smoking (subset of responders to both follow-up surveys) Boys P 252 T 256	I P 33.7%	I P 52.0%	+5.1 percentage points	2 years
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(1) Student self-reported smoking (subset of responders to both follow-up surveys) Boys P 252 T 256	I T 36.7%	I T 45.7%	-4.2 percentage points	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(1) Student self-reported smoking (subset of responders to both follow-up surveys) Boys P 252 T 256	C 36.1%	C 49.3%	Reference (I-T versus C p = 0.009)	2 years
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(2) Student self-reported smoking at 2-year follow-up in baseline nonsmokers (initiation) Logistic regression analyses (95% confidence interval not reported here) Girls P 164 T 196			IP –8.1 percentage points not significant IT –6.6 percentage points not significant	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Armstrong et al. 1990 (1981–83) Greatest: group randomized trial Fair (4 limitations) Schools (year 7; year 9 follow-up)	Australia; not reported School-based education peer-led (P); teacher-led (T): social consequences curriculum Compared with usual care	Participating schools: n = 45 Stratified by size and location then randomly assigned Students in year 7 N = 2,366 baseline 2-year follow-up 1,514 (64%) Subset analyses Baseline nonsmokers I peer Girls 164 Boys 166 I teacher Girls 196 Boys 162	(2) Student self-reported smoking at 2-year follow-up in baseline nonsmokers (initiation) Logistic regression analyses (95% confidence interval not reported here) Boys P 166 T 162			I P +6.4 percentage points not significant I T -2.8 percentage points not significant	2 years
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(1) Student self-reported tobacco use Monthly/weekly/daily Post-test adjusted differences at 1 year Peer-led ± booster in 8th grade Teacher-led ± booster in 8th grade Note: 4 m post result not presented here	I-P not reported	I-P Month 0.31 Weely 0.22 Day 0.17	I-P Month .08 Weekly .06 Day .04	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(1) Student self-reported tobacco use Monthly/weekly/daily Post-test adjusted differences at 1 year Peer-led ± booster in 8th grade Teacher-led ± booster in 8th grade Note: 4 m post result not presented here	I-Peer-led Booster not reported	Peer-led Booster Month 0.12 Weekly 0.05 Day 0.03	Peer-led Booster* Month -.11 Weekly -.11 Day -.10 *All Peer-led Booster difference $p < 0.05$	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(1) Student self-reported tobacco use Monthly/weekly/daily Post-test adjusted differences at 1 year Peer-led ± booster in 8th grade Teacher-led ± booster in 8th grade Note: 4 m post result not presented here	I-T not reported	I-T Month 0.26 Weekly 0.16 Day 0.11	I-T Month .03 Weekly .00 Day -.02	Post (1-year) B arms or 1-year follow-up non-B arms
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(1) Student self-reported tobacco use Monthly/weekly/daily Post-test adjusted differences at 1 year Peer-led ± booster in 8th grade Teacher-led ± booster in 8th grade Note: 4 m post result not presented here	I-Teacher-led Booster not reported	Teacher-led Booster Month 0.34 Weekly 0.21 Day 0.16	Teacher-led Booster Month .11 Weekly .05 Day .03	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(1) Student self-reported tobacco use Monthly/weekly/daily Post-test adjusted differences at 1 year Peer-led ± booster in 8th grade Teacher-led ± booster in 8th grade Note: 4 m post result not presented here	C not reported	C Month 0.23 Weekly 0.16 Day0.13	C Month ref Weekly ref Day ref	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported tobacco attitudes (scale score) (attitudes)	I-P not reported	Score I-P 37.84	I-P increased not significant	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported tobacco attitudes (scale score) (attitudes)	I-Peer-led Booster not reported	Score I-Peer-led Booster 38.95	I-Peer-led Booster increased p <0.01	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported tobacco attitudes (scale score) (attitudes)	I-T not reported	Score I-T 38.29	I-T increased $p < 0.5$	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported tobacco attitudes (scale score) (attitudes)	I-Teacher-led Booster not reported	Score I-Teacher-led Booster 37.19	I-Teacher-led Booster decreased not significant	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported tobacco attitudes (scale score) (attitudes)	C not reported	Score C 37.29	C reference	Post (1-year) B arms or 1-year follow-up non-B arms
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported locus of control (skills)	I-P not reported	Score I-P 7.53	I-P -0.18	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported locus of control (skills)	I-Peer-led Booster not reported	Score I-Peer-led Booster 6.68	I-Peer-led Booster –1.03 p <0.01	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported locus of control (skills)	I-T not reported	Score I-T 7.69	IT -0.02	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported locus of control (skills)	I-Teacher-led Booster not reported	Score I-Teacher-led Booster 8.19	I-Teacher-led Booster +0.43	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(3) Student self-reported locus of control (skills)	C not reported	Score C 7.71	C reference	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(4) Student tobacco knowledge (scale score) (knowledge)	I-P not reported	Score I-P 7.95	I-P increased p <0.0001	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(4) Student tobacco knowledge (scale score) (knowledge)	I-Peer-led Booster not reported	Score I-Peer-led Booster 8.50	I-Peer-led Booster increased p <0.0001	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(4) Student tobacco knowledge (scale score) (knowledge)	I-T not reported	Score I-T 7.36	I-T increased p <0.0001	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(4) Student tobacco knowledge (scale score) (knowledge)	I-Teacher-led Booster not reported	Score I-Teacher-led Booster 8.55	I-Teacher-led Booster increased $p < 0.0001$	Post (1-year) B arms or 1-year follow-up non-B arms
Botvin et al. 1990a,b Also Botvin et al. 1984 Fair (3 limitations) Schools (junior high schools; 7th-grade baseline; 8th-grade booster and follow-up) Life skills training	New York, New York School-based education, 18 sessions (drug use prevention), teacher (T) versus older peer delivered (P), cognitive behavioral approaches, homework, self-improvement project; refusal skills 10-session booster (B) in 8th grade delivered to 2 intervention arms Compared with usual care	Selected junior high schools (10) Peer: n = 4 Teacher: n = 4 Usual care: n = 2 7th graders Pre: 1,311 Post: 1,185 (90%) Follow-up: 998 (76%) at 1 year post pretest (8th grade)	(4) Student tobacco knowledge (scale score) (knowledge)	C not reported	Score C 6.74	C not reported	Post (1-year) B arms or 1-year follow-up non-B arms

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Gatta et al. 1991 (1982–86) Greatest: group randomized trial Fair (4 limitations) Schools (year 4) Italian League Against Cancer (Milan)	Milan, Italy School-based education; tobacco prevention; health effects and consequences, 1 day of lessons, slides, films, posters, comic strips, delivered by trained teachers to students in year 4 (aged 9–10 years) Compared with usual care	Schools in Milan N = 163 of 165 schools: Random assignment I: 55 C: 56 Mixed: 52 Class (I; C) Students: I year 4 8,549 Year 8 5,007 (58%) C Year 4 8,897 Year 8 5,310 (60%)	(1) Student self-reported status as smoker (prevalence) post only comparison	I not reported	I 8.0%	-0.7 percentage points not significant Risk ratio = 0.92 (95% confidence interval 0.79, 1.06)	4 years
Gatta et al. 1991 (1982–86) Greatest: group randomized trial Fair (4 limitations) Schools (year 4) Italian League Against Cancer (Milan)	Milan, Italy School-based education; tobacco prevention; health effects and consequences, 1 day of lessons, slides, films, posters, comic strips, delivered by trained teachers to students in year 4 (aged 9–10 years) Compared with usual care	Schools in Milan N = 163 of 165 schools: Random assignment I: 55 C: 56 Mixed: 52 Class (I; C) Students: I year 4 8,549 Year 8 5,007 (58%) C Year 4 8,897 Year 8 5,310 (60%)	(1) Student self-reported status as smoker (prevalence) post only comparison	C not reported	C 8.7%	-0.7 percentage points not significant Risk ratio = 0.92 (95% confidence interval 0.79, 1.06)	4 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1991 (1987–88) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade)	Los Angeles and Orange counties, California School-based education (drug use prevention); social influence theory); resistance skills training or correcting normative (norm) perceptions of use; project staff delivered 9 classroom sessions in each study arm Compared with school-based education (resistance skills versus normative arms)	Participating, selected junior high schools: n = 12 Assigned to one of 4 study arms by school 7th-grade students in study schools N = 3,011 at baseline N = 2,416 (80%) at 1-year follow-up (8th grade)	(1) Student self-reported cigarette smoking (prevalence) within 30 days Ever use Note: Data were incompletely reported for each study arm; analyses were reported for comparisons of students exposed to normative education or resistance skills training	I-Norm: not reported	I-Norm: 4.8%	-1.7 percentage points I-Norm: $F = 4.71$ $p < 0.05$	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1991 (1987–88) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade)	Los Angeles and Orange counties, California School-based education (drug use prevention); social influence theory); resistance skills training or correcting normative (norm) perceptions of use; project staff delivered 9 classroom sessions in each study arm Compared with school-based education (resistance skills versus normative arms)	Participating, selected junior high schools: n = 12 Assigned to one of 4 study arms by school 7th-grade students in study schools N = 3,011 at baseline N = 2,416 (80%) at 1-year follow-up (8th grade)	(1) Student self-reported cigarette smoking (prevalence) within 30 days Ever use Note: Data were incompletely reported for each study arm; analyses were reported for comparisons of students exposed to normative education or resistance skills training	C-Other: not reported	C-Other: 6.5%	-1.7 percentage points I-Norm: $F = 4.71$ $p < 0.05$	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1991 (1987–88) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade)	Los Angeles and Orange counties, California School-based education (drug use prevention); social influence theory); resistance skills training or correcting normative (norm) perceptions of use; project staff delivered 9 classroom sessions in each study arm Compared with school-based education (resistance skills versus normative arms)	Participating, selected junior high schools: n = 12 Assigned to one of 4 study arms by school 7th-grade students in study schools N = 3,011 at baseline N = 2,416 (80%) at 1-year follow-up (8th grade)	Ever use Note: Data were incompletely reported for each study arm; analyses were reported for comparisons of students exposed to normative education or resistance skills training	I-Norm: not reported	I-Norm 8.1%	-2.2 percentage points	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hansen et al. 1991 (1987–88) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th grade)	Los Angeles and Orange counties, California School-based education (drug use prevention); social influence theory); resistance skills training or correcting normative (norm) perceptions of use; project staff delivered 9 classroom sessions in each study arm Compared with school-based education (resistance skills versus normative arms)	Participating, selected junior high schools: n = 12 Assigned to one of 4 study arms by school 7th-grade students in study schools N = 3,011 at baseline N = 2,416 (80%) at 1-year follow-up (8th grade)	(1) Student self-reported cigarette smoking (prevalence) within 30 days Ever use Note: Data were incompletely reported for each study arm; analyses were reported for comparisons of students exposed to normative education or resistance skills training	C-Other: not reported	C-Other 10.3%	-2.2 percentage points	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) High school student self-reported tobacco use (average number per month) Cigarettes	I Boys 9.4 Girls 5.7	Boys 24.9 Girls 22.7	Boys: +2.8 cigarettes per month not significant Girls: +13 cigarettes per month not significant	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) High school student self-reported tobacco use (average number per month) Cigarettes	C Boys 3.2 Girls 13.9	Boys 17.9	Boys: +2.8 cigarettes per month not significant Girls: +13 cigarettes per month not significant	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) High school student self-reported tobacco use (average number per month) Smokeless	Boys I 15.5	I 11.7	-9.3 chews/ month $p < 0.05$ but not significant on logistic transformation	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) High school student self-reported tobacco use (average number per month) Smokeless	Boys C 16.0	C 21.5	-9.3 chews/ month p <0.05 but not significant on logistic transformation	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) Middle school student self-reported tobacco use (average number per month) Cigarettes	I Boys 0.7 Girls 1.9	Boys 9.1 Girls 13.6	Boys: +6.3 cigarettes per month Girls: +0.4 cigarettes per month	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) Middle school student self-reported tobacco use (average number per month) Cigarettes	C Boys 1.3 Girls 1.1	Boys 3.4 Girls 12.4	Boys: +6.3 cigarettes per month Girls: +0.4 cigarettes per month	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	**Intervention (I) and comparison (C)**	**Population; sample size**	**Effect measure**	**Reported baseline**	**Reported effect**	**Value used in summary**	**Follow-up time**
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) Middle school student self-reported tobacco use (average number per month) Smokeless	Boys I 4.8	I 5.1	-4.0 chews/month $p < 0.05$; not significant on logistic transformation	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Severson et al. 1991 (1985–87) Greatest: group randomized trial Fair (4 limitations) Schools (middle and high schools) PATH	Lane County, Oregon School-based education + parent education; smokeless content included: 7 sessions over 2–3 weeks with social influences content and emphasis on refusal skills training; teacher led with use of same-age peers (middle schools); decision making; health consequences; videos; 3 messages mailed to parents Compared with usual care	22 recruited schools matched, stratified, and random assignment Students (Middle Schools plus High Schools) N = 2,552 baseline N = 1,768(69%) follow-up I Middle School 610 High School 172 C Middle School 483 High School 503	(1) Middle school student self-reported tobacco use (average number per month) Smokeless	Boys C 2.6	C 7.3	-4.0 chews/month $p < 0.05$; not significant on logistic transformation	1 year
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported smoking during the past month (prevalence)	I 4.86%	I 5.19%	-1.79 percentage points $F(1,41) = 4.14$ $p < 0.05$	4 months (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported smoking during the past month (prevalence)	C 5.03%	C 7.15%	-1.79 percentage points F(1,41) = 4.14 p <0.05	4 months (post)
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported smoking-baseline nonsmokers (initiation)	I (0%)	I not reported	Not reported (reduced) F(1,42) = 5.74 p <0.03	4 months (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported smoking-baseline nonsmokers (initiation)	C (0%)	C not reported	Not reported (reduced) F(1,42) = 5.74 p <0.03	4 months (post)
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported current smoking	I not reported	I not reported	not reported F(1,41) = 3.27 p <0.08	4 months (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported current smoking	C not reported	C not reported	not reported F(1,41) = 3.27 p <0.08	4 months (post)
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported smoking in the past day or the past week	I not reported	I not reported	Not reported differences not significant	4 months (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(1) Student self-reported smoking in the past day or the past week	C not reported	C not reported	Not reported differences not significant	4 months (post)
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(3) Student self-reported anti-smoking attitudes (scale scores)	I 40.43	I 37.71	No significant difference	4 months (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(3) Student self-reported anti-smoking attitudes (scale scores)	C 40.51	C 38.32	No significant difference	4 months (post)
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(4) Student smoking knowledge (various) Smoking prevalence	I 0.91	I 0.86	Higher $p < 0.0001$	4 months (post)

Table 6.9 **Continued**

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1992 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (7th grade; public and parochial)	New York, New York School-based education, 15 sessions by teachers (manual with lesson plans) using tailored curriculum Social resistance/ competence enhancement Compared with usual care	Schools in 4 New York City boroughs: n = 47 Public I 6 C 5 Parochial I 19 C 17 7th-grade students n = 3,518 baseline n = 3,153 (90%) at analysis I: 1,795 C: 1,358	(4) Student smoking knowledge (various) Smoking prevalence	C 0.88	C 0.57	Higher p <0.0001	4 months (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Elder et al. 1993; Kellam et al. 1998 (see also Eckhardt et al. 1997) (1988–91) Greatest: group nonrandomized trial Fair (3 limitations) Schools (7th grade) Project SHOUT (Students Helping Others Understand Tobacco)	San Diego, California School-based education; 18 sessions (10 in 7th grade, 8 in 8th grade) led by trained undergrads; refusal skills training; activities, health consequences (some student activities outside of class) + mail/telephone support (9th-grade proactive follow-up with 2 calls/semester per student) Compared with usual care	Selected, participating schools n = 22 Matched + assigned I: 11 schools C: 11 schools 7th graders at baseline: n = 3,655 9th grade at follow-up: n = 2,668 (73%) I: 1,174 C: 1,494	(1) Student self-reported tobacco use in the past month (prevalence) Logistic regression analyses (1) Combined tobacco use in the past month (1) Combined tobacco use in the past week Note: At end of second year of study (school-based component), differences in student self-reported tobacco use in the past month was –1.8 (not significant), so an additional follow-up intervention was implemented	I 5.7%	I 14.2%	–7.1 percentage points significance not reported Odds ratio = 0.71 $p < 0.05$ Odds ratio = 0.66 $p < 0.05$	2 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Elder et al. 1993; Kellam et al. 1998 (see also Eckhardt et al. 1997) (1988–91) Greatest: group nonrandomized trial Fair (3 limitations) Schools (7th grade) Project SHOUT (Students Helping Others Understand Tobacco)	San Diego, California School-based education; 18 sessions (10 in 7th grade, 8 in 8th grade) led by trained undergrads; refusal skills training; activities, health consequences (some student activities outside of class) + mail/telephone support (9th-grade proactive follow-up with 2 calls/semester per student) Compared with usual care	Selected, participating schools n = 22 Matched + assigned I: 11 schools C: 11 schools 7th graders at baseline: n = 3,655 9th grade at follow-up: n = 2,668 (73%) I: 1,174 C: 1,494	(1) Student self-reported tobacco use in the past month (prevalence) Logistic regression analyses (1) Combined tobacco use in the past month (1) Combined tobacco use in the past week Note: At end of second year of study (school-based component), differences in student self-reported tobacco use in the past month was –1.8 (not significant), so an additional follow-up intervention was implemented	C 6.4%	C 22.5%	–7.1 percentage points significance not reported Odds ratio = 0.71 p <0.05 Odds ratio = 0.66 p <0.05	2 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(1) Student self-reported weekly smoking (prevalence)	I not reported	I 50.3%	-2.7 percentage points not significant	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(1) Student self-reported weekly smoking (prevalence)	C not reported	C 53.0%	-2.7 percentage points not significant	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	Subgroup analysis: male students	I not reported	I 43.1%	-8.6 percentage points not significant Logistic regression odds ratio 1.73, 95% confidence interval (1.04, 2.89)	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	Subgroup analysis: male students	C not reported	C 51.7%	-8.6 percentage points not significant Logistic regression odds ratio 1.73, 95% confidence interval (1.04, 2.89)	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(1) Student self-reported weekly smoking at follow-up in baseline nonsmokers (initiation + prevalence) Males	I (0%)	I 35.0%	-15 percentage points p <0.05 Odds ratio 2.09 (1.2, 3.6)	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(1) Student self-reported weekly smoking at follow-up in baseline nonsmokers (initiation + prevalence) Males	C (0%)	C 50.0%	-15 percentage points p <0.05 Odds ratio 2.09 (1.2, 3.6)	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(1) Student self-reported weekly smoking at follow-up in baseline nonsmokers (initiation + prevalence) Females	I (0%)	I 55.0%	+2 percentage points not significant	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(1) Student self-reported weekly smoking at follow-up in baseline nonsmokers (initiation + prevalence) Females	C (0%)	C 53.0%	+2 percentage points not significant	10 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(3) Student self-reported intentions to not smoke daily 5 years from now (attitude)	I 66.2%	I (+13.8 percentage points)	Overall difference +1.2 percentage points p <0.05	2 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(3) Student self-reported intentions to not smoke daily 5 years from now (attitude)	C 57.5%	C (+12.6 percentage points)	Overall difference +1.2 percentage points $p < 0.05$	2 years (post)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	Subgroup analysis: student self-reported intentions to not smoke daily 5 years from now (attitude)-baseline nonsmokers	I Boys 69.4% Girls 72.5%	I Boys +18.7 Girls +11.0	Boys +4.8 Girls -6.9	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	Subgroup analysis: student self-reported intentions to not smoke daily 5 years from now (attitude)-baseline nonsmokers	C Boys 64.6% Girls 57.7%	IC Boys +13.9 Girls +17.9	Boys (not reported) Girls (not reported)	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(4) Student smoking knowledge test scores (maximum 14)	I Boys 8.6 Girls 8.2	I Boys +1.3 Girls +1.7	Overall: increased $p < 0.05$	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Klepp et al. 1993; Tell and Vellar 1987 (1979–81 with 1989 follow-up) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grades 5–7) Oslo Youth Study Smoking Prevention Program	Oslo, Norway School-based education; (cardiovascular disease risk factor reduction): social influences curriculum: training to resist social pressures; role-models; public commitment to remain nonsmoker 10 sessions (smoking prevention program); partly led by older students Compared with usual care	Selected schools N = 6 I(3) C(3) Participating students in grades 5–7 (N; participation rate) 1979 827 (82%) 1981 718 (66%) 1989 796 (74%) At analysis 1981: 567 (52%) 1989: 570 (53%)	(4) Student smoking knowledge test scores (maximum 14)	C Boys 8.1 Girls 7.5	C Boys +1.2 Girls +1.4	Overall: increased $p < 0.05$	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect		Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(1) Student self-reported current smoker (prevalence)	C	2.2%	C	11.3%	Reference	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(1) Student self-reported current smoker (prevalence)	I-Family smoking education program 1.8%	I-Family smoking education program 14.4%	+3.5 percentage points	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect		Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(1) Student self-reported current smoker (prevalence)	I-M	4.4%	I-M	12.0%	-1.5 percentage points	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(1) Student self-reported current smoker (prevalence)	I-Family smoking education program + M 1.7%	I-Family smoking education program + M 10.1%	-0.7 percentage points Group difference not significant	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect	Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(4) Student knowledge score (maximum 12) baseline and interval change	C	5.18	Interval change +1.04	Group differences were small and not statistically significant	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(4) Student knowledge score (maximum 12) baseline and interval change	I-Family smoking education program 5.57	Interval change +1.09	Group differences were small and not statistically significant	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(4) Student knowledge score (maximum 12) baseline and interval change	I-M 5.38	Interval change +0.91	Group differences were small and not statistically significant	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Nutbeam et al. 1993 (1988–89, 1990) Greatest: group nonrandomized trial Fair (3 limitations) Schools (secondary)	Wales and England School-based education- MN curriculum I-M program; social consequences, peer, family, media influences; skills training; 5 teacher-delivered lessons for 12- to 13-year-olds Family smoking education program I-FSE 3 hours class lessons (11- to 12-year-olds), teacher delivered; parent leaflets Compared with usual care	Selected 2 schools Arm C N schools 10 Arm I-Family smoking education program N schools 10 Arm I-M N schools 9 Arm I-Family smoking education program + M N schools 10 All students in first year of secondary school N = 4,538 (89%) N = 3,677 (72%) at 1-year follow-up	(4) Student knowledge score (maximum 12) baseline and interval change	I-Family smoking education program + M 5.47	Interval change +1.28	Group differences were small and not statistically significant	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes × 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported smoking-weekly cigarette use (prevalence)	I-norm social influences not reported	Change in use +0.053	-0.3 percentage points not significant	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes x 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported smoking-weekly cigarette use (prevalence)	I-info social influences not reported	Change in use +0.032	-2.4 percentage points* *p <0.05	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes × 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported smoking-weekly cigarette use (prevalence)	I-non social influences not reported	Change in use +0.026	-3.0 percentage points* *p <0.05	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) **Design suitability: design** **Quality of execution (number of limitations)** **Evaluation setting**	**Intervention (I) and comparison (C)**	**Population; sample size**	**Effect measure**	**Reported baseline**	**Reported effect**	**Value used in summary**	**Follow-up time**
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes x 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported smoking-weekly cigarette use (prevalence)	I-combined not reported	Change in use +0.020	-3.6 percentage points* *p <0.05	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes × 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported smoking-weekly cigarette use (prevalence)	C-usual care not reported	Change in use +0.056 reference	Reference	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes x 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-norm social influences not reported	Change in use +0.102	+0.9 percentage points not significant	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	**Intervention (I) and comparison (C)**	**Population; sample size**	**Effect measure**	**Reported baseline**	**Reported effect**	**Value used in summary**	**Follow-up time**
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes × 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-info social influences not reported	Change in use +0.071	-2.2 percentage points* *p <0.05	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes x 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-non social influences not reported	Change in use +0.061	-3.2 percentage points* *p <0.05	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes × 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-combined not reported	Change in use +0.073	-2.0 percentage points* *p <0.05	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes x 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	C-usual care not reported	Change in use +0.093	Reference	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (junior high schools) Project Towards No Tobacco Use (TNT)	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Recruited junior high schools N = 48 schools from 27 districts (8 schools per arm with 16 C schools) Study cohorts of 7th graders (n = 2) Cohort 1: All 7th graders in 20 schools Cross-sectional samples (3 classes x 28 schools) Baseline: 6,716 response 1-year follow-up: 7,052	(1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless) Abbreviated results	not reported	I-combined –0.004 C-usual care +0.005	-0.9 percentage points $p < 0.05$ (all others not significant)	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly cigarette use (prevalence) School as unit of analyses	I-norm social influence not reported	Change in use +9	Differences +3 percentage points not significant (note statistically significant versus all others)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly cigarette use (prevalence) School as unit of analyses	I-info social influence not reported	Change in use +12	Differences +0 percentage points not significant (note statistically significant versus all others)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly cigarette use (prevalence) School as unit of analyses	I-non social influence not reported	Change in use +8	Differences -1 percentage points not significant (note statistically significant versus all others)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly cigarette use (prevalence) School as unit of analyses	I-combined not reported	Change in use +4	Differences -5 percentage points $p < 0.05$ (note statistically significant versus all others)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly cigarette use (prevalence) School as unit of analyses	C-usual care not reported	Change in use +9	Differences Reference (note statistically significant versus all others)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-norm SI not reported	+17	-6 percentage points* (*all p <0.05 compared to reference)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-info SI not reported	+15	-8 percentage points* (*all p <0.05 compared to reference)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-non SI not reported	+13	-10 percentage points* (*all p <0.05 compared to reference)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	I-combined not reported	+16	-7 percentage points* (*all p <0.05 compared to reference)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported trial cigarette use (ever tried) (prevalence-ever)	C-usual care not reported	+23	Reference	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless)	I-norm social influences not reported	+2	+3 percentage points not significant	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless)	I-info social influences not reported	+2	+3 percentage points not significant	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless)	I-non social influence not reported	-1	-2 percentage points p <0.05	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless)	I-combined not reported	-0	-1 percentage points (marginal)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported weekly smokeless tobacco use (prevalence-smokeless)	C-usual care not reported	+1	Reference	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1993a,b Addendum Dent et al. 1995 (2nd-year follow-up results) (not reported) Greatest: group randomized trial Fair (4 limitations) Schools (junior high schools; 7th-grade with 9th-grade follow-up	Southern California School-based education, social influences (SI) theory, 4 curricula (arms: countering normative social influences; countering informational social influences; physical consequences of use non-social influences; combined curricula), 10-day curricula presented by trained health educators; single booster session in 8th grade Compared with usual care	Students surveyed in high schools fed by study junior high schools N = 7,219 9th graders Self-reported exposure to Project Towards No Tobacco Use 65% (n = not reported but calculated 4,692) Exposed: 4,692 Unexposed: not reported (2,527; but unclear if this includes students from nonstudy schools)	(1) Student self-reported trial smokeless tobacco use (prevalence-ever) (results abbreviated)	not reported	I-non SI +0 C +7	-7 percentage points $p < 0.05$ (others were not significant)	2 years (9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
De Vries et al. 1994 (1986–87) Greatest: group nonrandomized trial Fair (3 limitations) Schools (8th grade) Vocational (Voc) schools High schools	The Netherlands School-based education for 8th-grade students based on social influences; 5 45-minute sessions based on peer-led program on video; peer training and peer led small group activities; manual Compared with usual care	Recruited schools Vocational I 3 High School 5 Vocational C 3 High School 3 Students in study classes (9 month follow-up) Vocational I 343 High School 585 Vocational C 217 High School 384	(1) Student self-reported regular smoking (daily + weekly prevalence) grade 9	Vocational I 16.4% High School 3.6%	Vocational I 23.5% High School 7.1%	Vocational-7.1 percentage points High School +0.8 Vocational odds ratio 2.24 High School odds ratio 0.78 Vocational (1.3, 3.9) High School (0.4,1.6)	9 months (9th)
De Vries et al. 1994 (1986–87) Greatest: group nonrandomized trial Fair (3 limitations) Schools (8th grade) Vocational (Voc) schools High schools	The Netherlands School-based education for 8th-grade students based on social influences; 5 45-minute sessions based on peer-led program on video; peer training and peer led small group activities; manual Compared with usual care	Recruited schools Vocational I 3 High School 5 Vocational C 3 High School 3 Students in study classes (9 month follow-up) Vocational I 343 High School 585 Vocational C 217 High School 384	(1) Student self-reported regular smoking (daily + weekly prevalence) grade 9	Vocational C 15.8% High School 3.0%	Vocational C 30.0% High School 5.7%	Vocational-7.1 percentage points High School +0.8 Vocational odds ratio 2.24 High School odds ratio 0.78 Vocational (1.3, 3.9) High School (0.4,1.6)	9 months (9th)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
De Vries et al. 1994 (1986–87) Greatest: group nonrandomized trial Fair (3 limitations) Schools (8th grade) Vocational (Voc) schools High schools	The Netherlands School-based education for 8th-grade students based on social influences; 5 45-minute sessions based on peer-led program on video; peer training and peer led small group activities; manual Compared with usual care	Recruited schools Vocational I 3 High School 5 Vocational C 3 High School 3 Students in study classes (9 month follow-up) Vocational I 343 High School 585 Vocational C 217 High School 384	(2) Student initiation of experimental smoking-baseline nonsmokers (initiation)	Vocational C 56.5% High School C 52.1%	Vocational I 64.0% High School I 41.6%	Vocational +7.5 not significant High School -10.5 $p < 0.02$	9 months (9th)
De Vries et al. 1994 (1986–87) Greatest: group nonrandomized trial Fair (3 limitations) Schools (8th grade) Vocational (Voc) schools High schools	The Netherlands School-based education for 8th-grade students based on social influences; 5 45-minute sessions based on peer-led program on video; peer training and peer led small group activities; manual Compared with usual care	Recruited schools Vocational I 3 High School 5 Vocational C 3 High School 3 Students in study classes (9 month follow-up) Vocational I 343 High School 585 Vocational C 217 High School 384	(3) Student cessation of smoking (baseline users) (cessation)	Vocational C 19.4% High School C 33.3%	Vocational I 27.4% High School I 28.1%	Vocational +8 not significant High School –5.2 not significant	9 months (9th)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
De Vries et al. 1994 (1986–87) Greatest: group nonrandomized trial Fair (3 limitations) Schools (8th grade) Vocational (Voc) schools High schools	The Netherlands School-based education for 8th-grade students based on social influences; 5 45-minute sessions based on peer-led program on video; peer training and peer led small group activities; manual Compared with usual care	Recruited schools Vocational I 3 High School 5 Vocational C 3 High School 3 Students in study classes (9 month follow-up) Vocational I343 High School 585 Vocational C 217 High School 384	(4) Student intentions to smoke (attitudes)	not reported	not reported	No significant differences	9 months (9th)
De Vries et al. 1994 (1986–87) Greatest: group nonrandomized trial Fair (3 limitations) Schools (8th grade) Vocational (Voc) schools High schools	The Netherlands School-based education for 8th-grade students based on social influences; 5 45-minute sessions based on peer-led program on video; peer training and peer led small group activities; manual Compared with usual care	Recruited schools Vocational I 3 High School 5 Vocational C 3 High School 3 Students in study classes (9 month follow-up) Vocational I343 High School 585 Vocational C 217 High School 384	(5) Student knowledge	not reported	not reported	Vocational not significant change High School Increased $p < 0.01$	9 months (9th)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(1) Student self-reported cigarette smoking (prevalence) Weekly	I1 4%	I1 23% p <0.05	-4 percentage points	6 years (3 years post at end of 12th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(1) Student self-reported cigarette smoking (prevalence) Weekly	I2 5%	I2 21% p <0.05	-7 percentage points	6 years (3 years post at end of 12th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(1) Student self-reported cigarette smoking (prevalence) Weekly	C 4%	C 27% reference	Reference	6 years (3 years post at end of 12th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(1) Student self-reported cigarette smoking (prevalence) Monthly Note: High-fidelity subsample demonstrated differences of greater magnitude; alcohol and marijuana data are not presented here	I1 6%	I1 27% p <0.05	-5 percentage points	6 years (3 years post at end of 12th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(1) Student self-reported cigarette smoking (prevalence) Monthly Note: High-fidelity subsample demonstrated differences of greater magnitude; alcohol and marijuana data are not presented here	I2 8%	I2 26% p <0.01	-10 percentage points	6 years (3 years post at end of 12th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(1) Student self-reported cigarette smoking (prevalence) Monthly Note: High-fidelity subsample demonstrated differences of greater magnitude; alcohol and marijuana data are not presented here	C 7%	C 33% reference	Reference	6 years (3 years post at end of 12th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(3) Student self-reported normative expectations-adult smoking	I1 not reported	I1 3.92 p <0.0001	Lower (improved)	3 years (post 9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(3) Student self-reported normative expectations-adult smoking	I2 not reported	I2 3.95 p <0.0001	Lower (improved)	3 years (post 9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	**Intervention (I) and comparison (C)**	**Population; sample size**	**Effect measure**	**Reported baseline**	**Reported effect**	**Value used in summary**	**Follow-up time**
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(3) Student self-reported normative expectations-adult smoking	C not reported	C 4.22 reference		3 years (post 9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York <u>Schools assigned</u> I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(4) Student knowledge on 10-item test (score) Smoking prevalence (actual)	I1 not reported	I1 1.10 p <0.0001	Higher (post)	3 years (post 9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York Schools assigned I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(4) Student knowledge on 10-item test (score) Smoking prevalence (actual)	I2 not reported	I2 1.16 p <0.0001	Higher (post)	3 years (post 9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1995a,b (1985–91 [follow-up 1994]) Greatest: group randomized trial Good (1 limitation) Schools (7th–9th grades) Life skills training	3 areas of New York state School-based education; drug use prevention; teacher-delivered 7th grade (15 sessions), 8th grade (10 sessions), 9th grade (5 sessions); social influences; development of personal and social skills for coping; self-esteem Compared with usual care	Recruited schools in 3 areas of New York <u>Schools assigned</u> I1 18 I2 16 C22 Students in study schools N = 5,954 7th grade N = 3,597 12th-grade follow-up Group I1 number at follow up 762 Group I2 number at follow up 848 Group C number at follow up 1,142	(4) Student knowledge on 10-item test (score) Smoking prevalence (actual)	C not reported	C 0.93 reference	Reference	3 years (post 9th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hawthorne et al. 1995 (not reported [5 year intervention]) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Schools (elementary)	Melbourne, Australia School-based education ("Life Education" drug use prevention); 5–12 years of age with new module for each class year; teacher-delivered; self-esteem, body function, drug use pressures; discussion and role-plays Compared with school-based education (usual care but equivalent hours)	Selected, stratified sample of schools in Melbourne area I: 42 C: 44 Students in year 6 (post-only) Aged 11–12 years I: 1,721 C: 1,298	(1) Student self-reported smoking (any) in the previous month (prevalence)	I not reported (post only)	I 7.8%	+2 percentage points Logistic regression odds ratio 1.3 (school) 95% confidence interval (1.0, 1.9)	Post (5 school years)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hawthorne et al. 1995 (not reported [5 year intervention]) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Schools (elementary)	Melbourne, Australia School-based education ("Life Education" drug use prevention); 5–12 years of age with new module for each class year; teacher-delivered; self-esteem, body function, drug use pressures; discussion and role-plays Compared with school-based education (usual care but equivalent hours)	Selected, stratified sample of schools in Melbourne area I: 42 C: 44 Students in year 6 (post-only) Aged 11–12 years I: 1,721 C: 1,298	(1) Student self-reported smoking (any) in the previous month (prevalence)	C not reported	C 5.8%	+2 percentage points Logistic regression odds ratio 1.3 (school) 95% confidence interval (1.0, 1.9)	Post (5 school years)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hawthorne et al. 1995 (not reported [5 year intervention]) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Schools (elementary)	Melbourne, Australia School-based education ("Life Education" drug use prevention); 5–12 years of age with new module for each class year; teacher-delivered; self-esteem, body function, drug use pressures; discussion and role-plays Compared with school-based education (usual care but equivalent hours)	Selected, stratified sample of schools in Melbourne area I: 42 C: 44 Students in year 6 (post-only) Aged 11–12 years I: 1,721 C: 1,298	(1) Student self-reported smoking (any) ever (prevalence)	I not reported	I 32%	+4 percentage points odds ratio 1.2 (school) 95% confidence interval (1.0, 1.4)	Post (5 school years)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hawthorne et al. 1995 (not reported [5 year intervention]) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Schools (elementary)	Melbourne, Australia School-based education ("Life Education" drug use prevention); 5–12 years of age with new module for each class year; teacher-delivered; self-esteem, body function, drug use pressures; discussion and role-plays Compared with school-based education (usual care but equivalent hours)	Selected, stratified sample of schools in Melbourne area I: 42 C: 44 Students in year 6 (post-only) Aged 11–12 years I: 1,721 C: 1,298	(1) Student self-reported smoking (any) ever (prevalence)	C not reported	C 28%	+4 percentage points odds ratio 1.2 (school) 95% confidence interval (1.0, 1.4)	Post (5 school years)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Eckhardt et al. 1997 (see also Elder et al. 1993) (1988–91; 1992) Greatest: individual randomized trial Fair (4 limitations) Schools (7th–11th grades) Project SHOUT extension	San Diego, California As per Elder 1993: School-based education, Students Working Against Tobacco, and mail/telephone support; tobacco use prevention; 7th–9th grades. Addition of 11th grade mailed newsletters (2) and proactive phone call (1) (2 study arms) Compared with 2 arms: usual care; no 11th-grade intervention	Students in the original grades 7–9 cohort contacted in 10th grade: n = 2,051 (76%) I grades (7–11) Lapsed grades (7–9) Delayed grade (11 only) C-usual care At analysis n = 1,545 (75%; 58% overall)	(1) Student self-reported smoking (any) in the past 30 days (prevalence)	I Not reported	7%* *x^2=6.33 $p < 0.05$	-5.6 percentage points	Post (4 years) 1-year follow-up

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect	Value used in summary	Follow-up time
Eckhardt et al. 1997 (see also Elder et al. 1993) (1988–91; 1992) Greatest: individual randomized trial Fair (4 limitations) Schools (7th–11th grades) Project SHOUT extension	San Diego, California As per Elder 1993: School-based education, Students Working Against Tobacco, and mail/telephone support; tobacco use prevention; 7th–9th grades. Addition of 11th grade mailed newsletters (2) and proactive phone call (1) (2 study arms) Compared with 2 arms: usual care; no 11th-grade intervention	Students in the original grades 7–9 cohort contacted in 10th grade: n = 2,051 (76%) I grades (7–11) Lapsed grades (7–9) Delayed grade (11 only) C-usual care At analysis n = 1,545 (75%; 58% overall)	(1) Student self-reported smoking (any) in the past 30 days (prevalence)	Lapsed reported	Not	10.8%	-1.8 percentage points	Post (4 years) 1-year follow-up

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	**Intervention (I) and comparison (C)**	**Population; sample size**	**Effect measure**	**Reported baseline**		**Reported effect**	**Value used in summary**	**Follow-up time**
Eckhardt et al. 1997 (see also Elder et al. 1993) (1988–91; 1992) Greatest: individual randomized trial Fair (4 limitations) Schools (7th–11th grades) Project SHOUT extension	San Diego, California As per Elder 1993: School-based education, Students Working Against Tobacco, and mail/telephone support; tobacco use prevention; 7th–9th grades. Addition of 11th grade mailed newsletters (2) and proactive phone call (1) (2 study arms) Compared with 2 arms: usual care; no 11th-grade intervention	Students in the original grades 7–9 cohort contacted in 10th grade: n = 2,051 (76%) I grades (7–11) Lapsed grades (7–9) Delayed grade (11 only) C-usual care At analysis n = 1,545 (75%; 58% overall)	(1) Student self-reported smoking (any) in the past 30 days (prevalence)	Delayed reported	Not	9.4%	-3.2 percentage points	Post (4 years) 1-year follow-up

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline		Reported effect	Value used in summary	Follow-up time
Eckhardt et al. 1997 (see also Elder et al. 1993) (1988–91; 1992) Greatest: individual randomized trial Fair (4 limitations) Schools (7th–11th grades) Project SHOUT extension	San Diego, California As per Elder 1993: School-based education, Students Working Against Tobacco, and mail/ telephone support; tobacco use prevention; 7th–9th grades. Addition of 11th grade mailed newsletters (2) and proactive phone call (1) (2 study arms) Compared with 2 arms: usual care; no 11th-grade intervention	Students in the original grades 7–9 cohort contacted in 10th grade: n = 2,051 (76%) I grades (7–11) Lapsed grades (7–9) Delayed grade (11 only) C-usual care At analysis n = 1,545 (75%; 58% overall)	(1) Student self-reported smoking (any) in the past 30 days (prevalence)	C reported	Not	12.6%	Reference	Post (4 years) 1-year follow-up

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Eckhardt et al. 1997 (see also Elder et al. 1993) (1988–91; 1992) Greatest: individual randomized trial Fair (4 limitations) Schools (7th–11th grades) Project SHOUT extension	San Diego, California As per Elder 1993: School-based education, Students Working Against Tobacco, and mail/telephone support; tobacco use prevention; 7th–9th grades. Addition of 11th grade mailed newsletters (2) and proactive phone call (1) (2 study arms) Compared with 2 arms: usual care; no 11th-grade intervention	Students in the original grades 7–9 cohort contacted in 10th grade: n = 2,051 (76%) I grades (7–11) Lapsed grades (7–9) Delayed grade (11 only) C-usual care At analysis n = 1,545 (75%; 58% overall)	Note: Elder 1993 reported combined tobacco use rates	Differences not significant			Post (4 years)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Weekly Note: Statistical significance was reported for comparison of nonsmoking (significant in favor of the intervention B versus usual care	C 0.8%	C 3.0% n = 1,091	Reference	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Weekly Note: Statistical significance was reported for comparison of nonsmoking (significant in favor of the intervention B versus usual care	I-B 1.6%	I-B 1.6% 1,060	-2.2 percentage points	6 months
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Weekly Note: Statistical significance was reported for comparison of nonsmoking (significant in favor of the intervention B versus usual care	I-C 1.7%	I-C 1.1% 791	-2.8 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Weekly Note: Statistical significance was reported for comparison of nonsmoking (significant in favor of the intervention B versus usual care	I-D 1.8%	I-D 2.7% 878	-1.3 percentage points	6 months
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Less than once/week	C 4.1%	C 5.9%	Reference	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Less than once/week	I-B 4.2%	I-B 4.9%	-1.1 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Less than once/week	I-C 4.4%	I-C 5.9%	-0.3 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Less than once/week	I-D 5.2%	I-D 6.7%	-0.3 percentage points	6 months
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Daily	C 2.2%	C 6.6%	Reference	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Daily	I-B 1.1%	I-B 2.2%	-2.2 percentage points	6 months
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Daily	I-C 2.1%	I-C 5.6%	-0.9 percentage points	6 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Jøsendal et al. 1998 (1995–97) Greatest: group nonrandomized trial Fair (4 limitations) Schools (grade 7)	Norway; nationwide sample School-based education, 8 sessions in grade 7 delivered by teachers; decision-making and social skills to resist smoking pressures; short-term consequences of use; parent education brochures and pledge; teacher training Compared with usual care	Random sample of secondary schools (99) systematically assigned to condition A: usual care B: education + parent + teacher C: education + parent D: education + teacher 7th grade students n = 4,441 eligible n = 3,820 (86%) follow-up	(1) Student self-reported smoking Daily	I-D 3.2%	I-D 7.1%	-0.5 percentage points	6 months
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) 7-day use	I 9.7%	I 30.1%	-6.1 percentage points	1 year (7th–9th grades)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) 7-day use	C 11.4%	C 37.9% p <0.01	-6.1 percentage points	1 year (7th–9th grades)
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) 30-day use	I 12.9%	I 33.6%	-6.1 percentage points	1 year (7th–9th grades)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) 30-day use	C 16.7%	C 43.5% p <0.01	-6.1 percentage points	1 year (7th–9th grades)
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) 24-hour use	I 5.2%	I 21.6%	-5.3 percentage points	1 year (7th–9th grades)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) 24-hour use	C 6.2%	C 27.9% $p < 0.05$	-5.3 percentage points	1 year (7th–9th grades)
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) Ever use	I 51.1%	I 72.2%	-4.5 percentage points	1 year (7th–9th grades)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Noland et al. 1998 (1992–93) Greatest: group randomized trial Fair (2 limitations) Schools (7th and 8th grade)	Kentucky School-based education; tobacco use prevention; social influences content: 6 45–50 minute sessions in 7th grade delivered by classroom teachers + 3 sessions in 8th grade delivered by project educators Compared with usual care	Selected schools in study areas assigned to condition (blocked on baseline tobacco use prevalence) I: n = 10 schools C: n = 9 schools 7th-grade students at baseline: n = 3,588 At 9th-grade follow-up N = 3,072 (86%)	(1) Student self-reported cigarette use (prevalence) Ever use	C 51.4%	C 77.0% not significant	-4.5 percentage points	1 year (7th–9th grades)
Sussman et al. 1998 (1994–95) Greatest: group randomized trial Fair (2 limitations) Schools (continuation high schools)	Southern California School-based education; drug use prevention/ cessation; 9 classroom sessions over 3 weeks delivered by trained project staff; health motivation, social skills, decision-making; emphasis on motivational activities; additional schoolwide activities (SAC) in one arm Compared with usual care	Selected continuation high schools (21 schools from 29 districts) Blocked random assignment Class: 7 schools Class + schoolwide activities: 7 schools Usual care: 7 schools Students (all grades) N = 2,863 available N = 1,587 consent N = 1,074 (38%) at analysis	(1) Adjusted means of student self-reported cigarette use in the past 30 days (prevalence) Adjusted for baseline use, interaction between condition and baseline level, and method of follow-up	I-Class not reported	I-C 34.53 (%)	+3.82 percentage points	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1998 (1994–95) Greatest: group randomized trial Fair (2 limitations) Schools (continuation high schools)	Southern California School-based education; drug use prevention/ cessation; 9 classroom sessions over 3 weeks delivered by trained project staff; health motivation, social skills, decision-making; emphasis on motivational activities; additional schoolwide activities (SAC) in one arm Compared with usual care	Selected continuation high schools (21 schools from 29 districts) Blocked random assignment Class: 7 schools Class + schoolwide activities 7 schools Usual care: 7 schools Students (all grades) N = 2,863 available N = 1,587 consent N = 1,074 (38%) at analysis	(1) Adjusted means of student self-reported cigarette use in the past 30 days (prevalence) Adjusted for baseline use, interaction between condition and baseline level, and method of follow-up	I-Class + schoolwide activities not reported	I-schoolwide activities 33.08	+2.37 percentage points	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1998 (1994–95) Greatest: group randomized trial Fair (2 limitations) Schools (continuation high schools)	Southern California School-based education; drug use prevention/ cessation; 9 classroom sessions over 3 weeks delivered by trained project staff; health motivation, social skills, decision-making; emphasis on motivational activities; additional schoolwide activities (SAC) in one arm Compared with usual care	Selected continuation high schools (21 schools from 29 districts) Blocked random assignment Class: 7 schools Class + schoolwide activities: 7 schools Usual care: 7 schools Students (all grades) N = 2,863 available N = 1,587 consent N = 1,074 (38%) at analysis	(1) Adjusted means of student self-reported cigarette use in the past 30 days (prevalence) Adjusted for baseline use, interaction between condition and baseline level, and method of follow-up	C-Usual care not reported	C 30.71	Reference	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Sussman et al. 1998 (1994–95) Greatest: group randomized trial Fair (2 limitations) Schools (continuation high schools)	Southern California School-based education; drug use prevention/ cessation; 9 classroom sessions over 3 weeks delivered by trained project staff; health motivation, social skills, decision-making; emphasis on motivational activities; additional schoolwide activities (SAC) in one arm Compared with usual care	Selected continuation high schools (21 schools from 29 districts) Blocked random assignment Class: 7 schools Class + schoolwide activities: 7 schools Usual care: 7 schools Students (all grades) N = 2,863 available N = 1,587 consent N = 1,074 (38%) at analysis	(1) Adjusted means of student self-reported cigarette use in the past 30 days (prevalence) Adjusted for baseline use, interaction between condition and baseline level, and method of follow-up	Note		Condition effect $F(2,18) = 0.16$ $p = 0.85$ Interaction effect $F(2,1049) = 0.45$ $p = 0.64$	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(1) Student self-reported smoking in the past month (prevalence-monthly)	I 4.2%	I 8.8%	-3.7 percentage points $x^2 = 7.1$ $p < 0.005$	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(1) Student self-reported smoking in the past month (prevalence-monthly)	C 4.0%	C 12.3%	-3.7 percentage points $x^2 = 7.1$ $p < 0.005$	1 year (8th grade)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(1) Student self-reported ever smoking (prevalence-ever)	I 19.1%	I 28.3%	-6.1 percentage points p = 0.001	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(1) Student self-reported ever smoking (prevalence-ever)	C 19.2%	C 34.5%	-6.1 percentage points p = 0.001	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(1) Self-reported initiation of tobacco use over study period (initiation-undefined)	I (0%)	I 19.6%	-4.3 percentage points p = 0.02	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(1) Self-reported initiation of tobacco use over study period (initiation-undefined)	C (0%)	C 23.9%	-4.3 percentage points p = 0.02	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(3) Student self reported intentions to smoke in the future (attitudes)	Adjusted means of scores at follow-up	I 1.68 (SE 0.03)	Improved p = 0.002	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(3) Student self reported intentions to smoke in the future (attitudes)	Adjusted means of scores at follow-up	C 1.85 (SE 0.04)	Improved p = 0.002	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(3) Student anti-smoking attitudes (attitude)	Adjusted means of scores at follow-up	I 87.23 (SE 0.51)	No significant difference	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(3) Student anti-smoking attitudes (attitude)	Adjusted means of scores at follow-up	C 86.34 (SE 0.62)	No significant difference	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(4) Student smoking knowledge score	Adjusted means of scores at follow-up	I 36.12 (SE 0.70)	Increased p = 0.001	1 year

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Botvin et al. 1999 (not reported) Greatest: group randomized trial Fair (2 limitations) Schools (grade 7) Life skills training: girls	New York, New York School-based education; drug use prevention; life skills training: 15 classroom sessions led by regular teachers; social resistance skills training; promotion of general personal and social competence skills Compared with school-based education (5 session information only)	Selected junior high schools in New York City (inner-city, low income) N = 29 assigned 7th-grade female students in study school n = 2,690 N = 2,209 (82%) at 8th-grade follow-up I: 1,278 C: 931	(4) Student smoking knowledge score	Adjusted means of scores at follow-up	C 30.19 (SE 0.84)	Increased p = 0.001	1 year
Cameron et al. 1999 (not reported [1992]) Greatest: group randomized trial Fair (2 limitations) Schools ("elementary" grades 6, 7, 8) [Canada] Waterloo Curriculum	Ontario, Canada School-based smoking prevention program; social influences; lessons in grade 6 (6), grade 7 (3), and grade 8 (6); modeling, rehearsal, discussions, audio visual aids, manuals; 4 intervention arms (training/provider comparisons) Compared with usual care	7 school districts Participating schools (n = 100) stratified on baseline risk score then randomly assigned I: 4 arms C: 1 arm Students: N = 4,466 baseline response N = 3,821 (85.6%) at post	(1) Student self-reported smoking status (experimental + regular/weekly) (prevalence) Note: No significant differences as function of training method or provider	I not reported (post only)	I 17.9%	-3.1 percentage points not significant	Post (8th grade-3 year intervention period)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Cameron et al. 1999 (not reported [1992]) Greatest: group randomized trial Fair (2 limitations) Schools ("elementary" grades 6, 7, 8) [Canada] Waterloo Curriculum	Ontario, Canada School-based smoking prevention program; social influences; lessons in grade 6 (6), grade 7 (3), and grade 8 (6); modeling, rehearsal, discussions, audio visual aids, manuals; 4 intervention arms (training/provider comparisons) Compared with usual care	7 school districts Participating schools (n = 100) stratified on baseline risk score then randomly assigned I: 4 arms C: 1 arm Students: N = 4,466 baseline response N = 3,821 (85.6%) at post	(1) Student self-reported smoking status (experimental + regular/weekly) (prevalence) Note: No significant differences as function of training method or provider	C not reported (post only)	C 21.0%	-3.1 percentage points not significant	Post (8th grade-3 year intervention period)
Cameron et al. 1999 (not reported [1992]) Greatest: group randomized trial Fair (2 limitations) Schools ("elementary" grades 6, 7, 8) [Canada] Waterloo Curriculum	Ontario, Canada School-based smoking prevention program; social influences; lessons in grade 6 (6), grade 7 (3), and grade 8 (6); modeling, rehearsal, discussions, audio visual aids, manuals; 4 intervention arms (training/provider comparisons) Compared with usual care	7 school districts Participating schools (n = 100) stratified on baseline risk score then randomly assigned I: 4 arms C: 1 arm Students: N = 4,466 baseline response N = 3,821 (85.6%) at post	Subset analysis: students in schools with baseline high risk score Note: No significant differences as function of training method or provider	I not reported	I 16.0%	-10.9 percentage points logistic regression $F_{1,26} = 8.99$ $p = 0.006$	Post (8th grade-3 year intervention period)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Cameron et al. 1999 (not reported [1992]) Greatest: group randomized trial Fair (2 limitations) Schools ("elementary" grades 6, 7, 8) [Canada] Waterloo Curriculum	Ontario, Canada School-based smoking prevention program; social influences; lessons in grade 6 (6), grade 7 (3), and grade 8 (6); modeling, rehearsal, discussions, audio visual aids, manuals; 4 intervention arms (training/provider comparisons) Compared with usual care	7 school districts Participating schools (n = 100) stratified on baseline risk score then randomly assigned I: 4 arms C: 1 arm Students: N = 4,466 baseline response N = 3,821 (85.6%) at post	Subset analysis: students in schools with baseline high risk score Note: No significant differences as function of training method or provider	C not reported	C 26.9%	-10.9 percentage points logistic regression $F_{1,26} = 8.99$ $p = 0.006$	Post (8th grade-3 year intervention period)

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(1) Student self-reported smoking (monthly or greater) (prevalence)	I1 7.4%	I1 28.4%	-2.7 percentage points odds ratio = 0.91 95% confidence interval (0.48, 1.72)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(1) Student self-reported smoking (monthly or greater) (prevalence)	I2 15.5%	I2 36.9%	-2.3 percentage points odds ratio = 0.91 95% confidence interval (0.48, 1.72)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(1) Student self-reported smoking (monthly or greater) (prevalence)	C 11.0% p <0.01	C 34.7%	Reference odds ratio = 0.91 95% confidence interval (0.48, 1.72)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(2) Student smoking-baseline nonsmokers (initiation)	I1 (0)%	I1 not reported	not reported (not significant)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(2) Student smoking-baseline nonsmokers (initiation)	I2 (0)%	I2 not reported	not reported (not significant)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(2) Student smoking-baseline nonsmokers (initiation)	C (0)%	C not reported	not reported	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(3) Student self-reported "high" intentions to smoke in the future (attitudes)	I1 12.0%	I1 26.1%	-1.7 percentage points odds ratio = 1.18 95% confidence interval (0.66, 2.09)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(3) Student self-reported "high" intentions to smoke in the future (attitudes)	I2 21.6%	I2 39.9%	+2.8 percentage points odds ratio = 1.18 95% confidence interval (0.66, 2.09)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chatrou et al. 1999 (1987–89) Greatest: group randomized trial Fair (4 limitations) Schools (age 12–14 years) Brabant Smoking Prevention Program	Brabant, The Netherlands 2 intervention arms of 3 class sessions over 3 weeks; video presentation; class discussions; organized by trained adults Emotional/self group (I1) smoking effects; risky behavior situations and emotional aspects Health/technical group (I2) focused on health and technical aspects of smoking Compared with usual care	Selected schools: n = 4 (vocation and high school); random allocation by classes I1 Classes 13 Students 284 I2 Classes 15 Students 315 C Classes 20 Students 350 Follow-up at 18 months n = 794 (84%)	(3) Student self-reported "high" intentions to smoke in the future (attitudes)	C 18.6% $p < 0.01$	C 34.1%	Reference odds ratio = 1.18 95% confidence interval (0.66, 2.09)	18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dijkstra et al. 1999 (1990–92) Greatest: group randomized trial Fair (4 limitations) Schools (grades 8 and 9; high school)	The Netherlands School-based education; smoking prevention; 5 45-minute lessons delivered weekly; social influences (SI) or decision-making + social influences curriculum with and without 3 magazines distributed in class as boosters (B). Compared with usual care	Recruited high schools n = 52 randomly assigned to condition Students: 8th grade at baseline: n = 4,826 N = 3,104 (64%) at post (18 months) Group I-social influences + B N post 526 Group I-social influences N post 575 Group I-social influences-decision-making+B N post 351 Group I-social influences+decision-making N post 460 Group C N post 1,192	(1) Student self-reported smoking (combined daily + weekly + occasional) (prevalence)	I-social influences+B 5.3%	15.0%	-5.2 percentage points p <0.005	Post 18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dijkstra et al. 1999 (1990–92) Greatest: group randomized trial Fair (4 limitations) Schools (grades 8 and 9; high school)	The Netherlands School-based education; smoking prevention; 5 45-minute lessons delivered weekly; social influences (SI) or decision-making + social influences curriculum with and without 3 magazines distributed in class as boosters (B). Compared with usual care	Recruited high schools n = 52 randomly assigned to condition Students: 8th grade at baseline: n = 4,826 N = 3,104 (64%) at post (18 months) Group I-social influences + B N post 526 Group I-social influences N post 575 Group I-social influences-decision-making+B N post 351 Group I-social influences+decision-making N post 460 Group C N post 1,192	(1) Student self-reported smoking (combined daily + weekly + occasional) (prevalence)	I-social influences 7.3%	21.2%	-1 percentage points not significant	Post 18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dijkstra et al. 1999 (1990–92) Greatest: group randomized trial Fair (4 limitations) Schools (grades 8 and 9; high school)	The Netherlands School-based education; smoking prevention; 5 45-minute lessons delivered weekly; social influences (SI) or decision-making + social influences curriculum with and without 3 magazines distributed in class as boosters (B). Compared with usual care	Recruited high schools n = 52 randomly assigned to condition Students: 8th grade at baseline: n = 4,826 N = 3,104 (64%) at post (18 months) Group I-social influences + B N post 526 Group I-social influences N post 575 Group I-social influences-decision-making+B N post 351 Group I-social influences+decision-making N post 460 Group C N post 1,192	(1) Student self-reported smoking (combined daily + weekly + occasional) (prevalence)	I-social influences+decision-making+B 7.7%	20.5%	-2.1 percentage points not significant	Post 18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dijkstra et al. 1999 (1990–92) Greatest: group randomized trial Fair (4 limitations) Schools (grades 8 and 9; high school)	The Netherlands School-based education; smoking prevention; 5 45-minute lessons delivered weekly; social influences (SI) or decision-making + social influences curriculum with and without 3 magazines distributed in class as boosters (B). Compared with usual care	Recruited high schools n = 52 randomly assigned to condition Students: 8th grade at baseline: n = 4,826 N = 3,104 (64%) at post (18 months) Group I-social influences + B N post 526 Group I-social influences N post 575 Group I-social influences-decision-making+B N post 351 Group I-social influences+decision-making N post 460 Group C N post 1,192	(1) Student self-reported smoking (combined daily + weekly + occasional) (prevalence)	I-social influences + decision-making 13.5%	23.9%	-4.5 percentage points p <0.07	Post 18 months

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Dijkstra et al. 1999 (1990–92) Greatest: group randomized trial Fair (4 limitations) Schools (grades 8 and 9; high school)	The Netherlands School-based education; smoking prevention; 5 45-minute lessons delivered weekly; social influences (SI) or decision-making + social influences curriculum with and without 3 magazines distributed in class as boosters (B). Compared with usual care	Recruited high schools n = 52 randomly assigned to condition Students: 8th grade at baseline: n = 4,826 N = 3,104 (64%) at post (18 months) Group I-social influences + B N post 526 Group I-social influences N post 575 Group I-social influences-decision-making+B N post 351 Group I-social influences+decision-making N post 460 Group C N post 1,192	(1) Student self-reported smoking (combined daily + weekly + occasional) (prevalence)	C 6.4%	21.3%	Reference	Post 18 months
Hawkins et al. 1999 (1981–86 [follow-up 1993]) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary)	Seattle, Washington School-based education (general social competence) + teacher education + parent education Compared with usual care	Elementary schools n = 18 assigned standard to condition Students Full 156 baseline 149 Students Late baseline 267 follow-up 243 Students C baseline 220 follow-up 206	(1) Student self-reported cigarette smoking-lifetime (ever) at follow-up (age 18) (prevalence)	C 54.4%	I-Full 53.7%	-0.7 percentage points (-10.6, 10.4) not significant	6 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Hawkins et al. 1999 (1981–86 [follow-up 1993]) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary)	Seattle, Washington School-based education (general social competence) + teacher education + parent education Compared with usual care	Elementary schools n = 18 assigned standard to condition Students Full 156 baseline 149 Students Late baseline 267 follow-up 243 Students C baseline 220 follow-up 206	(1) Student self-reported cigarette smoking-lifetime (ever) at follow-up (age 18) (prevalence)	C 54.4%	I-Later 52.7%	-1.7 percentage points (-10.5, 8.0) not significant	6 years
Hawkins et al. 1999 (1981–86 [follow-up 1993]) Greatest: group nonrandomized trial Fair (4 limitations) Schools (elementary)	Seattle, Washington School-based education (general social competence) + teacher education + parent education Compared with usual care	Elementary schools n = 18 assigned standard to condition Students Full 156 baseline 149 Students Late baseline 267 follow-up 243 Students C baseline 220 follow-up 206	Heavy cigarette smoking	C not reported	not reported	No significant effects	6 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Lynam et al. 1999 also Clayton et al. 1996 (1987–88 [follow-up 1997]) Greatest: group randomized trial Fair (4 limitations) Schools (grade 6; elementary) DARE (Drug Abuse Resistance Education)	Lexington-Fayette County, Kentucky DARE: school-based education; drug use prevention; 1 hour sessions x 17 weeks delivered by trained law enforcement officers; skills teaching social pressures; decision-making; self-esteem; drug information and alternatives Compared with school-based education (usual care)	Recruited elementary schools in county: n = 31 I: 23 schools C: 8 schools Students in study schools Baseline 2,071 5 years 1,143 10 years 1,002 Baseline 5 years (55%) 10 years (48%) I 762 10 year C 240 follow-up	(1) Student self-reported cigarette use (variety of frequency and prevalence measures) (prevalence)	I not reported C not reported	I not reported C not reported	No significant differences at 5-year or 10-year follow-up	10 years and 5 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Lynam et al. 1999 also Clayton et al. 1996 (1987–88 [follow-up 1997]) Greatest: group randomized trial Fair (4 limitations) Schools (grade 6; elementary) DARE (Drug Abuse Resistance Education)	Lexington-Fayette County, Kentucky DARE: school-based education; drug use prevention; 1 hour sessions x 17 weeks delivered by trained law enforcement officers; skills teaching social pressures; decision-making; self-esteem; drug information and alternatives Compared with school-based education (usual care)	Recruited elementary schools in county: n = 31 I: 23 schools C: 8 schools Students in study schools Baseline 2,071 5 years 1,143 10 years 1,002 Baseline 5 years (55%) 10 years (48%) I 762 10 year C 240 follow-up	Hierarchical linear models with fixed effect estimates (group mean centered)	Frequency past month cigarette use	Fixed effect: 0.101	Not significant	10 years and 5 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Lynam et al. 1999 also Clayton et al. 1996 (1987–88 [follow-up 1997]) Greatest: group randomized trial Fair (4 limitations) Schools (grade 6; elementary) DARE (Drug Abuse Resistance Education)	Lexington-Fayette County, Kentucky DARE: school-based education; drug use prevention; 1 hour sessions x 17 weeks delivered by trained law enforcement officers; skills teaching social pressures; decision-making; self-esteem; drug information and alternatives Compared with school-based education (usual care)	Recruited elementary schools in county: n = 31 I: 23 schools C: 8 schools Students in study schools Baseline 2,071 5 years 1,143 10 years 1,002 Baseline 5 years (55%) 10 years (48%) I 762 10 year C 240 follow-up	(3) Positive expectancies toward cigarettes (attitude) Fixed effect estimates		0.053	Not significant	10 years and 5 years
Bergamaschi et al. 2000 (1993–94) Moderate: Retrospective cohort Fair (4 limitations) Schools (middle schools) Leave Us Clean	Italy; 3 communities in Romagna School-based education campaign; antismoking; 6 units led by regular teachers for middle school students; resist influences to start smoking Compared with exposed versus not exposed while middle school students	2nd year high school students (aged 16 years) present on date of survey N = 2,691 Exposed 863 (32.1%) Unexposed 1,828 (67.9%)	(1) Student self-reported smoker	Exposed not reported	Exposed 19.1%	-4.1 percentage points x^2=5.54 p <0.05	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Bergamaschi et al. 2000 (1993–94) Moderate: Retrospective cohort Fair (4 limitations) Schools (middle schools) Leave Us Clean	Italy; 3 communities in Romagna School-based education campaign; antismoking; 6 units led by regular teachers for middle school students; resist influences to start smoking Compared with exposed versus not exposed while middle school students	2nd year high school students (aged 16 years) present on date of survey N = 2,691 Exposed 863 (32.1%) Unexposed 1,828 (67.9%)	(1) Student self-reported smoker	Unexposed not reported	Unexposed 23.2%	-4.1 percentage points x^2=5.54 p <0.05	3 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Peterson et al. 2000 (1984–99) Greatest: group randomized trial Good (0 limitations) Schools (grades 3–10) Hutchinson Smoking Prevention Project	Washington state School-based education, based on social influences; led by trained teachers with curriculum for grades 3–10; 65 classroom lessons 30–50 minute each (5–10 lessons/grade) total 46.75 hours (3.2 hours/grade); also self-help cessation materials and promotion (grades 9–12), and biannual newsletters for teachers Compared with usual care (school education was noted at 2.9 hours/grade)	Recruited school districts (40 of 41) Matched pair randomization to condition I: n = 20 districts C: n = 20 districts Students 3rd-grade baseline I 4,177 C 4,211 2 years post 12th grade follow-up I 3,919 (94%) C 3,946 (94%)	(1) Mean school district smoking prevalence-daily smoking (prevalence)	I not reported (3rd grade)	I 28.42%	-0.65 percentage points 95% confidence interval (-2.8, +3.8) p=0.68 +1.4 percentage points p=0.38 -2.6 percentage points p=0.30	2 years post 12th grade 4 years post education intervention 11 years post baseline

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Peterson et al. 2000 (1984–99) Greatest: group randomized trial Good (0 limitations) Schools (grades 3–10) Hutchinson Smoking Prevention Project	Washington state School-based education, based on social influences; led by trained teachers with curriculum for grades 3–10; 65 classroom lessons 30–50 minute each (5–10 lessons/grade) total 46.75 hours (3.2 hours/grade); also self-help cessation materials and promotion (grades 9–12), and biannual newsletters for teachers Compared with usual care (school education was noted at 2.9 hours/grade)	Recruited school districts (40 of 41) Matched pair randomization to condition I: n = 20 districts C: n = 20 districts Students 3rd-grade baseline I 4,177 C 4,211 2 years post 12th grade follow-up I 3,919 (94%) C 3,946 (94%)	(1) Mean school district smoking prevalence-daily smoking (prevalence)	C not reported	C 29.07%	-0.65 percentage points 95% confidence interval (-2.8, +3.8) p=0.68 +1.4 percentage points p=0.38 -2.6 percentage points p=0.30	2 years post 12th grade 4 years post education intervention 11 years post baseline

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Peterson et al. 2000 (1984–99) Greatest: group randomized trial Good (0 limitations) Schools (grades 3–10) Hutchinson Smoking Prevention Project	Washington state School-based education, based on social influences; led by trained teachers with curriculum for grades 3–10; 65 classroom lessons 30–50 minute each (5–10 lessons/grade) total 46.75 hours (3.2 hours/grade); also self-help cessation materials and promotion (grades 9–12), and biannual newsletters for teachers Compared with usual care (school education was noted at 2.9 hours/grade)	Recruited school districts (40 of 41) Matched pair randomization to condition I: n = 20 districts C: n = 20 districts Students 3rd-grade baseline I 4,177 C 4,211 2 years post 12th grade follow-up I 3,919 (94%) C 3,946 (94%)	Subset Girls	not reported	I 27.0% C 25.6%	-0.65 percentage points 95% confidence interval (-2.8, +3.8) p=0.68 +1.4 percentage points p=0.38 -2.6 percentage points p=0.30	2 years post 12th grade 4 years post education intervention 11 years post baseline

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Peterson et al. 2000 (1984–99) Greatest: group randomized trial Good (0 limitations) Schools (grades 3–10) Hutchinson Smoking Prevention Project	Washington state School-based education, based on social influences; led by trained teachers with curriculum for grades 3–10; 65 classroom lessons 30–50 minute each (5–10 lessons/grade) total 46.75 hours (3.2 hours/grade); also self-help cessation materials and promotion (grades 9–12), and biannual newsletters for teachers Compared with usual care (school education was noted at 2.9 hours/grade)	Recruited school districts (40 of 41) Matched pair randomization to condition I: n = 20 districts C: n = 20 districts Students 3rd-grade baseline I 4,177 C 4,211 2 years post 12th grade follow-up I 3,919 (94%) C 3,946 (94%)	Subset Boys	not reported	I 29.9% C 32.5%	-0.65 percentage points 95% confidence interval (-2.8, +3.8) p=0.68 +1.4 percentage points p=0.38 -2.6 percentage points p=0.30	2 years post 12th grade 4 years post education intervention 11 years post baseline

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Peterson et al. 2000 (1984–99) Greatest: group randomized trial Good (0 limitations) Schools (grades 3–10) Hutchinson Smoking Prevention Project	Washington state School-based education, based on social influences; led by trained teachers with curriculum for grades 3–10; 65 classroom lessons 30–50 minute each (5–10 lessons/grade) total 46.75 hours (3.2 hours/grade); also self-help cessation materials and promotion (grades 9–12), and biannual newsletters for teachers Compared with usual care (school education was noted at 2.9 hours/grade)	Recruited school districts (40 of 41) Matched pair randomization to condition I: n = 20 districts C: n = 20 districts Students 3rd-grade baseline I 4,177 C 4,211 2 years post 12th grade follow-up I 3,919 (94%) C 3,946 (94%)	(1) Mean school district smoking prevalence-daily smoking (prevalence)	I Not reported (3rd grade)	I 25.4%	-0.3 percentage points 95% confidence interval (-3.5, +3.7) p=0.86	12th grade 9 years post baseline

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Peterson et al. 2000 (1984–99) Greatest: group randomized trial Good (0 limitations) Schools (grades 3–10) Hutchinson Smoking Prevention Project	Washington state School-based education, based on social influences; led by trained teachers with curriculum for grades 3–10; 65 classroom lessons 30–50 minute each (5–10 lessons/grade) total 46.75 hours (3.2 hours/grade); also self-help cessation materials and promotion (grades 9–12), and biannual newsletters for teachers Compared with usual care (school education was noted at 2.9 hours/grade)	Recruited school districts (40 of 41) Matched pair randomization to condition I: n = 20 districts C: n = 20 districts Students 3rd-grade baseline I 4,177 C 4,211 2 years post 12th grade follow-up I 3,919 (94%) C 3,946 (94%)	(1) Mean school district smoking prevalence-daily smoking (prevalence)	C not reported	C 25.7%	-0.3 percentage points 95% confidence interval (-3.5, +3.7) p=0.86	12th grade 9 years post baseline

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Aveyard et al. 2001 (1997–98) Greatest: group randomized trial Fair (4 limitations) Schools (year 9)	West Midlands region, United Kingdom School-based education (6 sessions computer + classroom) Compared with school-based education (national health education curriculum)	Participating schools n = 53 (58%) I: 27 C: 26 Students in year 9 n = 8,352 enrolled n = 6,819 (73%) at 2-year follow-up	(1) Self-reported regular weekly smoking (prevalence years 9–11)	I 13.3%	I 23.5%	+0.6 percentage points overall; -1.1 percentage points (post-only) Adjusted odds ratio 1.06 (0.86, 1.31)	2 years
Aveyard et al. 2001 (1997–98) Greatest: group randomized trial Fair (4 limitations) Schools (year 9)	West Midlands region, United Kingdom School-based education (6 sessions computer + classroom) Compared with school-based education (national health education curriculum)	Participating schools n = 53 (58%) I: 27 C: 26 Students in year 9 n = 8,352 enrolled n = 6,819 (73%) at 2-year follow-up	(1) Self-reported regular weekly smoking (prevalence years 9–11)	C 12.8%	C 22.4%	+0.6 percentage points overall; -1.1 percentage points (post-only) Adjusted odds ratio 1.06 (0.86, 1.31)	2 years

Table 6.9 Continued

Author & year (study period) Design suitability: design Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population; sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Aveyard et al. 2001 (1997–98) Greatest: group randomized trial Fair (4 limitations) Schools (year 9)	West Midlands region, United Kingdom School-based education (6 sessions computer + classroom) Compared with school-based education (national health education curriculum)	Participating schools n = 53 (58%) I: 27 C: 26 Students in year 9 n = 8,352 enrolled n = 6,819 (73%) at 2-year follow-up	(2) Self-reported smoking in baseline regular, daily smokers (cessation)	I (100%)	I 76.1%	+0.5 percentage points (-6.8, +9.9)	2 years
Aveyard et al. 2001 (1997–98) Greatest: group randomized trial Fair (4 limitations) Schools (year 9)	West Midlands region, United Kingdom School-based education (6 sessions computer + classroom) Compared with school-based education (national health education curriculum)	Participating schools n = 53 (58%) I: 27 C: 26 Students in year 9 n = 8,352 enrolled n = 6,819 (73%) at 2-year follow-up	(2) Self-reported smoking in baseline regular, daily smokers (cessation)	C (100%)	C 76.6%	+0.5 percentage points (-6.8, +9.9)	2 years

Note: **CI** = confidence interval; **ALA** = American Lung Association; **ANCOVA** = analysis of covariation; **HS** = high school; **MS** = middle school; **NR** = not reported; **NS** = not significant; **OR** = odds ratio; **SD** = standard deviation; **SWAT** = Students Working Against Tobacco; **µmoles/L** = micrometer per liter.

Table 6.10 Studies of the effectiveness of multicomponent interventions that include school-based programs to reduce tobacco use

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Flay 1987 (1982–1984) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Los Angeles, California School-based education + mass media series (5 TV news segments) Compared with unexposed to school program (possible media exposure)	7th-grade students At analysis N = 1,419 I = 783 C = 636	(1) Self-reported current cigarette use Pre-post mean increase	Immediately post I = -0.56	2-year follow-up I = +0.03	Overall difference: -0.16 No significant difference on analyses	2 years
Flay 1987 (1982–1984) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Los Angeles, California School-based education + mass media series (5 TV news segments) Compared with unexposed to school program (possible media exposure)	7th-grade students At analysis N = 1,419 I = 783 C = 636	(1) Self-reported current cigarette use Pre-post mean increase	Immediately post C = -0.67	2-year follow-up C = +0.08	Overall difference: -0.16 No significant difference on analyses	2 years
Johnson et al. 1990 (1984–1986) Greatest (group randomized trial) Good (1 limitation) Community-wide	Kansas City, Kansas School-based education + community education + mass media campaign Compared with usual care with potential exposure to mass media	Schools selected for evaluation N = 8 (4I + 4C) 6th- and 7th-grade students N = 1,607 baseline N = 1,122 at 2 years N = 1,105 (69%) at 3-year follow-up	(1) Self-reported cigarette smoking (any) in the last 30 days	I = 9.8%	I = 24.8%	Overall difference -5.5 percentage points (percentage points) Multiple logistic regression p = 0.21	3 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Johnson et al. 1990 (1984–1986) Greatest (group randomized trial) Good (1 limitation) Community-wide	Kansas City, Kansas School-based education + community education + mass media campaign Compared with usual care with potential exposure to mass media	Schools selected for evaluation N = 8 (4I + 4C) 6th- and 7th-grade students N = 1,607 baseline N = 1,122 at 2 years N = 1,105 (69%) at 3-year follow-up	(1) Self-reported cigarette smoking (any) in the last 30 days	C = 10.0%	C = 30.5%	Overall difference -5.5 percentage points (percentage points) Multiple logistic regression p = 0.21	3 years
Johnson et al. 1990 (1984–1986) Greatest (group randomized trial) Good (1 limitation) Community-wide	Kansas City, Kansas School-based education + community education + mass media campaign Compared with usual care with potential exposure to mass media	Schools selected for evaluation N = 8 (4I + 4C) 6th- and 7th-grade students N = 1,607 baseline N = 1,122 at 2 years N = 1,105 (69%) at 3-year follow-up	Odds ratio (intervention group) for self-reported cigarette use in the last month	Not reported	Not reported	Odds ratio = 0.58 $p < 0.10$	3 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Johnson et al. 1990 (1984–1986) Greatest (group randomized trial) Good (1 limitation) Community-wide	Kansas City, Kansas School-based education + community education + mass media campaign Compared with usual care with potential exposure to mass media	Schools selected for evaluation N = 8 (4I + 4C) 6th- and 7th-grade students N = 1,607 baseline N = 1,122 at 2 years N = 1,105 (69%) at 3-year follow-up	Adjusted net differences in the percentage of smokers (between I and C schools) in the last month	Not reported	Not reported	-16.0 percentage points $p < 0.01$	3 years
Perry et al. 1992 (1983–1989) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Minnesota Mass media campaign + school-based education + community education Compared with usual care	Communities: n = 2 Schools: n = Not reported Students in both 1983 and 1989 surveys 6th–12th grades N = 1,080 (45% of baseline) Cross-sectional N = 1,439 in 1989	(1) Self-reported smoking status (weekly) School as unit of analysis	Cohort I = 1%	Cohort I = 14.6%	Overall difference - 9.5 percentage points	5 years
Perry et al. 1992 (1983–1989) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Minnesota Mass media campaign + school-based education + community education Compared with usual care	Communities: n = 2 Schools: n = Not reported Students in both 1983 and 1989 surveys 6th–12th grades N = 1,080 (45% of baseline) Cross-sectional N = 1,439 in 1989	(1) Self-reported smoking status (weekly) School as unit of analysis	Cohort C = 1%	Cohort C = 24.1% $p = 0.011$	Overall difference - 9.5 percentage points	5 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Perry et al. 1992 (1983–1989) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Minnesota Mass media campaign + school-based education + community education Compared with usual care	Communities: n = 2 Schools: n = Not reported Students in both 1983 and 1989 surveys 6th–12th grades N = 1,080 (45% of baseline) Cross-sectional N = 1,439 in 1989	(1) Self-reported smoking status (weekly) School as unit of analysis	Cross-sectional I = 1.5%	Cross-sectional I = 15%	Overall difference -8.5 percentage points	5 years
Perry et al. 1992 (1983–1989) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Minnesota Mass media campaign + school-based education + community education Compared with usual care	Communities: n = 2 Schools: n = Not reported Students in both 1983 and 1989 surveys 6th–12th grades N = 1,080 (45% of baseline) Cross-sectional N = 1,439 in 1989	(1) Self-reported smoking status (weekly) School as unit of analysis	Cross-sectional C = 2.5%	Cross-sectional C = 24.5% p = 0.007	Overall difference -8.5 percentage points	5 years
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Self-reported smoking prevalence (mean of pre-post differences between treatment cities: survey periods pre-post implementation of school education)	1981–82 survey Aged 12–15 years I1 = 3.8%	1985–86 survey Aged 12–15 years I1 = 8.2	Mean interval change Aged 12–15 years I1 & I2 -1.2 C3 & C4 +4.3 Overall -5.5	2-year follow-up of school education period

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Self-reported smoking prevalence (mean of pre-post differences between treatment cities: survey periods pre-post implementation of school education)	1981–82 survey Aged 12–15 years I2 = 12.5%	1985–86 survey Aged 12–15 years I2 = 5.6	Mean interval change Aged 12–15 years I1 & I2 -1.2 C3 & C4 +4.3 Overall -5.5	2-year follow-up of school education period
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Self-reported smoking prevalence (mean of pre-post differences between treatment cities: survey periods pre-post implementation of school education)	1981–82 survey Aged 12–15 years C3 = 1.7%	1985–86 survey Aged 12–15 years C3 = 4.0	Mean interval change Aged 12–15 years I1 & I2 -1.2 C3 & C4 +4.3 Overall -5.5	2-year follow-up of school education period
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Self-reported smoking prevalence (mean of pre-post differences between treatment cities: survey periods pre-post implementation of school education)	1981–82 survey Aged 12–15 years C4 = 0.0%	1985–86 survey Aged 12–15 years C4 = 6.3	Mean interval change Aged 12–15 years I1 & I2 -1.2 C3 & C4 +4.3 Overall -5.5	2-year follow-up of school education period

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Note: Multiple logistic regression was used for comparison Comparison results were summarized as "not significant" although interval changes were noted within cities Results given here are calculations based on presented data	1981–82 survey Aged 16–19 years I1 = 28.6%	1985–86 survey Aged 16–19 years I1 = 5.9	Mean interval change Aged 16–19 years I1 & I2 -18.6 C3 & C4 -5.6 Overall -13 Differences were not significant	2-year follow-up of school education period
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Note: Multiple logistic regression was used for comparison Comparison results were summarized as "not significant" although interval changes were noted within cities Results given here are calculations based on presented data	1981–82 survey Aged 16–19 years I2 = 38.5%	1985–86 survey Aged 16–19 years I2 = 24.0	Mean interval change Aged 16–19 years I1 & I2 -18.6 C3 & C4 -5.6 Overall -13 Differences were not significant	2-year follow-up of school education period

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Note: Multiple logistic regression was used for comparison Comparison results were summarized as “not significant” although interval changes were noted within cities Results given here are calculations based on presented data	1981–82 survey Aged 16–19 years C3 = 24.3%	1985–86 survey Aged 16–19 years C3 = 17.1	Mean interval change Aged 16–19 years I1 & I2 -18.6 C3 & C4 -5.6 Overall -13 Differences were not significant	2-year follow-up of school education period
Winkleby et al. 1993 (1979–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	4 cities in California Community education + mass media + school education (for 1 year) Compared with usual care	2 I cities 2 C cities Adolescents/young adults aged 12–24 years N = 2,605 across 4 cross-sectional surveys Aged 12–15 years: n = 651 Aged 16–19 years: n = 629	Note: Multiple logistic regression was used for comparison Comparison results were summarized as “not significant” although interval changes were noted within cities Results given here are calculations based on presented data	1981–82 survey Aged 16–19 years C4 = 10.9%	1985–86 survey Aged 16–19 years C4 = 7.0%	Mean interval change Aged 16–19 years I1 & I2 -18.6 C3 & C4 -5.6 Overall -13 Differences were not significant	2-year follow-up of school education period

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Kaufman et al. 1994 (1989–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Chicago, Illinois School-based education + mass media series (contest) Compared with media only	6th- and 7th-grade students in 3 selected schools N = 276	(1) Self-reported tobacco product use Mean score on Botvin scale	I = 13.01	I = 11.63	Scale difference -0.08 points F(1,145) = 0.08 not significant	6 months high school
Kaufman et al. 1994 (1989–1990) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Chicago, Illinois School-based education + mass media series (contest) Compared with media only	6th- and 7th-grade students in 3 selected schools N = 276	(1) Self-reported tobacco product use Mean score on Botvin scale	C = 12.29	C = 10.99	Scale difference -0.08 points F(1,145) = 0.08 not significant	6 months high school
Murray et al. 1994 (1986–1990) Greatest (other design with a concurrent comparison group) Fair (3 limitations) Community-wide	Minnesota (I) and Wisconsin (C) School-based education + excise tax + mass media education + community education Compared with usual care	9th-grade students Estimated 3,600 students/year	(1) Self-reported prevalence of smoking (at least one cigarette/week)	I = 12.6	I = 10.3	Overall difference over study period -2.4 percentage points F = 1.17 p = 0.324	5 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Murray et al. 1994 (1986–1990) Greatest (other design with a concurrent comparison group) Fair (3 limitations) Community-wide	Minnesota (I) and Wisconsin (C) School-based education + excise tax + mass media education + community education Compared with usual care	9th-grade students Estimated 3,600 students/year	(1) Self-reported prevalence of smoking (at least one cigarette/week)	C = 15.8	C = 15.9	Overall difference over study period -2.4 percentage points F = 1.17 p = 0.324	5 years
Flay et al. 1995 (1986–1988) Greatest (group randomized trial) Fair (2 limitations) Community-wide	Los Angeles and San Diego, California School-based education + mass media series (17 TV news segments) Compared with school + media; media alone; school alone; usual care	7th-grade students in 47 study schools N = 6,695 baseline N = 3,155 (47%) at 2-year follow-up	(1) Self-reported tobacco use behaviors			Logistic regression analysis No significant predictors of smoking at any post-test	2 years
Baxter et al. 1997 (1991–1994) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Rotherham, United Kingdom Community education + school education (cardiovasular health promotion) Compared with usual care	7th- and 10th-grade students 1991: n = 1,327 1994: n = 1,678 Cohort 1991–1994 Cross-sectional analysis	(1) Student self-reported “active smoking” Cohort sample (aged 11–14 years)	I = <1%	I = 21%	0 Note: Not significan on cross-sectional analysis	3 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Baxter et al. 1997 (1991–1994) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Rotherham, United Kingdom Community education + school education (cardiovasular health promotion) Compared with usual care	7th- and 10th-grade students 1991: n = 1,327 1994: n = 1,678 Cohort 1991–1994 Cross-sectional analysis	(1) Student self-reported "active smoking" Cohort sample (aged 11–14 years)	C = 4%	C = 24%	0 Note: Not significan on cross-sectional analysis	3 years
Baxter et al. 1997 (1991–1994) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Rotherham, United Kingdom Community education + school education (cardiovasular health promotion) Compared with usual care	7th- and 10th-grade students 1991: n = 1,327 1994: n = 1,678 Cohort 1991–1994 Cross-sectional analysis	(2) Student self-reported "passive smoking" Cohort sample (aged 11–14 years)	I = 52%	I = 49%	+9 percentage points Note: Not significant on cross-sectional analysis	3 years
Baxter et al. 1997 (1991–1994) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Rotherham, United Kingdom Community education + school education (cardiovasular health promotion) Compared with usual care	7th- and 10th-grade students 1991: n = 1,327 1994: n = 1,678 Cohort 1991–1994 Cross-sectional analysis	(2) Student self-reported "passive smoking" Cohort sample (aged 11–14 years)	C = 57%	C = 45%	+9 percentage points Note: Not significant on cross-sectional analysis	3 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Flynn et al. 1997 (1985–1991) Greatest (group non-randomized trial) Good (1 limitation) Community-wide	Northeast United States and Montana School-based education + mass media campaign Compared with school-based education only	Students in study schools (grades 4, 5, 6 at baseline with follow-up through grades 10, 11, 12) N = 5,458 (cohort) N = 2,086 (38%) Observed in all 6 surveys	(1) Self-reported tobacco use behaviors Odds ratio for weekly smoking status Individual as the unit of analysis (Significant differences were also observed using the community as the unit of analysis)			Stepwise logistic regression Intervention Odds ration = 0.62 95% confidence interval (0.49, 0.78)	6 years (2 years post I)
Lewit et al. 1997 (1990, 1992 surveys) Least (cross-sectional surveys) Fair (3 limitations) Community-wide	United States + Canada 21 communities Variable: cigarette price, and the presence/absence of COMMIT (community education), clean indoor air laws, school smoking policies, school education, antitobacco media exposure, protobacco media exposure, minors' access restrictions Compared with cross-sectional 1990 and 1992	Random samples of classrooms 9th-grade students n = 15,432 (88% of respondents)	Variable for cumulative school education exposure (self-reported total of grades with class instruction for grades 1-8) Mean exposure was 3.29 grades	Not available	Not available	Variable -0.02 $p \leq 0.05$	Not available

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Lewit et al. 1997 (1990, 1992 surveys) Least (cross-sectional surveys) Fair (3 limitations) Community-wide	United States + Canada 21 communities Variable: cigarette price, and the presence/absence of COMMIT (community education), clean indoor air laws, school smoking policies, school education, antitobacco media exposure, protobacco media exposure, minors' access restrictions Compared with cross-sectional 1990 and 1992	Random samples of classrooms 9th-grade students n = 15,432 (88% of respondents)	Variable for school smoking policy (self-reported scale score from 0-allowed anywhere to 3-not allowed on school property) Mean of scale score was 2.58 Note: Primary outcomes reported were price elasticity estimates (not presented)	Not available	Not available	Variable -0.13 Not significant	Not available
Chou et al. 1998 (1987–1990) Greatest (group randomized trial) Fair (3 limitations) Community-wide	Indianapolis, Indiana School-based education + other school (parent program, policy focus) + mass media campaign + community education Compared with usual care	Subset analysis 7th-grade students using tobacco at baseline Baseline N = 212 I Follow-up 53 I Baseline N = 188 C Follow-up 55 C	Subset analysis: baseline tobacco users (1) Interval decrease in self-reported tobacco use in the previous month	I = Not reported	I = Not reported	Odds ratio for decreasing use Odds ratio = 1.53 95% confidence interval (1.05, 2.24)	3.5 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Chou et al. 1998 (1987–1990) Greatest (group randomized trial) Fair (3 limitations) Community-wide	Indianapolis, Indiana School-based education + other school (parent program, policy focus) + mass media campaign + community education Compared with usual care	Subset analysis 7th-grade students using tobacco at baseline Baseline N = 212 I Follow-up 53 I Baseline N = 188 C Follow-up 55 C	Subset analysis: baseline tobacco users (1) Interval decrease in self-reported tobacco use in the previous month	C = Not reported	C = Not reported	Odds ratio for decreasing use Odds ratio = 1.53 95% confidence interval (1.05, 2.24)	3.5 years
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	(1) Self-reported smoking status Any	I10 = 15%	I10 = 34.6%	Overall differences versus comparison I10: -14.8 percentage points	15 years
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	(1) Self-reported smoking status Any	I5 = 13.2%	I5 = 34.3%	Overall differences versus comparison I5: -13.3 percentage points	15 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	(1) Self-reported smoking status Any	C = 8.4%	C = 42.8%		15 years
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	(1) Self-reported smoking status Daily	I10 = 3.1%	I10 = 32.5%	Overall differences versus comparison I10: -4.2 percentage points	15 years
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	(1) Self-reported smoking status Daily	I5 = 2.5%	I5 = 32.8%	Overall differences versus comparison I5: -3.3 percentage points	15 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	Individual as the unit of analysis	C = 1.1%	C = 34.7%		
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	School as unit of analysis Self-reported smoking (any) Any education versus usual care on baseline nonsmokers	Not available	I = 30%	Overall differences versus comparison -11 percentage points F = 11.7 p = 0.027	15 years
Vartiainen et al. 1998 (1978–1993) Greatest (group non-randomized trial) Fair (4 limitations) Community-wide	Finland School-based education (10 sessions or 5 sessions) + mass media campaign + community education Compared with usual care	Students in study schools Cohort follow-up N = 903 baseline N = 786 at 4-year follow-up N = 640 (71%) at 15-year follow-up	School as unit of analysis Self-reported smoking (any) Any education versus usual care on baseline nonsmokers	Not available	C = 41%	Overall differences versus comparison -11 percentage points F = 11.7 p = 0.027	15 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Centers for Disease Control and Prevention 1999a,b (1998–1999) Least (before-after) Fair (4 limitations) Community-wide	Florida Mass media campaign + community education + student-directed community education Compared with before-after	Public school students Representative sample of middle school and high school students N = 43,518	(1) Student self-reported tobacco product use (1998–1999) High school students	27.4%	25.2%	-2.2 percentage points $p<0.02$	12 months
Centers for Disease Control and Prevention 1999a,b (1998–1999) Least (before-after) Fair (4 limitations) Community-wide	Florida Mass media campaign + community education + student-directed community education Compared with before-after	Public school students Representative sample of middle school and high school students N = 43,518	(1) Student self-reported tobacco product use (1998–1999) Middle school students	18.5%	15.0%	-3.5 percentage points $p <0.01$	12 months
Biglan et al. 2000a,b Also Biglan et al. 1995 and 1996 (1991–1995) Greatest (group randomized trial) Fair (3 limitations) Community-wide	16 rural communities in Oregon Community education + retailer education + school-based education Compared with school-based education only	N = 16 7th- and 9th-grade students in study school districts (approximately 2,100 students in each grade in each annual survey)	(1) Student self-reported tobacco use measured as a weekly smoking index (Link 8)	I = 10.5% C = 8.0%	I = 12.0% C = 13.9%	Reported net difference: (-)3.8 95% confidence interval (0.2,7.3)	4 years

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Biglan et al. 2000a,b Also Biglan et al. 1995 and 1996 (1991–1995) Greatest (group randomized trial) Fair (3 limitations) Community-wide	16 rural communities in Oregon Community education + retailer education + school-based education Compared with school-based education only	N = 16 7th- and 9th-grade students in study school districts (approximately 2,100 students in each grade in each annual survey)	(2) Student self-reported awareness of efforts to prevent illegal sales (Link 6)	Not reported (negative slope)	Not reported (positive slope)	Reported net difference: p = 0.0026	4 years
Biglan et al. 2000a,b Also Biglan et al. 1995 and 1996 (1991–1995) Greatest (group randomized trial) Fair (3 limitations) Community-wide	16 rural communities in Oregon Community education + retailer education + school-based education Compared with school-based education only	N = 16 7th- and 9th-grade students in study school districts (approximately 2,100 students in each grade in each annual survey)	(3) Parents' perceived community support for tobacco access restrictions (Link 1)	Not reported	Not reported	Reported net difference: p = 0.006 (year 4) Not significant (year 5)	4 years
Centers for Disease Control and Prevention 2001 (1999–2000) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Oregon Funded school-based education + mass media + excise tax + community education Compared with/without funded school-based education	Schools surveyed in both 1999 and 2000 I = 38 C = 14 8th-grade students participating in surveys 1999: n = 3,519 2000: n = 5,556	(1) Student self-reported tobacco use (any) in the previous 30 days	I = 16.6%	I = 13.0%	Overall difference -2.3 percentage points No measure	12 months

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Centers for Disease Control and Prevention2001 (1999–2000) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Oregon Funded school-based education + mass media + excise tax + community education Compared with/ without funded school-based education	Schools surveyed in both 1999 and 2000 I = 38 C = 14 8th-grade students participating in surveys 1999: n = 3,519 2000: n = 5,556	(1) Student self-reported tobacco use (any) in the previous 30 days	C = 17.0%	C = 15.7%	Overall difference -2.3 percentage points No measure	12 months
Centers for Disease Control and Prevention 2001 (1999–2000) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Oregon Funded school-based education + mass media + excise tax + community education Compared with/ without funded school-based education	Schools surveyed in both 1999 and 2000 I = 38 C = 14 8th-grade students participating in surveys 1999: n = 3,519 2000: n = 5,556	Subset analysis: (2) Student self-reported tobacco use (any) in the previous 30 days High-level implementation schools Nonfunded schools	I = 14.2%	I = 8.2%	-4.7 percentage points Logistic regression Odds ratio = 0.65 95% confidence interval (0.45, 0.94)	12 months
Centers for Disease Control and Prevention 2001 (1999–2000) Greatest (group non-randomized trial) Fair (3 limitations) Community-wide	Oregon Funded school-based education + mass media + excise tax + community education Compared with/ without funded school-based education	Schools surveyed in both 1999 and 2000 I = 38 C = 14 8th-grade students participating in surveys 1999: n = 3,519 2000: n = 5,556	Subset analysis: (2) Student self-reported tobacco use (any) in the previous 30 days High-level implementation schools Nonfunded schools	C = 17.0%	C = 15.7%	-4.7 percentage points Logistic regression Odds ratio = 0.65 95% confidence interval (0.45, 0.94)	12 months

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Texas Department of Health Services 2001 (2000) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Community-wide	14 counties in east Texas Mass media education + school education and/or community prevention programs Compared with usual care (no media, no school or community programs) Note: cessation measures compare high school students in high media exposure + combined program (n = 1,066) to others (n = 14,370)	Selected "sentinal schools": n = not reported Students in study schools 7th–12th grades Baseline 32,560 Post 35,781 Focus 6th Middle 4,070 Grades 4,366 Focus 7th Middle 628 Grades 735	(1) Student self-reported tobacco use (any product in the past month)	I = 8%	I = 3%	-2 percentage points (Difference outcomes reported in study)	1 year

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Texas Department of Health Services 2001 (2000) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Community-wide	14 counties in east Texas Mass media education + school education and/or community prevention programs Compared with usual care (no media, no school or community programs) Note: cessation measures compare high school students in high media exposure + combined program (n = 1,066) to others (n = 14,370)	Selected "sentinal schools": n = not reported Students in study schools 7th–12th grades Baseline 32,560 Post 35,781 Focus 6th Middle 4,070 Grades 4,366 Focus 7th Middle 628 Grades 735	(1) Student self-reported tobacco use (any product in the past month)	C = 14%	C = 11%	-2 percentage points (Difference outcomes reported in study)	1 year

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Texas Department of Health Services 2001 (2000) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Community-wide	14 counties in east Texas Mass media education + school education and/or community prevention programs Compared with usual care (no media, no school or community programs) Note: cessation measures compare high school students in high media exposure + combined program (n = 1,066) to others (n = 14,370)	Selected "sentinal schools": n = not reported Students in study schools 7th–12th grades Baseline 32,560 Post 35,781 Focus 6th Middle 4,070 Grades 4,366 Focus 7th Middle 628 Grades 735	(2) High school student smoker self-reporting cessation attempt in the last 6 months	I = Not reported	I = 66%	+7 percentage points Post only	1 year

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Texas Department of Health Services 2001 (2000) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Community-wide	14 counties in east Texas Mass media education + school education and/or community prevention programs Compared with usual care (no media, no school or community programs) Note: cessation measures compare high school students in high media exposure + combined program (n = 1,066) to others (n = 14,370)	Selected "sentinal schools": n = not reported Students in study schools 7th–12th grades Baseline 32,560 Post 35,781 Focus 6th Middle 4,070 Grades 4,366 Focus 7th Middle 628 Grades 735	(2) High school student smoker self-reporting cessation attempt in the last 6 months	C = Not reported	C = 59%	+7 percentage points Post only	1 year

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Texas Department of Health Services 2001 (2000) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Community-wide	14 counties in east Texas Mass media education + school education and/or community prevention programs Compared with usual care (no media, no school or community programs) Note: cessation measures compare high school students in high media exposure + combined program (n = 1,066) to others (n = 14,370)	Selected "sentinal schools": n = not reported Students in study schools 7th–12th grades Baseline 32,560 Post 35,781 Focus 6th Middle 4,070 Grades 4,366 Focus 7th Middle 628 Grades 735	(3) High school student smoker + quit attempter self-reporting cessation	I = Not reported	I = 33%	+7 percentage points Post only	1 year

Table 6.10 Continued

Author & year (study period) Design suitability (design) Quality of execution (number of limitations) Evaluation setting	Intervention (I) and comparison (C)	Population/sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-up time
Texas Department of Health Services 2001 (2000) Greatest (other design with a concurrent comparison group) Fair (4 limitations) Community-wide	14 counties in east Texas Mass media education + school education and/or community prevention programs Compared with usual care (no media, no school or community programs) Note: cessation measures compare high school students in high media exposure + combined program (n = 1,066) to others (n = 14,370)	Selected "sentinal schools": n = not reported Students in study schools 7th–12th grades Baseline 32,560 Post 35,781 Focus 6th Middle 4,070 Grades 4,366 Focus 7th Middle 628 Grades 735	(3) High school student smoker + quit attempter self-reporting cessation	C = Not reported	C = 26%	+7 percentage points Post only	1 year

Note: **CDC** = Centers for Disease Control and Prevention; **CI** = confidence interval; **COMMIT** = Community Intervention Trial for Smoking Cessation; **NA** = not available; **NR** = not reported; **NS** = not significant; **OR** = odds ratio.

Data Table for Figure 6.3—U.S. cities and counties with 100% smoke-free air laws, as of July 1, 2011.

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
1. Anchorage	AK	Yes	Yes	Yes
2. Barrow	AK	—	Yes	—
3. Dillingham	AK	—	Yes	—
4. Fairbanks	AK	Yes	—	—
5. Haines Borough+	AK	Yes	Yes	Yes
6. Juneau	AK	Yes	Yes	Yes
7. Klawock	AK	Yes	Yes	Yes
8. Petersburg	AK	—	Yes	Yes
9. Sitka	AK	Yes	Yes	—
10. Skagway Borough+	AK	Yes	Yes	Yes
11. Unalaska	AK	—	Yes	Yes
12. Albertville	AL	Yes	Yes	Yes
13. Alexander City	AL	Yes	Yes	—
14. Atmore	AL	Yes	Yes	Yes
15. Auburn	AL	—	Yes	Yes
16. Bay Minette	AL	—	Yes	—
17. Bayou La Batre	AL	Yes	Yes	Yes
18. Birmingham	AL	—	Yes	—
19. Center Point	AL	Yes	—	—
20. Citronelle	AL	Yes	Yes	Yes
21. Cottonwood	AL	Yes	Yes	Yes
22. Daphne	AL	Yes	Yes	—
23. Decatur	AL	Yes	Yes	Yes
24. East Brewton	AL	Yes	Yes	Yes
25. Fairfield	AL	—	Yes	Yes
26. Fairhope	AL	Yes	Yes	—
27. Flomaton	AL	Yes	Yes	Yes
28. Foley	AL	Yes	Yes	—
29. Fort Payne	AL	—	Yes	—
30. Geneva	AL	Yes	—	—
31. Gulf Shores	AL	Yes	Yes	Yes
32. Headland	AL	—	Yes	Yes
33. Homewood	AL	—	Yes	Yes
34. Luverne	AL	—	Yes	Yes
35. Northport	AL	—	Yes	—
36. Opelika	AL	Yes	Yes	—
37. Opp	AL	—	Yes	—
38. Orange Beach	AL	Yes	Yes	Yes
39. Oxford	AL	Yes	Yes	Yes
40. Phenix City	AL	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
41. Prichard	AL	Yes	Yes	—
42. Robertsdale	AL	Yes	Yes	—
43. Spanish Fort	AL	Yes	Yes	—
44. Talladega	AL	Yes	Yes	Yes
45. Tuskegee	AL	Yes	Yes	—
46. Fairfield Bay	AR	Yes	Yes	Yes
47. Fayetteville	AR	—	Yes	—
48. Highfill	AR	—	Yes	—
49. Pine Bluff	AR	—	Yes	—
50. Chandler	AZ	Yes	—	—
51. Coconino County	AZ	Yes	—	—
52. Cottonwood	AZ	Yes	—	—
53. Flagstaff	AZ	Yes	Yes	Yes
54. Gilbert	AZ	Yes	Yes	Yes
55. Goodyear	AZ	Yes	—	—
56. Guadalupe	AZ	Yes	Yes	Yes
57. Nogales	AZ	Yes	—	—
58. Prescott	AZ	Yes	Yes	Yes
59. Santa Cruz County	AZ	Yes	—	—
60. Sedona	AZ	Yes	Yes	Yes
61. Surprise	AZ	Yes	—	—
62. Tempe	AZ	Yes	Yes	Yes
63. Youngtown	AZ	Yes	Yes	Yes
64. Alameda County	CA	Yes	Yes	Yes
65. Albany	CA	Yes	Yes	Yes
66. Auburn	CA	Yes	—	—
67. Belmont	CA	Yes	Yes	Yes
68. Belvedere	CA	Yes	—	Yes
69. Berkeley	CA	Yes	Yes	Yes
70. Blue Lake	CA	Yes	Yes	Yes
71. Burlingame	CA	Yes	—	—
72. Butte County	CA	Yes	—	—
73. Calabasas	CA	Yes	Yes	Yes
74. Calexico	CA	Yes	Yes	—
75. Calistoga	CA	Yes	—	—
76. Capitola	CA	Yes	—	—
77. Carpinteria	CA	Yes	Yes	Yes
78. Ceres	CA	Yes	—	—
79. Chico	CA	Yes	Yes	Yes
80. Chino Hills	CA	Yes	—	—

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
81. Colfax	CA	Yes	—	—
82. Contra Costa County	CA	Yes	Yes	Yes
83. Cotati	CA	Yes	—	—
84. Cupertino	CA	Yes	—	—
85. Davis	CA	Yes	Yes	Yes
86. Del Mar	CA	Yes	Yes	Yes
87. Dublin	CA	—	Yes	Yes
88. El Cajon	CA	—	Yes	Yes
89. El Cerrito	CA	—	Yes	Yes
90. Emeryville	CA	—	Yes	Yes
91. Eureka	CA	Yes	Yes	Yes
92. Fairfax	CA	Yes	—	—
93. Fort Bragg	CA	Yes	—	—
94. Fremont	CA	Yes	Yes	—
95. Galt	CA	—	Yes	Yes
96. Gilroy	CA	—	Yes	Yes
97. Glendale	CA	Yes	Yes	Yes
98. Goleta	CA	Yes	—	—
99. Hayward	CA	—	Yes	Yes
100. Hughson	CA	Yes	—	—
101. Imperial Beach	CA	Yes	Yes	Yes
102. Laguna Hills	CA	Yes	Yes	Yes
103. Laguna Woods	CA	Yes	Yes	Yes
104. Larkspur	CA	Yes	Yes	Yes
105. Lathrop	CA	Yes	—	—
106. Loma Linda	CA	Yes	Yes	Yes
107. Long Beach	CA	Yes	Yes	Yes
108. Mammoth Lakes	CA	Yes	Yes	Yes
109. Marin County	CA	Yes	Yes	Yes
110. Martinez	CA	Yes	Yes	Yes
111. Mendocino County	CA	Yes	—	—
112. Menlo Park	CA	—	Yes	Yes
113. Merced	CA	Yes	—	—
114. Mill Valley	CA	Yes	—	—
115. Millbrae	CA	Yes	Yes	Yes
116. Mission Viejo	CA	—	Yes	Yes
117. Modesto	CA	Yes	Yes	—
118. Monterey	CA	Yes	Yes	Yes
119. Monterey County	CA	Yes	Yes	—
120. Moorpark	CA	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
121. Mountain View	CA	Yes	Yes	—
122. Murrieta	CA	—	Yes	Yes
123. Napa	CA	—	Yes	Yes
124. Napa County	CA	Yes	—	—
125. Newark	CA	Yes	Yes	Yes
126. Novato	CA	Yes	Yes	Yes
127. Oakland	CA	Yes	—	—
128. Ojai	CA	Yes	—	—
129. Paradise	CA	Yes	—	—
130. Pasadena	CA	Yes	Yes	Yes
131. Patterson	CA	Yes	—	—
132. Petaluma	CA	Yes	—	—
133. Pinole	CA	—	Yes	Yes
134. Pittsburg	CA	—	Yes	Yes
135. Pleasant Hill	CA	Yes	Yes	Yes
136. Pleasanton	CA	—	Yes	—
137. Rancho Cucamonga	CA	—	Yes	Yes
138. Richmond	CA	Yes	Yes	Yes
139. Rohnert Park	CA	Yes	Yes	Yes
140. Roseville	CA	Yes	—	—
141. Ross	CA	Yes	Yes	Yes
142. Sacramento	CA	Yes	—	—
143. Sacramento County	CA	Yes	—	—
144. Salinas	CA	—	Yes	Yes
145. San Anselmo	CA	Yes	Yes	Yes
146. San Bernardino County	CA	Yes	—	—
147. San Carlos	CA	Yes	Yes	Yes
148. San Diego	CA	—	Yes	Yes
149. San Diego County	CA	—	Yes	Yes
150. San Francisco	CA	Yes	Yes	—
151. San Jose	CA	Yes	Yes	Yes
152. San Juan Bautista	CA	Yes	Yes	—
153. San Luis Obispo	CA	Yes	Yes	Yes
154. San Mateo	CA	Yes	Yes	Yes
155. San Mateo County	CA	Yes	—	—
156. San Rafael	CA	Yes	—	—
157. San Ramon	CA	Yes	—	—
158. Santa Barbara	CA	Yes	Yes	Yes
159. Santa Barbara County	CA	Yes	—	—
160. Santa Clara	CA	Yes	Yes	—

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
161. Santa Clara County	CA	Yes	Yes	Yes
162. Santa Clarita	CA	Yes	—	—
163. Santa Cruz	CA	Yes	—	—
164. Santa Cruz County	CA	Yes	—	—
165. Santa Rosa	CA	Yes	—	—
166. Saratoga	CA	Yes	—	—
167. Sausalito	CA	Yes	—	—
168. Scotts Valley	CA	Yes	Yes	—
169. Sebastopol	CA	Yes	Yes	Yes
170. Shafter	CA	Yes	Yes	—
171. Shasta County	CA	Yes	Yes	Yes
172. Sierra Madre	CA	—	Yes	Yes
173. Solana Beach	CA	—	Yes	Yes
174. Solano County	CA	Yes	—	—
175. Sonoma County	CA	Yes	—	—
176. South Pasadena	CA	Yes	Yes	Yes
177. Stanislaus County	CA	Yes	—	—
178. Temecula	CA	Yes	Yes	Yes
179. Tiburon	CA	Yes	—	Yes
180. Tracy	CA	Yes	—	—
181. Tuolumne County+ (except the city of Sonora)	CA	Yes	—	—
182. Ukiah	CA	Yes	—	—
183. Union City	CA	Yes	Yes	Yes
184. Vallejo	CA	Yes	—	—
185. Ventura	CA	Yes	—	—
186. Ventura County	CA	Yes	—	—
187. Visalia	CA	Yes	Yes	—
188. Watsonville	CA	Yes	—	—
189. Yountville	CA	Yes	—	—
190. Alamosa	CO	—	Yes	—
191. Arvada	CO	Yes	Yes	Yes
192. Avon	CO	Yes	Yes	Yes
193. Boulder	CO	Yes	Yes	Yes
194. Boulder County	CO	Yes	Yes	Yes
195. Breckenridge	CO	—	Yes	Yes
196. Central City	CO	—	Yes	Yes
197. Dillon	CO	—	Yes	Yes
198. Eagle County	CO	Yes	Yes	Yes
199. Edgewater	CO	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
200. Firestone	CO	Yes	—	—
201. Fort Collins	CO	Yes	Yes	Yes
202. Frisco	CO	—	Yes	Yes
203. Golden	CO	—	Yes	Yes
204. Grand Junction	CO	—	Yes	Yes
205. Greeley	CO	—	Yes	Yes
206. Lakewood	CO	—	Yes	Yes
207. Longmont	CO	—	Yes	Yes
208. Louisville	CO	—	Yes	Yes
209. Loveland	CO	—	Yes	Yes
210. Monte Vista	CO	—	Yes	Yes
211. Pueblo	CO	Yes	Yes	Yes
212. Rifle	CO	—	Yes	Yes
213. San Luis	CO	Yes	Yes	Yes
214. Silverthorne	CO	—	Yes	Yes
215. Snowmass Village	CO	Yes	Yes	Yes
216. Steamboat Springs	CO	—	Yes	—
217. Summit County	CO	—	Yes	Yes
218. Superior	CO	Yes	—	—
219. Telluride	CO	Yes	Yes	Yes
220. Timnath	CO	Yes	Yes	Yes
221. Washington	DC	Yes	Yes	Yes
222. Athens/Clarke County	GA	—	Yes	Yes
223. Berkeley Lake	GA	Yes	Yes	—
224. Buena Vista	GA	Yes	Yes	Yes
225. Columbia County	GA	Yes	Yes	—
226. Cordele	GA	Yes	—	—
227. Decatur	GA	Yes	Yes	—
228. DeKalb County	GA	Yes	—	—
229. Douglas	GA	Yes	Yes	—
230. Douglas County	GA	Yes	—	—
231. Douglasville	GA	Yes	—	—
232. Dunwoody	GA	Yes	—	—
233. Effingham County	GA	—	Yes	Yes
234. Gainesville	GA	—	Yes	Yes
235. Loganville	GA	Yes	Yes	—
236. Madison	GA	—	Yes	—
237. Morrow	GA	Yes	Yes	Yes
238. Peachtree City	GA	—	Yes	—
239. Savannah	GA	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
240. Snellville	GA	—	Yes	Yes
241. Tift County	GA	—	Yes	Yes
242. Tifton	GA	—	Yes	—
243. Valdosta	GA	Yes	Yes	—
244. Hawaii County+	HI	Yes	Yes	—
245. Honolulu	HI	Yes	Yes	—
246. Maui County+	HI	—	Yes	—
247. Glenwood	IA	Yes	Yes	Yes
248. Moscow	ID	—	—	Yes
249. Arlington Heights	IL	Yes	Yes	—
250. Barrington	IL	Yes	Yes	Yes
251. Batavia	IL	Yes	Yes	Yes
252. Bedford Park	IL	Yes	Yes	Yes
253. Benton	IL	Yes	Yes	Yes
254. Berwyn	IL	Yes	—	—
255. Bloomington	IL	Yes	Yes	Yes
256. Buffalo Grove	IL	Yes	Yes	Yes
257. Burr Ridge	IL	Yes	Yes	Yes
258. Calumet City	IL	Yes	—	—
259. Carbondale	IL	—	Yes	Yes
260. Centralia	IL	Yes	Yes	Yes
261. Chicago	IL	Yes	Yes	Yes
262. Chicago Heights	IL	Yes	—	—
263. Cook County+ (except those areas governed by an ordinance of another governmental entity)	IL	Yes	Yes	Yes
264. Countryside	IL	Yes	Yes	Yes
265. Deerfield	IL	Yes	Yes	Yes
266. DeKalb	IL	Yes	Yes	Yes
267. East Moline	IL	Yes	Yes	Yes
268. East Peoria	IL	Yes	Yes	Yes
269. Elk Grove Village	IL	Yes	Yes	Yes
270. Elmwood Park	IL	Yes	Yes	Yes
271. Evanston	IL	Yes	Yes	Yes
272. Frankfort	IL	Yes	Yes	Yes
273. Galesburg	IL	Yes	Yes	Yes
274. Hanover Park	IL	Yes	Yes	—
275. Hawthorn Woods	IL	Yes	Yes	Yes
276. Highland Park	IL	Yes	Yes	Yes
277. Hinsdale	IL	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
278. Hoffman Estates	IL	Yes	Yes	—
279. Indian Head Park	IL	Yes	—	—
280. Justice	IL	Yes	—	—
281. La Grange	IL	Yes	Yes	—
282. La Grange Park	IL	Yes	—	Yes
283. Lake Bluff	IL	Yes	Yes	Yes
284. Lake County	IL	Yes	Yes	Yes
285. Lake Forest	IL	Yes	Yes	Yes
286. Lemont	IL	Yes	Yes	Yes
287. Libertyville	IL	Yes	Yes	Yes
288. Lincolnshire	IL	Yes	—	—
289. Lincolnwood	IL	Yes	Yes	Yes
290. Lindenhurst	IL	Yes	Yes	Yes
291. Long Grove	IL	Yes	—	—
292. Mclean County	IL	Yes	Yes	—
293. Milan	IL	Yes	Yes	Yes
294. Morton Grove	IL	Yes	Yes	Yes
295. Naperville	IL	Yes	Yes	Yes
296. Niles	IL	Yes	—	—
297. Normal	IL	Yes	Yes	Yes
298. Norridge	IL	Yes	Yes	Yes
299. North Aurora	IL	Yes	Yes	Yes
300. Northbrook	IL	Yes	Yes	—
301. Oak Lawn	IL	Yes	—	—
302. Oak Park	IL	Yes	Yes	Yes
303. Orland Park	IL	Yes	Yes	Yes
304. Palatine	IL	Yes	Yes	Yes
305. Park Forest	IL	Yes	Yes	Yes
306. Park Ridge	IL	Yes	Yes	Yes
307. Plainfield	IL	Yes	Yes	Yes
308. Prospect Heights	IL	Yes	Yes	Yes
309. Riverside	IL	Yes	Yes	—
310. Rochelle	IL	Yes	Yes	Yes
311. Rolling Meadows	IL	Yes	Yes	Yes
312. Sangamon County	IL	Yes	Yes	Yes
313. Schaumburg	IL	Yes	Yes	—
314. Skokie	IL	Yes	—	—
315. South Beloit	IL	Yes	Yes	Yes
316. Springfield	IL	—	Yes	Yes
317. Steger	IL	Yes	—	—

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
318. Taylor Springs	IL	Yes	Yes	Yes
319. Tinley Park	IL	Yes	Yes	Yes
320. Urbana	IL	Yes	Yes	Yes
321. Vernon Hills	IL	Yes	Yes	Yes
322. Villa Grove	IL	Yes	Yes	Yes
323. Wamac	IL	Yes	Yes	Yes
324. Washington	IL	Yes	Yes	Yes
325. Westchester	IL	Yes	—	—
326. Wheaton	IL	Yes	Yes	—
327. Wheeling	IL	Yes	—	—
328. Wilmette	IL	Yes	Yes	Yes
329. Worth	IL	Yes	Yes	Yes
330. Allen County+ (except those cities that choose to opt out)	IN	Yes	Yes	—
331. Avon	IN	Yes	Yes	—
332. Bloomington	IN	Yes	Yes	Yes
333. Carmel	IN	Yes	Yes	—
334. Chesterton	IN	Yes	—	—
335. Columbus	IN	Yes	Yes	—
336. Crown Point	IN	Yes	Yes	—
337. Cumberland	IN	Yes	Yes	Yes
338. Delaware County+	IN	Yes	—	—
339. Elkhart	IN	Yes	Yes	Yes
340. Fort Wayne	IN	Yes	Yes	Yes
341. Franklin	IN	Yes	Yes	Yes
342. Goshen	IN	Yes	—	—
343. Greencastle	IN	Yes	Yes	Yes
344. Greenfield	IN	Yes	Yes	—
345. Greensburg	IN	Yes	Yes	—
346. Greenwood	IN	Yes	Yes	—
347. Hancock County+	IN	Yes	Yes	Yes
348. Henry County+	IN	Yes	Yes	—
349. Indianapolis/Marion County+ (except the cities of Beech Grove, Lawrence, Southport, and Speedway)	IN	Yes	Yes	—
350. Jeffersonville	IN	Yes	Yes	—
351. Kokomo	IN	Yes	Yes	—
352. Lawrence	IN	Yes	Yes	—
353. Madison	IN	Yes	Yes	—
354. Monroe County+	IN	Yes	Yes	Yes
355. Plainfield	IN	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
356. Seymour	IN	Yes	Yes	—
357. Shelbyville	IN	Yes	—	—
358. Speedway	IN	Yes	Yes	—
359. Valparaiso	IN	Yes	—	—
360. Vanderburgh County+ (except the city of Evansville)	IN	Yes	Yes	Yes
361. West Lafayette	IN	Yes	Yes	Yes
362. Westfield	IN	Yes	—	—
363. Whitestown	IN	Yes	—	—
364. Zionsville	IN	Yes	Yes	Yes
365. Abilene	KS	—	Yes	—
366. Bel Aire	KS	—	Yes	Yes
367. Derby	KS	Yes	Yes	Yes
368. Emporia	KS	—	Yes	Yes
369. Fairway	KS	Yes	Yes	Yes
370. Garden City	KS	—	Yes	Yes
371. Harvey County	KS	Yes	Yes	Yes
372. Hesston	KS	Yes	Yes	Yes
373. Johnson County	KS	—	Yes	Yes
374. Lawrence	KS	—	Yes	Yes
375. Leawood	KS	Yes	Yes	Yes
376. Lenexa	KS	Yes	Yes	Yes
377. Maize	KS	—	Yes	Yes
378. Manhattan	KS	Yes	Yes	Yes
379. Merriam	KS	Yes	Yes	Yes
380. Mission	KS	Yes	Yes	Yes
381. Newton	KS	Yes	Yes	Yes
382. North Newton	KS	Yes	Yes	Yes
383. Olathe	KS	Yes	Yes	Yes
384. Ottawa	KS	—	Yes	—
385. Overland Park	KS	Yes	Yes	Yes
386. Prairie Village	KS	Yes	Yes	Yes
387. Pratt	KS	Yes	—	—
388. Pratt County	KS	Yes	Yes	Yes
389. Roeland Park	KS	Yes	Yes	Yes
390. Salina	KS	Yes	Yes	Yes
391. Shawnee	KS	Yes	—	—
392. Topeka	KS	Yes	Yes	Yes
393. Walton	KS	—	Yes	Yes
394. Westwood	KS	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
395. Winfield	KS	—	Yes	Yes
396. Ashland	KY	Yes	Yes	Yes
397. Bardstown	KY	Yes	Yes	Yes
398. Bowling Green	KY	Yes	Yes	Yes
399. Campbellsville	KY	Yes	Yes	Yes
400. Clark County+	KY	Yes	Yes	Yes
401. Danville	KY	Yes	Yes	Yes
402. Elizabethtown	KY	Yes	Yes	Yes
403. Frankfort	KY	—	Yes	Yes
404. Georgetown	KY	Yes	Yes	Yes
405. Glasgow	KY	—	Yes	Yes
406. Hardin County	KY	Yes	Yes	Yes
407. Henderson	KY	Yes	—	—
408. Kenton County+	KY	Yes	—	—
409. Letcher County+	KY	—	Yes	—
410. Lexington/Fayette County+	KY	Yes	Yes	Yes
411. London	KY	Yes	Yes	Yes
412. Louisville/Jefferson County+	KY	Yes	Yes	Yes
413. Madison County+	KY	Yes	Yes	Yes
414. Morehead	KY	Yes	Yes	Yes
415. Oldham County+	KY	—	Yes	—
416. Paducah	KY	—	Yes	Yes
417. Paintsville	KY	—	Yes	—
418. Pikeville	KY	—	Yes	—
419. Prestonsburg	KY	Yes	Yes	Yes
420. Radcliff	KY	Yes	Yes	Yes
421. Gibsland	LA	Yes	—	—
422. Grambling	LA	Yes	—	—
423. Lafayette	LA	Yes	—	—
424. Lafayette Parish+	LA	Yes	—	—
425. Mandeville	LA	Yes	—	—
426. Sulphur	LA	Yes	—	—
427. Abington	MA	Yes	Yes	Yes
428. Acushnet	MA	—	Yes	—
429. Adams	MA	Yes	—	—
430. Amherst	MA	Yes	Yes	Yes
431. Andover	MA	—	Yes	—
432. Aquinnah	MA	Yes	—	—
433. Arlington	MA	—	Yes	Yes
434. Ashland	MA	Yes	—	—

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
435. Barnstable	MA	—	Yes	Yes
436. Barre	MA	—	Yes	Yes
437. Belchertown	MA	—	Yes	Yes
438. Bellingham	MA	—	Yes	—
439. Belmont	MA	—	Yes	—
440. Beverly	MA	Yes	Yes	Yes
441. Boston	MA	Yes	Yes	Yes
442. Bourne	MA	Yes	Yes	Yes
443. Braintree	MA	Yes	Yes	Yes
444. Brewster	MA	Yes	Yes	Yes
445. Bridgewater	MA	Yes	Yes	Yes
446. Brimfield	MA	Yes	Yes	Yes
447. Brookline	MA	—	Yes	—
448. Cambridge	MA	Yes	Yes	—
449. Canton	MA	Yes	Yes	Yes
450. Carver	MA	Yes	Yes	Yes
451. Chatham	MA	—	Yes	Yes
452. Chelsea	MA	Yes	Yes	Yes
453. Chilmark	MA	Yes	Yes	Yes
454. Cohasset	MA	—	Yes	Yes
455. Concord	MA	—	Yes	Yes
456. Dedham	MA	Yes	Yes	Yes
457. Dover	MA	—	Yes	Yes
458. Dracut	MA	Yes	—	—
459. Duxbury	MA	Yes	Yes	Yes
460. Easthampton	MA	Yes	Yes	Yes
461. Easton	MA	—	Yes	Yes
462. Edgartown	MA	Yes	Yes	Yes
463. Egremont	MA	Yes	Yes	Yes
464. Essex	MA	Yes	Yes	Yes
465. Everett	MA	Yes	Yes	Yes
466. Framingham	MA	Yes	Yes	Yes
467. Freetown	MA	Yes	Yes	Yes
468. Great Barrington	MA	Yes	Yes	Yes
469. Hancock	MA	Yes	Yes	Yes
470. Hatfield	MA	Yes	—	—
471. Haverhill	MA	Yes	—	Yes
472. Hingham	MA	—	Yes	Yes
473. Holbrook	MA	Yes	—	—
474. Holliston	MA	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
475. Holyoke	MA	Yes	—	—
476. Hopkinton	MA	—	Yes	Yes
477. Hubbardston	MA	—	Yes	Yes
478. Lee	MA	Yes	Yes	Yes
479. Leicester	MA	—	Yes	—
480. Lenox	MA	Yes	Yes	Yes
481. Lexington	MA	Yes	Yes	Yes
482. Lincoln	MA	Yes	Yes	Yes
483. Littleton	MA	—	Yes	Yes
484. Lynn	MA	Yes	Yes	Yes
485. Marblehead	MA	—	Yes	—
486. Marion	MA	Yes	Yes	Yes
487. Marshfield	MA	Yes	—	—
488. Mashpee	MA	Yes	Yes	Yes
489. Maynard	MA	—	Yes	Yes
490. Medfield	MA	Yes	Yes	Yes
491. Melrose	MA	—	Yes	Yes
492. Middleton	MA	Yes	Yes	Yes
493. Millville	MA	Yes	Yes	Yes
494. Monterey	MA	Yes	Yes	Yes
495. Nantucket	MA	Yes	Yes	Yes
496. Needham	MA	Yes	Yes	Yes
497. New Braintree	MA	—	Yes	Yes
498. Newburyport	MA	Yes	—	—
499. Norfolk	MA	—	Yes	Yes
500. North Adams	MA	Yes	—	—
501. Northampton	MA	Yes	Yes	Yes
502. Norton	MA	—	Yes	Yes
503. Norwood	MA	Yes	Yes	Yes
504. Oak Bluffs	MA	Yes	Yes	Yes
505. Orleans	MA	—	Yes	Yes
506. Peabody	MA	Yes	Yes	Yes
507. Pittsfield	MA	Yes	Yes	Yes
508. Plymouth	MA	—	Yes	Yes
509. Provincetown	MA	—	Yes	Yes
510. Quincy	MA	Yes	Yes	Yes
511. Reading	MA	—	Yes	Yes
512. Revere	MA	Yes	Yes	Yes
513. Richmond	MA	Yes	Yes	Yes
514. Salem	MA	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
515. Sandwich	MA	Yes	Yes	Yes
516. Saugus	MA	Yes	Yes	Yes
517. Scituate	MA	—	Yes	Yes
518. Sharon	MA	—	Yes	Yes
519. Somerset	MA	Yes	Yes	Yes
520. Somerville	MA	Yes	Yes	Yes
521. Southborough	MA	—	Yes	Yes
522. Sterling	MA	—	Yes	Yes
523. Stockbridge	MA	Yes	Yes	Yes
524. Stoneham	MA	—	Yes	Yes
525. Tisbury	MA	Yes	Yes	Yes
526. Truro	MA	Yes	Yes	Yes
527. Tyngsborough	MA	Yes	Yes	Yes
528. Tyringham	MA	Yes	Yes	Yes
529. Wakefield	MA	Yes	Yes	Yes
530. Walpole	MA	Yes	Yes	Yes
531. Wareham	MA	—	Yes	Yes
532. Watertown	MA	Yes	Yes	Yes
533. Wayland	MA	—	Yes	—
534. Wellesley	MA	—	Yes	—
535. Wellfleet	MA	—	Yes	Yes
536. West Tisbury	MA	Yes	Yes	—
537. Westford	MA	Yes	Yes	Yes
538. Westport	MA	Yes	Yes	Yes
539. Westwood	MA	—	Yes	Yes
540. Weymouth	MA	Yes	Yes	Yes
541. Whately	MA	Yes	Yes	—
542. Williamstown	MA	—	Yes	Yes
543. Winchendon	MA	—	Yes	—
544. Woburn	MA	—	Yes	—
545. Wrentham	MA	Yes	Yes	Yes
546. Yarmouth	MA	—	Yes	Yes
547. Baltimore	MD	Yes	Yes	Yes
548. Charles County	MD	—	Yes	—
549. Gaithersburg	MD	—	Yes	—
550. Howard County	MD	Yes	Yes	Yes
551. Kensington	MD	—	Yes	Yes
552. La Plata	MD	—	Yes	Yes
553. Montgomery County	MD	—	Yes	Yes
554. Prince George's County+	MD	—	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
555. Rockville	MD	—	Yes	Yes
556. Takoma Park	MD	—	Yes	Yes
557. Talbot County+	MD	—	Yes	—
558. Alger County+	MI	Yes	—	—
559. Baraga County+	MI	Yes	—	—
560. Benzie County+	MI	Yes	—	—
561. Berrien County+	MI	Yes	—	—
562. Calhoun County+	MI	Yes	—	—
563. Detroit	MI	Yes	—	—
564. Gogebic County+	MI	Yes	—	—
565. Grand Rapids	MI	Yes	—	—
566. Houghton County+	MI	Yes	—	—
567. Leelanau County+	MI	Yes	—	—
568. Lenawee County+	MI	Yes	—	—
569. Mackinac County+	MI	Yes	—	—
570. Marquette	MI	Yes	—	—
571. Marquette County+	MI	Yes	—	—
572. Midland County+	MI	Yes	—	—
573. Muskegon County+	MI	Yes	—	—
574. Ottawa County+	MI	Yes	—	—
575. Schoolcraft County+	MI	Yes	—	—
576. St. Clair County+	MI	Yes	—	—
577. Traverse City	MI	Yes	—	—
578. Washtenaw County+	MI	Yes	—	—
579. Beltrami County+	MN	Yes	—	—
580. Bloomington	MN	Yes	Yes	Yes
581. Carlton County+	MN	Yes	Yes	Yes
582. Cottage Grove	MN	Yes	Yes	Yes
583. Duluth	MN	Yes	Yes	Yes
584. Golden Valley	MN	Yes	Yes	Yes
585. Hennepin County+	MN	—	Yes	Yes
586. Hutchinson	MN	Yes	Yes	Yes
587. Mankato	MN	Yes	Yes	Yes
588. McLeod County+	MN	Yes	—	—
589. Minneapolis	MN	—	Yes	Yes
590. Moorhead	MN	Yes	—	—
591. Olmsted County+	MN	Yes	Yes	Yes
592. St. Paul	MN	—	Yes	Yes
593. Ballwin	MO	Yes	Yes	Yes
594. Blue Springs	MO	Yes	—	—

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
595. Brentwood	MO	Yes	Yes	Yes
596. Chillicothe	MO	—	Yes	Yes
597. Clayton	MO	Yes	Yes	—
598. Columbia	MO	—	Yes	Yes
599. Creve Coeur	MO	Yes	Yes	Yes
600. Fulton	MO	Yes	Yes	Yes
601. Gladstone	MO	Yes	—	—
602. Hazelwood	MO	Yes	Yes	—
603. Independence	MO	Yes	Yes	Yes
604. Jefferson City	MO	Yes	Yes	Yes
605. Kansas City	MO	Yes	Yes	Yes
606. Kirksville	MO	—	Yes	Yes
607. Kirkwood	MO	Yes	Yes	Yes
608. Lake Saint Louis	MO	Yes	Yes	Yes
609. Lee's Summit	MO	Yes	Yes	Yes
610. Liberty	MO	Yes	Yes	Yes
611. Maryville	MO	Yes	Yes	Yes
612. Nixa	MO	—	Yes	—
613. North Kansas City	MO	Yes	Yes	Yes
614. O'Fallon	MO	Yes	Yes	Yes
615. Parkville	MO	Yes	—	—
616. Raymore	MO	Yes	—	—
617. Springfield	MO	Yes	Yes	Yes
618. St. Louis	MO	Yes	Yes	—
619. St. Louis County+	MO	Yes	Yes	—
620. Warrensburg	MO	Yes	Yes	—
621. Aberdeen	MS	—	Yes	Yes
622. Amory	MS	Yes	Yes	Yes
623. Bassfield	MS	Yes	Yes	Yes
624. Batesville	MS	—	Yes	Yes
625. Brandon	MS	—	Yes	—
626. Clinton	MS	—	Yes	Yes
627. Collins	MS	Yes	Yes	Yes
628. Corinth	MS	Yes	Yes	—
629. Crystal Springs	MS	Yes	Yes	Yes
630. Ecru	MS	—	Yes	Yes
631. Flora	MS	Yes	Yes	Yes
632. Flowood	MS	Yes	Yes	—
633. Greenwood	MS	Yes	Yes	Yes
634. Grenada	MS	—	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
635. Gulfport	MS	Yes	Yes	—
636. Hattiesburg	MS	Yes	Yes	Yes
637. Hernando	MS	Yes	Yes	Yes
638. Hollandale	MS	Yes	Yes	Yes
639. Jackson	MS	Yes	Yes	Yes
640. Kosciusko	MS	Yes	Yes	Yes
641. Laurel	MS	Yes	Yes	Yes
642. Lumberton	MS	Yes	Yes	Yes
643. Madison	MS	Yes	Yes	Yes
644. Mayersville	MS	Yes	Yes	Yes
645. Meridian	MS	Yes	Yes	Yes
646. Metcalfe	MS	Yes	Yes	Yes
647. Oxford	MS	—	Yes	Yes
648. Pearl	MS	—	Yes	—
649. Petal	MS	Yes	Yes	Yes
650. Picayune	MS	—	Yes	—
651. Pontotoc	MS	—	Yes	Yes
652. Prentiss	MS	Yes	Yes	Yes
653. Ridgeland	MS	Yes	Yes	Yes
654. Senatobia	MS	—	Yes	Yes
655. Starkville	MS	Yes	Yes	Yes
656. Sumrall	MS	Yes	Yes	Yes
657. Tupelo	MS	Yes	Yes	Yes
658. Walls	MS	Yes	Yes	—
659. West	MS	Yes	—	—
660. Bozeman	MT	Yes	Yes	—
661. Helena	MT	Yes	Yes	Yes
662. Boone	NC	—	Yes	Yes
663. Montreat	NC	Yes	—	—
664. Bismarck	ND	Yes	Yes	Yes
665. Devils Lake	ND	Yes	Yes	Yes
666. Fargo	ND	Yes	Yes	Yes
667. Grafton	ND	Yes	—	—
668. Grand Forks	ND	Yes	Yes	Yes
669. Napoleon	ND	Yes	Yes	Yes
670. Pembina	ND	Yes	Yes	Yes
671. West Fargo	ND	Yes	Yes	Yes
672. Grand Island	NE	Yes	Yes	Yes
673. Humboldt	NE	Yes	Yes	Yes
674. Lincoln	NE	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
675. Atlantic City	NJ	Yes	Yes	Yes
676. Highland Park Borough	NJ	Yes	—	—
677. Holmdel Township	NJ	Yes	—	—
678. Livingston Township	NJ	Yes	—	—
679. Manville Borough	NJ	Yes	—	—
680. Alamogordo	NM	—	Yes	Yes
681. Albuquerque	NM	Yes	—	—
682. Bayard	NM	Yes	Yes	Yes
683. Carlsbad	NM	Yes	—	—
684. Curry County	NM	—	Yes	Yes
685. Dona Ana County	NM	Yes	Yes	Yes
686. Edgewood	NM	Yes	Yes	Yes
687. Elephant Butte	NM	—	Yes	Yes
688. Espanola	NM	Yes	Yes	Yes
689. Farmington	NM	—	Yes	Yes
690. Gallup	NM	—	Yes	Yes
691. Las Cruces	NM	—	Yes	Yes
692. Los Lunas	NM	—	Yes	Yes
693. Magdalena	NM	—	Yes	Yes
694. Mesilla	NM	Yes	Yes	Yes
695. Portales	NM	—	Yes	Yes
696. Rio Rancho	NM	—	Yes	Yes
697. Roswell	NM	—	Yes	Yes
698. Santa Clara	NM	Yes	Yes	—
699. Santa Fe	NM	Yes	Yes	Yes
700. Taos	NM	—	Yes	Yes
701. Tucumcari	NM	—	Yes	Yes
702. Dutchess County+	NY	Yes	Yes	—
703. Nassau County+	NY	Yes	Yes	Yes
704. New York City	NY	Yes	Yes	Yes
705. Suffolk County+	NY	Yes	Yes	Yes
706. Tompkins County+	NY	Yes	Yes	Yes
707. Westchester County+	NY	Yes	Yes	Yes
708. Bexley	OH	Yes	Yes	Yes
709. Centerville	OH	Yes	—	—
710. Columbus	OH	Yes	Yes	Yes
711. Dublin	OH	Yes	Yes	Yes
712. Findlay	OH	Yes	—	—
713. Gahanna	OH	Yes	Yes	Yes
714. Grandview Heights	OH	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
715. Granville	OH	Yes	Yes	Yes
716. Heath	OH	Yes	Yes	Yes
717. Hilliard	OH	Yes	—	—
718. Marble Cliff	OH	Yes	Yes	Yes
719. New Albany	OH	Yes	Yes	Yes
720. Newark	OH	Yes	—	—
721. Powell	OH	Yes	Yes	Yes
722. Summit County+	OH	Yes	Yes	Yes
723. Upper Arlington	OH	Yes	Yes	Yes
724. Westerville	OH	Yes	Yes	Yes
725. Worthington	OH	Yes	Yes	Yes
726. Baker City	OR	Yes	—	—
727. Benton County	OR	Yes	—	—
728. Central Point	OR	Yes	—	—
729. Corvallis	OR	Yes	Yes	Yes
730. Eugene	OR	Yes	Yes	Yes
731. Independence	OR	Yes	Yes	Yes
732. Manzanita	OR	Yes	—	—
733. Philomath	OR	Yes	Yes	Yes
734. Rockaway Beach	OR	Yes	—	—
735. St. Helens	OR	Yes	—	—
736. Tillamook	OR	Yes	—	—
737. Tillamook County	OR	Yes	—	—
738. Tualatin	OR	Yes	—	—
739. Wheeler	OR	Yes	—	—
740. Philadelphia	PA	—	Yes	Yes
741. Aiken	SC	Yes	Yes	Yes
742. Aiken County+ (except the cities of Aiken and North Augusta)	SC	Yes	Yes	Yes
743. Atlantic Beach	SC	—	Yes	Yes
744. Beaufort	SC	Yes	Yes	Yes
745. Beaufort County	SC	Yes	Yes	Yes
746. Bluffton	SC	Yes	—	—
747. Camden	SC	Yes	Yes	Yes
748. Cayce	SC	Yes	Yes	Yes
749. Chapin	SC	Yes	Yes	Yes
750. Charleston	SC	—	Yes	Yes
751. Chesnee	SC	Yes	Yes	Yes
752. Clemson	SC	—	Yes	Yes
753. Columbia	SC	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
754. Easley	SC	Yes	Yes	Yes
755. Edisto Beach	SC	Yes	Yes	Yes
756. Fort Mill	SC	Yes	Yes	Yes
757. Greenville	SC	Yes	Yes	Yes
758. Hilton Head Island	SC	—	Yes	Yes
759. Hollywood	SC	Yes	Yes	Yes
760. Isle of Palms	SC	—	Yes	Yes
761. Lexington	SC	Yes	Yes	Yes
762. Lexington County	SC	Yes	Yes	Yes
763. Liberty	SC	—	Yes	—
764. Mount Pleasant	SC	—	Yes	Yes
765. North Augusta	SC	Yes	Yes	Yes
766. Pickens	SC	—	Yes	Yes
767. Pine Ridge	SC	Yes	Yes	Yes
768. Ravenel	SC	—	Yes	Yes
769. Richland County	SC	Yes	Yes	Yes
770. Rock Hill	SC	Yes	Yes	Yes
771. South Congaree	SC	Yes	Yes	Yes
772. Springdale	SC	Yes	Yes	Yes
773. Sullivan's Island	SC	—	Yes	Yes
774. Sumter	SC	Yes	Yes	Yes
775. Surfside Beach	SC	Yes	Yes	Yes
776. Walterboro	SC	Yes	Yes	Yes
777. West Columbia	SC	Yes	Yes	Yes
778. York County	SC	Yes	Yes	Yes
779. Abilene	TX	Yes	Yes	Yes
780. Alpine	TX	—	—	Yes
781. Alton	TX	Yes	Yes	Yes
782. Angleton	TX	—	Yes	—
783. Arlington	TX	—	Yes	—
784. Austin	TX	Yes	Yes	Yes
785. Baytown	TX	Yes	Yes	Yes
786. Beaumont	TX	Yes	Yes	Yes
787. Benbrook	TX	Yes	Yes	Yes
788. Boerne	TX	—	Yes	—
789. Brenham	TX	—	Yes	—
790. Brownsville	TX	—	Yes	—
791. Caldwell	TX	Yes	—	—
792. College Station	TX	Yes	Yes	Yes
793. Conroe	TX	Yes	Yes	—

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
794. Copperas Cove	TX	Yes	Yes	Yes
795. Corpus Christi	TX	Yes	Yes	Yes
796. Dallas	TX	Yes	Yes	Yes
797. El Lago	TX	—	Yes	Yes
798. El Paso	TX	Yes	Yes	Yes
799. Ennis	TX	Yes	Yes	Yes
800. Flower Mound	TX	Yes	Yes	Yes
801. Fort Worth	TX	Yes	Yes	—
802. Frisco	TX	Yes	—	—
803. Galveston	TX	Yes	—	—
804. Harlingen	TX	Yes	Yes	Yes
805. Hewitt	TX	Yes	—	—
806. Highland Village	TX	Yes	—	—
807. Horseshoe Bay	TX	Yes	Yes	Yes
808. Houston	TX	Yes	Yes	Yes
809. Kaufman	TX	Yes	—	—
810. Kerrville	TX	—	—	Yes
811. Kilgore	TX	Yes	—	—
812. Killeen	TX	Yes	Yes	—
813. Laredo	TX	Yes	Yes	Yes
814. Leander	TX	Yes	—	—
815. Marshall	TX	Yes	Yes	Yes
816. McKinney	TX	Yes	Yes	Yes
817. Mesquite	TX	—	Yes	Yes
818. Missouri City	TX	Yes	Yes	Yes
819. Nacogdoches	TX	Yes	Yes	Yes
820. New Braunfels	TX	Yes	—	—
821. Palestine	TX	Yes	—	—
822. Pasadena	TX	Yes	Yes	—
823. Pearland	TX	Yes	Yes	Yes
824. Plano	TX	Yes	Yes	Yes
825. Portland	TX	Yes	Yes	—
826. Prosper	TX	—	Yes	—
827. Richardson	TX	Yes	—	—
828. Robinson	TX	Yes	Yes	—
829. Rockwall	TX	—	Yes	
830. Rollingwood	TX	—	Yes	Yes
831. Rosenberg	TX	Yes	Yes	—
832. Round Rock	TX	Yes	Yes	—
833. Rowlett	TX	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
834. San Angelo	TX	Yes	Yes	Yes
835. San Antonio	TX	Yes	—	—
836. Socorro	TX	Yes	Yes	Yes
837. Southlake	TX	Yes	Yes	Yes
838. Sugar Land	TX	Yes	Yes	—
839. Sweeny	TX	—	Yes	—
840. Tyler	TX	Yes	Yes	Yes
841. University Park	TX	—	Yes	Yes
842. Vernon	TX	Yes	Yes	Yes
843. Victoria	TX	Yes	Yes	Yes
844. Woodway	TX	Yes	Yes	Yes
845. Yoakum	TX	Yes	—	—
846. Norfolk	VA	—	Yes	Yes
847. Burlington	VT	—	Yes	Yes
848. South Burlington	VT	—	Yes	Yes
849. Williston	VT	—	Yes	Yes
850. Winooski	VT	—	Yes	Yes
851. Mason County	WA	Yes	Yes	Yes
852. Appleton	WI	Yes	Yes	Yes
853. Beaver Dam	WI	Yes	Yes	Yes
854. Beloit	WI	Yes	Yes	Yes
855. Big Bend	WI	Yes	Yes	Yes
856. Chippewa County	WI	Yes	Yes	Yes
857. Dane County	WI	Yes	Yes	Yes
858. De Pere	WI	Yes	Yes	Yes
859. Eau Claire	WI	Yes	Yes	Yes
860. Fennimore	WI	Yes	Yes	Yes
861. Fitchburg	WI	Yes	Yes	Yes
862. Fond du Lac	WI	Yes	Yes	Yes
863. Glendale	WI	Yes	Yes	Yes
864. Green Bay	WI	Yes	Yes	Yes
865. Hudson	WI	Yes	Yes	Yes
866. Kenosha	WI	Yes	Yes	Yes
867. Lake Delton Village	WI	Yes	Yes	Yes
868. Lincoln County	WI	Yes	Yes	Yes
869. Madison	WI	Yes	Yes	Yes
870. Marshfield	WI	Yes	Yes	Yes
871. Menomonie	WI	Yes	—	—
872. Merrill	WI	Yes	Yes	Yes
873. Middleton	WI	Yes	Yes	Yes

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
874. Milwaukee	WI	Yes	Yes	Yes
875. Monona	WI	Yes	Yes	Yes
876. Neenah	WI	Yes	Yes	Yes
877. North Hudson	WI	Yes	Yes	Yes
878. Oak Creek	WI	Yes	Yes	Yes
879. Oneida County+	WI	Yes	Yes	Yes
880. Park Ridge	WI	—	Yes	—
881. Portage	WI	Yes	Yes	Yes
882. Prairie du Chien	WI	Yes	Yes	Yes
883. Reedsburg	WI	Yes	Yes	Yes
884. Rhinelander	WI	Yes	Yes	Yes
885. Shorewood	WI	Yes	Yes	Yes
886. Shorewood Hills	WI	Yes	Yes	Yes
887. Somerset	WI	Yes	Yes	Yes
888. South Milwaukee	WI	Yes	Yes	Yes
889. Stevens Point	WI	Yes	—	—
890. Suamico	WI	Yes	Yes	Yes
891. Verona	WI	Yes	Yes	Yes
892. Watertown	WI	Yes	Yes	Yes
893. West Allis	WI	Yes	Yes	Yes
894. Weston	WI	Yes	Yes	Yes
895. Winnebago County	WI	Yes	Yes	Yes
896. Wisconsin Dells	WI	Yes	Yes	Yes
897. Wisconsin Rapids	WI	Yes	Yes	Yes
898. Barbour County+	WV	Yes	Yes	—
899. Berkeley County+	WV	Yes	Yes	—
900. Boone County+	WV	Yes	—	—
901. Braxton County+	WV	Yes	Yes	Yes
902. Brooke County+	WV	Yes	—	—
903. Cabell County+	WV	Yes	Yes	Yes
904. Calhoun County+	WV	Yes	Yes	Yes
905. Clay County+	WV	Yes	Yes	—
906. Doddridge County+	WV	Yes	Yes	Yes
907. Fayette County+	WV	Yes	Yes	—
908. Grant County+	WV	Yes	Yes	Yes
909. Greenbrier County+	WV	Yes	Yes	—
910. Hardy County+	WV	Yes	—	—
911. Harrison County+	WV	Yes	Yes	Yes
912. Jackson County+	WV	Yes	Yes	Yes
913. Jefferson County+	WV	Yes	—	—

Data Table for Figure 6.3 Continued

Municipality	State	100% Smokefree Non-Hospitality Workplaces	100% Smokefree Restaurants	100% Smokefree Freestanding Bars
914. Kanawha County+	WV	Yes	Yes	Yes
915. Lewis County+	WV	Yes	Yes	—
916. Lincoln County+	WV	Yes	Yes	Yes
917. Marion County+	WV	Yes	Yes	—
918. Marlinton	WV	Yes	Yes	Yes
919. Marshall County+	WV	Yes	Yes	—
920. McDowell County+	WV	—	Yes	—
921. Mercer County+	WV	Yes	Yes	—
922. Mineral County+	WV	Yes	—	—
923. Mingo County+	WV	Yes	—	—
924. Monroe County+	WV	Yes	Yes	—
925. Morgan County+	WV	Yes	Yes	—
926. Nicholas County+	WV	Yes	—	—
927. Ohio County+	WV	Yes	Yes	Yes
928. Pendleton County+	WV	Yes	—	—
929. Pleasants County+	WV	Yes	Yes	Yes
930. Pocahontas County+	WV	Yes	Yes	Yes
931. Preston County+	WV	Yes	—	—
932. Raleigh County+	WV	Yes	—	—
933. Randolph County+	WV	Yes	Yes	Yes
934. Ritchie County+	WV	Yes	Yes	Yes
935. Roane County+	WV	Yes	Yes	Yes
936. Summers County+	WV	Yes	Yes	Yes
937. Tucker County+	WV	Yes	Yes	Yes
938. Upshur County+	WV	Yes	Yes	Yes
939. Wayne County+	WV	Yes	—	—
940. Webster County+	WV	Yes	Yes	—
941. Wirt County+	WV	Yes	Yes	Yes
942. Wood County+	WV	Yes	Yes	Yes
943. Wyoming County+	WV	Yes	Yes	Yes
944. Burlington	WY	Yes	Yes	Yes
945. Cheyenne	WY	—	Yes	Yes
946. Evanston	WY	—	Yes	Yes
947. Laramie	WY	—	Yes	Yes
948. Mountain View	WY	Yes	Yes	Yes
949. Rock Springs	WY	—	Yes	—
Total: 949 (in 39 states and the District of Columbia) by Provision		748	752	622

+ Law pertains to both incorporated and unincorporated areas of county.
Additional Summary Counts: Total number of municipalities that are 100% smokefree workplaces, restaurants, and freestanding bars, 468; total Number of municipalities that are 100% smokefree in both workplaces and restaurants, 561; and total number of municipalities that are 100% smokefree in both restaurants and freestanding bars, 615.