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Part I

Changing Risk Behaviors and Addressing Environmental Challenges

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Chapter 1

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*Insufficient evidence means that we were not able to determine whether or not the intervention works.

The Task Force approved the recommendations in this chapter in 1999–2000. The research on which the findings are based was conducted between 1976 and May 2000. This information—with the exception of reviews of approaches to reduce tobacco use through interventions to restrict minors' access to tobacco products—has been previously published in the American Journal of Preventive Medicine [2001; 20(2S): 10–15 and 16–66] and the MMWR Recommendations and Reports series [2000; 49(No. RR-12):1–11]. The information on restricting minors' access to tobacco products is being prepared for publication.

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Tobacco use is the leading cause of preventable illness and death in the United States.[1] Recognized as a cause of multiple cancers, heart disease, stroke, complications of pregnancy, and chronic obstructive pulmonary disease,[2] tobacco use is responsible for 430,000 deaths per year among adults, and direct medical costs are in the range of $50–$73 billion per year.[3]

Despite nearly four decades of policies, regulations, educational efforts, and increasing information on the negative health effects of tobacco use and the positive health benefits of cessation, tobacco use remains unacceptably high. In 2002, an estimated 45.8 million adults in the United States (nearly one in four adults) smoked.[4] Tobacco use and disparities in tobacco-related morbidity and mortality vary by region, level of education, socioeconomic status, race, gender, and ethnicity.[2,5] Individuals below the poverty line, for example, are more likely to smoke than individuals at or above the poverty line (32.9% compared with 22.2%).[4] By level of education, adults who had earned a General Educational Development (GED) diploma had the highest prevalence (42.3%) of smoking; people with masters, professional, and doctoral degrees had the lowest prevalence (7.2%).[4] The prevalence of smoking among American Indians and Alaska Natives (40.8%) is higher than that of other racial and ethnic groups.[4]

Regular tobacco use results in true drug dependence in most users, making attempts to quit difficult and relapses common.[6] Many users make multiple attempts to quit.[7] In 2002, an estimated 15.4 million current smokers (41.2%) had stopped smoking for at least one day during the preceding 12 months because they were trying to stop smoking entirely.[4] Although cessation significantly reduces the immediate and subsequent risks of tobacco-related morbidity and mortality,[8,9] most tobacco users do not receive assistance in quitting.[6]

Preventing the acquisition of this costly, chronic dependence is clearly de-

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sirable. However, tobacco use initiation and the transition from experimentation to addiction are not easy to prevent because they occur primarily in adolescence, when individuals are more susceptible to influences from family, friends, peers, society, and the tobacco industry that encourage tobacco use.[10] Smoking among 8th, 10th, and 12th graders increased dramatically from 1991 to 1997 and then declined just as dramatically from 1997 to 2003. For example, prevalence of current smoking among high school seniors was 28.3% in 1991, increased to 36.5% by 1997, and declined to 24.4% by 2003.[11] The high rates of smoking prevalence among young adults aged 18–24 years (28.5% in 2002), in addition to reflecting those who started smoking in high school, may also indicate an increase in tobacco use initiation among this group.[4]

Exposure to environmental tobacco smoke (ETS) is a recognized cause of heart disease and accounts for an estimated 3000 lung cancer deaths per year among adults.[12] Among infants and children, exposure to ETS causes middle ear infections and effusions, exacerbates 400,000–1,000,000 cases of asthma annually, and causes 150,000–300,000 cases of lower respiratory tract infections each year.[13] The health effects of exposure to ETS have prompted the increasing implementation of public and private policies that restrict smoking.[2] The median level of cotinine (a marker for exposure to tobacco smoke) among nonsmokers declined 70% from 1988–1991 to 1999–2000, suggesting a dramatic reduction in exposure of the general U.S. population to ETS over this time period. However, substantial gender, racial, and age disparities in exposure are evident, with children, men, and African Americans having higher exposure levels.[14] Exposure to ETS continues to occur in workplaces and public areas without smoking bans or effective restrictions and in households in which smoking indoors is allowed.

OBJECTIVES AND RECOMMENDATIONS FROM OTHER ADVISORY GROUPS

The interventions reviewed in this chapter can be useful in reaching many of the tobacco control objectives in *Healthy People 2010*[15] (Table 1–1). In the field of tobacco control, many groups have published useful guidelines. To help summarize this information, we published an article in 2001[16] comparing the *Community Guide* population-based recommendations with reviews and recommendations produced by other groups, including the Surgeon General's office, the United States Preventive Services Task Force (which publishes the *Guide to Clinical Preventive Services*[17]), and the Cochrane Collaboration. Another good source for readers interested in information on various clinical guidelines is *Treating Tobacco Use and Dependence: Clinical Practice Guideline*[6]; some information from that report is also summarized in our article.

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Table 1–1. Selected *Healthy People 2010*[15] Objectives Related to Tobacco Use and Environmental Tobacco Smoke Exposure

Objective	*Population*	*Baseline*	*2010 Objective*
Tobacco Use in Population Groups			
Reduce cigarette smoking by adults (Objective 27–1a)	Adults	24% (1998)	12%
Reduce use of tobacco products by adolescents (in the past month)(27–2a)	Adolescents	40% (1999)	21%
Reduce the initiation of tobacco use among children and adolescents (27–3)	Children/ adolescents	Developmental	
Increase (delay) the average age of first tobacco use by adolescents (aged 12–17 years) (27–4a)	Adolescents	12 years old (1997)	14 years old
Cessation and Treatment			
Increase the percentage of smokers stopping smoking for a day or longer (27–5)	Adults	41% (1998[a])	75%
Among females aged 18–49 years, increase smoking cessation in pregnant women in the first trimester of pregnancy (27–6)	Pregnant women	14% (1998)	30%
Among adolescents in grades 9–12, increase the percentage of ever-daily smokers who try to quit (27–7)	Adolescents	76% (1999)	84%
Increase in insurance coverage of evidence-based treatment for nicotine dependency:			
• in managed care organizations: (27–8a)	All	75% (1997–98)	100%
• in Medicaid programs in states and the District of Columbia (27–8b)		24 states (1998)	51 states
Exposure to Secondhand Smoke (ETS)			
Among children aged ≤6 years, reduce the proportion of children who live in homes in which someone smokes inside the house ≥4 days per week (27–9)	Young children	27% (1994)	10%
Reduce the proportion of nonsmokers aged ≥4 years with a serum cotinine level >0.10 ng/mL (27–10)	Nonsmokers	65% (1988–94[a])	45%

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Table 1–1. *Continued*

Objective	*Population*	*Baseline*	*2010 Objective*
Exposure to Secondhand Smoke (ETS) (continued)			
Increase the proportion of smoke-free and tobacco-free middle, junior high, and senior high schools (27–11)	Schools	37% (1994)	100%
Increase the proportion of worksites (with ≥50 workers) with formal smoking policies that prohibit smoking or limit it to separately ventilated areas (27–12)	Employees	79% (1998–99)	100%
Increase the number of states plus the District of Columbia with laws on smoke-free air:		(All 1998)	(For all)
• in private workplaces (27–13a)	All	1 state	51 states
• in public workplaces (27–13b)		13 states	
• in restaurants (27–13c)		3 states	
• on public transportation (27–13d)		16 states	
• in day-care centers (27–13e)		22 states	
• in retail stores (27–13f)		4 states	
Social and Environmental Changes			
Increase the number of states (including the District of Columbia) with a ≤5% sales rate of tobacco products to minors (27–14a)	Minors	0 states (1998)	51 states
Increase the number of states (including the District of Columbia) that can suspend or revoke state licenses for violation of laws prohibiting the sale of tobacco to minors (27–15)	Minors	34 states (1998)	51 states
Eliminate tobacco advertising and promotions that influence adolescents and young adults (27–16)	Adolescents/ young adults	Developmental	
Increase the proportion of adolescents who disapprove of smoking:		(All 1998)	
• among 8th graders (27–17a)	Adolescents	80%	95% for all

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Table 1–1. *Continued*

Objective	*Population*	*Baseline*	*2010 Objective*
Social and Environmental Changes (continued)			
• among 10th graders (27–17b)		75%	
• among 12th graders (27–17c)		69%	
Increase the number of tribes, territories, and states and the District of Columbia with comprehensive, evidence-based tobacco control programs (27–18)	All	Developmental	
Reduce the number of states that have laws preempting stronger tobacco control (in the areas of clean indoor air, minors' access laws, or marketing) (27–19)	All	30 states (1998)	0 states
Reduce the toxicity of tobacco products by establishing a regulatory structure to monitor toxicity (27–20)	All	Developmental	
• Increase the combined federal and average state tax (per pack) on cigarettes (27–21a)	All	$0.63 (1998)	$2
• Increase the combined federal and average state tax on spit tobacco (27–21b)		Developmental	

[a]Age adjusted for the year 2000 standard population.

METHODS

Methods used for the reviews are summarized in Chapter 10. Specific methods used in the systematic reviews of tobacco use prevention and control have been described elsewhere[16,18–20] and are available at www.thecommunityguide.org/tobacco. The logic framework depicting the conceptual approach used in these reviews is presented in Figure 1–1.

ECONOMIC EFFICIENCY

A systematic review of available economic evaluations was conducted for each recommended intervention, and a summary of each review is presented with the related intervention. The methods used to conduct these economics reviews are summarized in Chapter 11.

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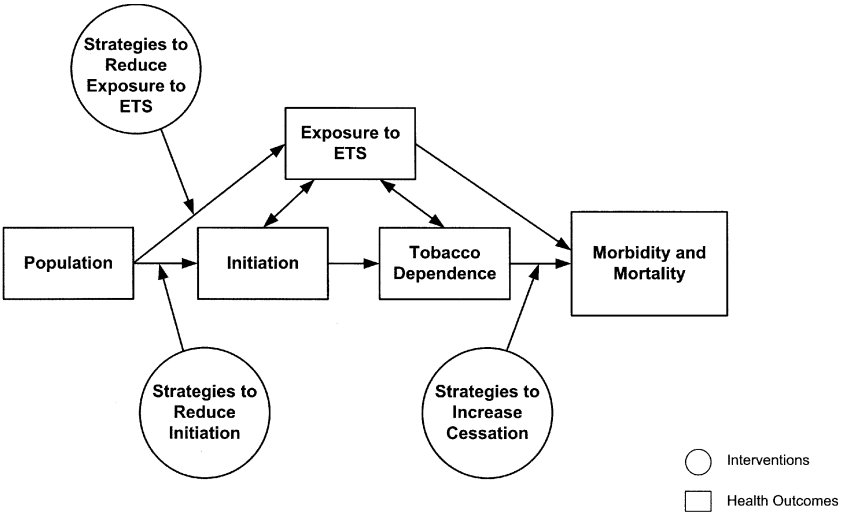

Figure 1–1. Logic framework illustrating the conceptual approach used in systematic reviews of tobacco use. (ETS = environmental tobacco smoke.) (Reprinted from Am J Prev Med, Vol. 20, No. 2S, Hopkins DP et al., Reviews of evidence regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke, p. 18, Copyright 2001, with permission from American Journal of Preventive Medicine.)

RECOMMENDATIONS AND FINDINGS

This section presents a summary of the findings of the systematic reviews conducted to determine the effectiveness of the selected interventions in this topic area. We evaluated interventions to address three goals essential to tobacco prevention and control efforts: decreasing the number of people who start using tobacco products (tobacco use initiation), increasing the number of tobacco users who quit (tobacco use cessation), and reducing exposures among nonsmokers to environmental tobacco smoke (ETS).

Reducing Tobacco Use Initiation

The interventions in our reviews are designed to change knowledge, attitudes, and tobacco use among children, adolescents, and young adults. Most adults who use tobacco products began in adolescence, and nicotine addiction develops during the first few years of use.[21] Children and adolescents may perceive tobacco use to be a normal peer and adult behavior, and can often act on this belief because tobacco products are readily available and accessible.[10] Preventing or delaying experimentation with tobacco or preventing the transition from experimentation to regular use are the major goals of the interventions we reviewed: increasing the unit price for tobacco products,

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mass media campaigns when combined with additional efforts, and interventions to restrict minors' access to tobacco products.

Increasing the Unit Price for Tobacco Products: Recommended (Strong Evidence of Effectiveness)

Interventions to increase the unit price for tobacco products primarily include legislation at the municipal, state, or federal level that raises the excise tax on tobacco products. In several states, excise tax increases have resulted from successful state ballot initiatives. Although other factors affect tobacco product pricing, excise tax increases have historically resulted in an equivalent or larger increase in tobacco product prices.[22]

Excise taxes on tobacco products increase the overall product cost and therefore make the use of tobacco products less attractive to young people with limited income and a variety of ways to spend their money.

Effectiveness

- Higher prices for tobacco products are associated with reduced consumption of tobacco products (a 10% price increase results in approximately a 4% decrease).
- Higher prices for tobacco products are associated with lower levels of tobacco use by adolescents and young adults who use tobacco (a 10% price increase results in approximately a 2% decrease in the amount smoked).

Applicability

- These findings should be applicable to most adolescents and young adults in the United States.

Other Effects

- Price increases also reduce tobacco use among adults.

Barriers

- Increasing the excise tax on tobacco products requires passage of legislation or a statewide referendum.

The findings of our systematic review are based on eight studies that evaluated the effectiveness of increasing the price of tobacco products on changing the tobacco use behaviors of adolescents or young adults.[23–30] Three additional articles provided information on a study already included in the review.[31–33] All studies were conducted in the United States. Studies examined the effect of product price on tobacco use by adolescents (13–18 years old) and by young adults (18–24 years or under 25 years old).

All eight studies used econometric methods to analyze surveys of students

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or young adults. Price elasticity of demand (the percentage change in consumption that results from a 1% change in price) estimates were calculated by combining information on local tobacco product prices, price changes, or differences over the period of study with responses to surveys on tobacco use and consumption. The price elasticity of demand estimates in these studies included participation (i.e., tobacco use prevalence), number of cigarettes smoked per day among those who smoke, and overall estimates of tobacco consumption (which includes both changes in participation and amount smoked by those who continue to smoke). All of the studies attempted to control for concurrent tobacco prevention and control efforts, including differences in smoking restrictions, youth tobacco access laws, school tobacco education programs, and exposure to anti-tobacco media. Five studies evaluated the effect of price on tobacco use for study periods that included the 1990s, and three studies reported the effect of price on tobacco use for periods before 1990.

Price elasticity of demand estimates from seven studies demonstrated that higher tobacco product prices are associated with lower levels of tobacco use by adolescents and young adults. Based on the median estimate of price elasticity from the studies in this review, for example, tobacco use prevalence among adolescents (13–18 years old) would decrease 3.7% with a 10% increase in product price (range, "no statistically significant effect" to 11.9%). The effects are at least as strong for young adults (18–24 years old). For estimates of amount smoked, the median estimate from six studies suggests that a 10% increase in product price would result in a 2.3% decrease in the amount of tobacco used by adolescents who smoke.

These findings show that increasing the unit price for tobacco products is effective in reducing both tobacco use prevalence and tobacco consumption among adolescents and young adults.

These results should be applicable to most adolescents and young adults in the United States. All studies were conducted in the United States, and most of the studies used national datasets to compare tobacco use and product price across jurisdictions (e.g., states). The study samples are representative of populations of adolescents and young adults. Studies evaluated the effect of product price on use and consumption of both cigarettes and smokeless tobacco products.

Overall, the studies showed that tobacco product price increases had a greater effect among males than among females; price affected tobacco use and consumption among whites, African Americans, and Hispanics; and African-American adolescents and young adults were more responsive to differences in product price than were white adolescents and young adults, respectively.

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Increasing the price of tobacco products also reduces tobacco use among adults (for additional information see the review of Increasing the Unit Price for Tobacco Products in the next section, Increasing Tobacco Use Cessation). We found no other additional positive or negative effects of tobacco product price increases on adolescent tobacco use initiation.

Econometric analyses were included in the studies qualifying for the review of effectiveness. A separate economic evaluation was not conducted for this intervention review.

Passage of legislation or a statewide referendum is required for an excise tax increase on tobacco products and may, therefore, present a significant barrier to implementation. Political opposition has historically been well organized and funded at both the federal and state levels. Reports on both successful and unsuccessful state initiatives that proposed an increase on tobacco product excise taxes have been published.[34–36]

In conclusion, the Task Force recommends increasing the unit price for tobacco on the basis of strong evidence of effectiveness in reducing tobacco use initiation among adolescents and young adults. Raising the unit price for tobacco products (through increases in the excise tax) is effective in reducing both the number of adolescents and young adults who use tobacco products and the amount of tobacco they use. Increasing the unit price for tobacco products also reduces tobacco use among adults. The need for passage by a state legislature or a referendum can present a barrier to increasing excise taxes.

Mass Media Education Campaigns When Combined with Other Interventions: Recommended (Strong Evidence of Effectiveness)

These campaigns use mass media for an extended duration (months to years) to disseminate brief, recurring messages with the goal of providing information that will motivate people, primarily children and adolescents, to remain tobacco-free. The messages, developed through formative research, are disseminated through paid broadcast time and print space, donated time and space (as public service announcements), or a combination of the two. Mass media campaigns can be combined or coordinated with additional interventions, such as increases in tobacco product excise taxes, school-based education, and other community-wide educational activities.

Mass media techniques primarily include broadcast messages on television and radio, although other formats such as billboards, print, and movies have been used. Campaigns can focus on messages targeting children and adolescents or can include such messages as part of an overall anti-tobacco effort (e.g., including messages targeting tobacco users to increase cessation

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and messages about reducing exposure to secondhand tobacco smoke). The content of mass media campaigns designed to educate and motivate children and adolescents to remain tobacco-free can vary, but a recent review identified two primary strategies: agenda setting and demand reduction education.[37] Agenda-setting messages increase awareness of strategies used by the tobacco industry to promote tobacco use, and attempt to facilitate changes in both tobacco use behaviors and public tobacco policies. Demand reduction education messages provide information and support to young people to help them decide to remain tobacco-free.

Effectiveness

- Mass media education campaigns, combined with other interventions, are effective in decreasing the number of young people who use tobacco by approximately 2.4 percentage points.
- Effectiveness was increased in campaigns lasting two years or longer.

Applicability

- These findings should be applicable to most adolescents in the United States.

Other Effects

- Mass media education campaigns can also include messages that contribute to reductions in tobacco use among adults.

The findings of our systematic review are based on 12 studies that evaluated the effectiveness of mass media campaigns in reducing tobacco use among adolescents.[38–49] Two additional studies were identified but did not meet our quality criteria and were excluded from the review.[50,51] Another 28 papers provided information on studies already included in the review.[52–79] In nine studies, the mass media efforts focused on youth; in three other studies, youth-targeted messages were part of a larger anti-tobacco campaign. Only one study used mass media alone (through a variety of outlets). In 11 studies, the mass media campaign was conducted in coordination or concurrently with contests, school-based education programs, or community education programs. Two studies were conducted in settings where excise taxes on tobacco products had been increased. Two of the mass media campaigns were less than two weeks long, three were less than two years long, and seven campaigns were more than two years long.

The qualifying studies provided 12 diverse measures of tobacco use and generally showed reductions among youth (students) in the intervention communities relative to youth in the comparison communities. For example, five studies reported absolute differences in self-reported tobacco use and observed a median reduction of 2.4 percentage points (range, 0.02 increase to

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9.5 decrease). In six studies, comparisons in self-reported tobacco use were expressed as odds ratios. Two of these studies reported no intervention effect on tobacco use, whereas four studies observed lower rates among people exposed to the intervention (median odds ratio of 0.60, range 0.49 to 0.74).

All seven studies evaluating campaigns of two or more years' duration observed reductions in tobacco use among youth in favor of the intervention communities. In studies reporting absolute percentage differences the median reduction in tobacco use was 8.0 percentage points (range, 2.4 to 11), and in studies calculating odds ratios the median was 0.74 (range, 0.49 to 0.74).

We could not assess the effects of the separate components of these combined intervention efforts.

These findings show that mass media education campaigns, when combined with other intervention activities, are effective in decreasing tobacco use among youth.

These results should be applicable to most adolescents in the United States. Statewide campaigns were conducted in Florida, Massachusetts, and Minnesota. Community and regional interventions were conducted in the Southeast, Northeast, and Midwest, and in Montana and Southern California. Campaigns began in the 1990s, the 1980s, and the 1970s. Both representative samples of adolescents in the general population and representative or selected samples of schools were used. Student populations were recruited or surveyed before grade 6, in grades 6–7, or after grade 7. The two most recent studies showed a greater benefit among younger adolescents. Evaluation of the Florida campaign provides evidence of effectiveness of mass media campaigns among girls, boys, whites, African Americans, and Hispanics.

Mass media campaigns, when combined with additional interventions, can also reduce tobacco use among adults (for additional information see Mass Media Education Campaigns in the next section, Increasing Tobacco Use Cessation), although the message content, broadcast times, and settings that reduce youth tobacco use may not be effective in reducing adult tobacco use. No other positive or negative effects were identified.

The findings of our systematic review of economic evaluations are based on one four-year economic study conducted in Montana, New York, and Vermont.[71] This cost-effectiveness analysis compared the effect on students of a mass media campaign combined with a school smoking prevention program to the effect of a school smoking prevention program alone. Students (from grades 5–7 through grades 8–10) were followed for two years after the intervention. Costs included personnel, travel, data entry, message research and development, and television and radio advertising. At follow-up, smoking prevalence among students exposed to the media intervention plus the school

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smoking prevention program was 20.4%, compared with 25.9% among students exposed only to the school program. Adjusted program cost per smoker averted was $6069, and the adjusted program cost per quality-adjusted life year (QALY) was $333.

The main barrier to implementation of mass media campaigns is the cost of purchasing advertising time. Costs of developing and test marketing messages can be offset by cooperation between tobacco control programs.

In conclusion, the Task Force recommends mass media campaigns, when combined with additional interventions, on the basis of strong evidence of effectiveness in reducing tobacco use among adolescents. These interventions were effective in decreasing the number of young people who use tobacco products. The findings of this review should be applicable to most adolescents in the United States. Mass media campaigns can produce the additional benefit of a reduction in adult tobacco use.

Restricting Minors' Access to Tobacco Products: Interventions to Reduce Tobacco Use

Access to tobacco products by minors (people under 18 years of age in most states) contributes to the initiation and regular use of tobacco by children and adolescents.[2,10] Retailers who sell tobacco products to minors (including vending machines in accessible settings) constitute one avenue of access for minors.[2,10,80] Social sources provide another route of access for many, but not all, minors. Although social sources include adults (parents, family, friends) who may purchase tobacco products legally,[81–83] illegal retailer sales to minors provide tobacco products for distribution to other minors, contributing to social access.[81]

Minors obtain tobacco from commercial sources through face-to-face purchases from retailers (from self-service displays or requests for products held behind the counter), purchases from vending machines, purchases through the mail or over the Internet, access to free product samples, and theft from retail sources. Overall, minors' access reflects the availability of tobacco products within the community, the willingness of retailers to sell them, and the efforts of minors to obtain them. Interventions to reduce access attempt to modify or to change one or more of these factors.

This section includes a review of a variety of interventions to restrict and reduce the supply of tobacco products that minors can obtain from commercial sources. Some of the intervention combinations reviewed included components intended, in whole or in part, to reduce the demand for tobacco products by minors through efforts to educate and mobilize the community

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and to change social norms about the acceptability of tobacco use.[84] In these efforts, minors' access to commercial sources of tobacco provided a focus for the community to address the problem of tobacco use among youth.

In conducting this review of interventions to reduce minors' access to tobacco products, we considered as evidence of effectiveness (*1*) measurements of differences or changes in self-reported tobacco use in the study population and (*2*) measurements of differences or changes in self-reported purchases of tobacco products or use of tobacco obtained from commercial sources. Because it is not clear how the compliance of any particular retailer contributes to the overall availability of tobacco to youth, differences or changes in retailer sales of tobacco products to minors were evaluated and summarized but did not by themselves provide the basis for our assessments of effectiveness.

In this section, we review studies that combined two or more interventions in a coordinated effort to restrict minors' access to tobacco products. We identified a total of 28 multicomponent studies. The 13 studies (with 14 arms) that qualified for our assessment of effectiveness evaluated a total of 10 different combinations of interventions. However, only five of these studies conducted measurements of differences or changes in tobacco use among youth, the focus of our assessment of effectiveness. The remaining studies measured differences or changes in retailer sales rates on "youth test purchase attempts" (in which recruited, trained, and supervised minors make standardized attempts to purchase tobacco products from retailers and vending machines). Overall, the body of evidence included evaluations of effectiveness for a variety of overlapping combinations of interventions. The information presented here summarizes only one of our reviews on effectiveness across the qualifying multicomponent studies.

Community Mobilization When Combined with Additional Interventions: Recommended (Sufficient Evidence of Effectiveness)

These interventions are implemented community-wide to focus public attention on the issue of youth access to tobacco products and to generate and mobilize community support for additional efforts to reduce that access. The community mobilization efforts evaluated here either fostered or were coordinated with additional interventions, such as stronger restrictions on retailer sales of tobacco products; restrictions directed at youth purchase, possession, or use; active enforcement of tobacco sales laws; and retailer education interventions (with or without reinforcement).

Educational components of the interventions included community-wide assessments of compliance by tobacco retailers—with dissemination of the results through mass media events and news coverage—and presentations to

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civic groups and local governments. Community and school meetings and activities, as well as direct contact with local governments through testimony, petitions, letters, and phone calls, also occurred.

We included studies in the review regardless of the order in which components were added. For example, in some studies, community mobilization was the initial intervention and contributed to the adoption of additional interventions. In other studies, community mobilization followed other interventions (such as stronger laws directed at retailers) in efforts to generate and maintain community support for reducing minors' access to tobacco products.

Effectiveness

- Community mobilization, when combined with other interventions, was effective in reducing tobacco use among youth (students) by approximately 5.8 percentage points.
- The intervention reduced the sale of tobacco products by retailers to youth making test purchase attempts by approximately 34 percentage points.

Applicability

- These findings should be applicable to most communities in the United States where not precluded by preemption legislation.

Barriers to Implementation

- The adoption or existence of a law at the state level that supersedes or precludes stronger local laws (preemption) is a significant barrier to the effective combination of community mobilization and coordinated interventions.

We identified a total of nine qualifying studies (10 intervention arms) that provided evidence on the effectiveness of community mobilization when combined with additional interventions.[85–93] Seven additional papers provided information on studies already included in our review.[94–100] Seven studies did not meet our quality criteria and were excluded from the review.[101–107]

As noted above, most of the qualifying studies did not attempt to measure differences or changes in tobacco use among youth, the focus of our assessment of effectiveness. The nine qualifying studies provided 10 measurements of changes in the percentage of retailers willing to sell tobacco products to youth in test purchase attempts. Overall, the studies observed a 33.5 percentage point reduction in retailers willing to sell tobacco to youth (range, 4.5 to 68). In the intervention communities at follow-up, the median sales rate among retailers on youth test purchase attempts was 27.5% (range, 0% to 65%).

The findings of this systematic review are based on the subset of five multicomponent intervention studies that measured differences or changes in tobacco use among youth in the study communities.[86,87,90,91,108] Four of these studies evaluated a combined intervention including community mobiliza-

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tion.[86,87,90,91] In these studies, the interventions coordinated with community mobilization included retailer education with reinforcement,[86,87,91] stronger local ordinances directed at retailers,[90,91] active enforcement of retailer sales laws,[90,91] local ordinances directed at youth tobacco purchase, possession, or use,[90,91] and school-based education.[87]

All four studies evaluating interventions combined with community mobilization observed decreases in self-reported tobacco use by students, with a median decrease of 5.8 percentage points (range, 3.8 to 11) over follow-up periods of 24 – 48 months. In addition, all four studies observed both reductions in the sale of tobacco products on youth test purchase attempts (median – 44 percentage points) and low post-intervention sales rates by retailers on youth test purchase attempts (median 7.9%; range, 0% to 24%) in the intervention communities.

The fifth qualifying study that measured youth tobacco use as an intervention outcome evaluated the combination of sustained, active enforcement of sales laws directed at retailers following a brief retailer education effort (notification of existing sales laws).[108] Despite a significant reduction of 30 percentage points in retailer sale of tobacco products on youth test purchase attempts (the post-intervention sales rate was 18% in the intervention community), self-reported tobacco use by surveyed high school students was not significantly different at two-year follow-up.

Overall, these results indicate that the combination of community mobilization and additional activities is effective in reducing youth access to tobacco.

These results should be applicable to some communities in the United States (barriers are described below). The multicomponent interventions evaluated in this body of evidence were implemented in a variety of settings and populations, including urban, suburban, and rural communities in the United States and Australia. Interventions were implemented in U.S. communities that included predominantly African-American, Hispanic, or white populations.

We found no information on other positive or negative effects of community mobilization. One report observed that youth who took part in test purchase attempts had not increased smoking or intentions to smoke at a two-year follow-up.[109]

The findings of our systematic review of economic evaluations are based on one study of a component of community mobilization.[110] This one-year study modeled the cost effectiveness of active enforcement of tobacco sales to minors on a national level. The intervention included employing minors to attempt tobacco purchases, licensing tobacco vendors, and civil penalties for vendors who illegally sold tobacco products to minors. Program costs in-

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cluded personnel, salary, and benefits for minors and for adult inspectors; liability insurance; money to purchase tobacco; transportation; and overhead (analyses were based on enforcement costs of $50, $150, $250, and $350, where marginal expense is lowest at the community level and highest at the federal level). Primary outcome measures consisted of four levels of reduction in youth tobacco use ranging from 5% to 50%, with subsequent cost-effectiveness ratios ranging from $44 to $3100 per year of life saved.

Barriers to implementation are well described in the published literature. Preemption, the adoption or existence of a law at the state level that supersedes or precludes stronger local laws, is the subject of a *Healthy People 2010*[15] objective (see Table 1–1). Preemption is a significant barrier to the effective combination of community mobilization and coordinated interventions, such as laws directed at retailers and the conduct of active enforcement.[2,90,106,111,112] Preemption statutes in many states hinder or prevent implementation of the effective combinations of interventions described in this review.[2,106] In addition, some preemption laws hinder or obstruct compliance checks of retailers, making it more difficult for communities to recognize and address minors' access to commercial sources of tobacco products.

Opposition by retailers, retail associations, and the tobacco industry can be a significant barrier to the implementation and conduct of sustained, active enforcement of sales laws.[2,90] Lack of resources or interest in conducting active enforcement can affect the impact and duration of enforcement efforts.[113]

Judicial nullification of penalties directed at retailers was noted as a potential barrier in achieving and maintaining retailer compliance through active enforcement.[89,114] Other reviews have suggested that replacing criminal offense statutes with specified civil penalties (e.g., graduated fines or license suspension) would improve enforcement efforts and minimize court appearances.[2,84,114]

Another barrier to implementation can come from legislative efforts to weaken, replace, or prevent the implementation and conduct of interventions to reduce minors' access. Several reports identified in this review summarized these efforts.[2,80,115,116]

In conclusion, the Task Force recommends 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—on the basis of sufficient evidence of effectiveness in reducing youth tobacco use and access to tobacco products from commercial sources. Preemption is a significant barrier to the implementation of the intervention combinations evaluated in this report. The published literature describes a number of legislative efforts to weaken, replace, or prevent the implementation and conduct of these interventions.

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We also evaluated the effectiveness of several interventions implemented alone in reducing minors' access to and use of tobacco products. The evidence was insufficient to determine the effectiveness of any of these interventions by itself.

Sales Laws Directed at Tobacco Retailers to Reduce Illegal Sales to Minors When Implemented Alone: Insufficient Evidence to Determine Effectiveness

In addition to general laws governing the sale of tobacco, laws directed at retailers provide specific regulation or restriction of the sale of tobacco products to minors. These laws include licensing requirements for tobacco retailers and bans or restrictions on tobacco product vending machines and self-service displays. The laws may include additional conditions, such as requiring proof of the purchaser's age before selling tobacco, displaying sales laws (such as warning signs at the point of purchase), banning the sale of single cigarettes, and restricting the age of the seller.

These laws may designate the method of enforcement and establish the penalties and the responsible parties for each violation (for example, civil penalties directed at the retail owner or license holder). The interventions described in the studies we reviewed were implemented by local governments and were not limited by state preemption legislation. (The effectiveness of active enforcement of these laws is reviewed separately in this chapter.)

Effectiveness

- We found insufficient evidence to determine the effectiveness of sales laws directed at retailers, when implemented alone, in reducing minors' access to and use of tobacco products.
- Only one study qualified for review; it had limitations in study execution and lacked measurements of youth tobacco use or purchase behaviors.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review are based on a single qualifying study.[117] Four additional reports[24,32,118,119] (on three studies) were identified but did not meet our quality criteria and were excluded from the review. The single qualifying study evaluated the effect of a local county ban of self-service displays on sales of tobacco products to youth. No measurements of differences in tobacco use among youth were attempted. A slight reduction (3.2 percentage points from a baseline of 17.5%) in the number of retailers willing to sell tobacco to youth was observed. Results from this single qualifying study provided insufficient evidence to determine the effectiveness of sales laws directed at retailers when implemented alone in reducing youth access to tobacco.

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Because we could not establish the effectiveness of these laws, we did not examine situations in which these laws would be applicable, information about economic efficiency, or possible barriers to implementation.

A potential benefit of these laws is that license requirements for the sale of tobacco products enable communities to identify commercial sources of tobacco. These laws also provide support for additional interventions, such as active enforcement of sales laws. Finally, self-service display bans reduce or eliminate minors' ability to obtain cigarettes by stealing them. No harms were identified.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of laws directed at retailers when implemented alone in reducing youth access to tobacco, because only one study qualified for our review, and that study had limitations in execution and lacked measurements of youth tobacco use or purchase behaviors.

Laws Directed at Minors' Purchase, Possession, or Use of Tobacco Products When Implemented Alone: Insufficient Evidence to Determine Effectiveness

These laws prohibit the purchase, possession, or use of tobacco products by minors. Communities have implemented laws directed at minors, and state governments are increasingly doing so. The laws may designate which agency is responsible for enforcement as well as the penalty for violations. Some laws require minors who have received citations to participate in educational programs that provide assistance in quitting smoking.

Effectiveness

- We found insufficient evidence to determine the effectiveness of laws directed at minors' purchase, possession, or use of tobacco products when implemented alone in reducing minors' access to and use of tobacco products.
- The evidence was insufficient because we identified no studies that met the quality criteria for our review.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

Our search identified no studies that evaluated the effectiveness of laws directed at minors' purchase, possession, or use of tobacco products when implemented alone. We therefore found insufficient evidence to determine whether or not these laws are effective in reducing minors' access to tobacco.

Because we could not establish the effectiveness of these laws, we did not examine situations in which they would be applicable, information about economic efficiency, or possible barriers to implementation.

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Although we could not determine whether these laws are effective, we did note other published effects of the laws. Preemption legislation and policies in some states have directed resources and priority of enforcement away from laws directed at retailers in favor of laws directed at youth.[114,120] Some laws establish or mandate participation in programs providing education and cessation assistance to cited youth.[121]

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of laws directed at minors' purchase, possession, or use of tobacco products when implemented alone, because no studies qualified for the review.

Active Enforcement of Sales Laws Directed at Retailers When Implemented Alone: Insufficient Evidence to Determine Effectiveness

Active enforcement is used to achieve and maintain retailer compliance with sales laws. This enforcement consists of periodic unannounced compliance checks, which employ recruited, trained, and supervised minors to make standardized attempts to purchase tobacco products from retailers and vending machines. Retailers who violate sales laws receive citations from law enforcement officers or officers in designated government agencies (e.g., health department inspectors).

Local enforcement operations identified in this review were not limited by state preemption legislation.

Effectiveness

- We found insufficient evidence to determine the effectiveness of active enforcement of sales laws when implemented alone in reducing minors' access to and use of tobacco products.
- Evidence was insufficient because only one qualifying study was identified, which did not measure differences or changes in youth tobacco use or purchase behaviors.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review are based on one study.[122] An additional study was identified but did not meet our quality criteria and was excluded from the review.[123]

The single qualifying study evaluated the effect of an enforcement campaign on the sale of single cigarettes by tobacco retailers in New York City. Starting from a 100% baseline, the percentage of retailers willing to sell cigarettes in the intervention (enforcement) group decreased by 47.7 percentage points (singles or packs) on youth test purchases (the post-intervention sales

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rate was 46.9%). This study did not measure differences or changes in youth tobacco use or purchase behaviors. We therefore found insufficient evidence to determine if active enforcement of existing laws against sale of tobacco products to minors, when implemented alone, is effective in reducing such sales.

Because we could not establish the effectiveness of these laws, we did not examine situations in which they would be applicable, information about economic efficiency, or possible barriers to implementation.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of active enforcement of sales laws when implemented alone in reducing youth access to tobacco, because only one qualifying study was identified and it did not provide measurements of youth tobacco use or purchase behaviors.

Our review identified two types of education interventions directed to tobacco retailers. In both interventions, the messages emphasized the importance of refusing to sell tobacco products to minors. These education interventions differed in the intensity and content of the educational messages, and in whether or not they provided reinforcement to retailers (in the form of follow-up and feedback).

Retailer Education with Reinforcement and Information on Health Consequences When Implemented Alone: Insufficient Evidence to Determine Effectiveness

These interventions aim to increase retailer compliance with prohibitions on tobacco sales to minors through repeated educational messages and feedback on retailer performance. Reviewed interventions involved face-to-face delivery of education messages by concerned citizens, health department workers, or law enforcement officers. The educational component included follow-up that provided either positive or negative reinforcement of retailer or clerk compliance with sales laws based on periodic unannounced compliance checks. In most cases, these interventions included information on the health consequences of tobacco use.

Effectiveness

- We found insufficient evidence to determine the effectiveness of retailer education providing reinforcement and information on health consequences when implemented alone in reducing minors' access to and use of tobacco products.
- The evidence was insufficient because we found no studies that met our quality criteria for review.

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- Insufficient evidence means that we were not able to determine whether or not the intervention works.

Our search identified two studies in which retailer education with reinforcement was implemented alone.[124,125] Both studies were excluded from the review, however, because one had limitations in the quality of execution and the other had a least suitable study design. Additionally, neither study evaluated differences or changes in youth tobacco use or purchase behaviors. Therefore, we found insufficient evidence to determine whether or not retailer education with reinforcement and information on health consequences, by itself, is effective in increasing retailer compliance with laws prohibiting the sale of tobacco products to minors.

Because we could not establish the effectiveness of this intervention, we did not examine situations in which such programs would be applicable, information about economic efficiency, or possible barriers to implementation.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of retailer education providing reinforcement and information on health consequences when implemented alone in reducing minors' access to tobacco, because no studies met our quality criteria for inclusion in the review.

Retailer Education without Reinforcement When Implemented Alone: Insufficient Evidence to Determine Effectiveness

These education interventions deliver messages to retailers about tobacco sales to minors without providing follow-up and feedback on retailer performance. Education interventions, which aim to increase retailer compliance with prohibitions on the sale of tobacco to minors, include distribution of information about current or recent changes in local or state laws governing sales to minors as well as distribution of materials such as display signs or training manuals for clerks. In the studies evaluated in this review, education was carried out by mail; in face-to-face encounters; or through training sessions conducted by concerned citizens, health department workers, or law enforcement officers. The educational messages did not address the health consequences of tobacco use. Our review did not identify any studies evaluating mandatory training sessions for retailers or clerks or provisions to reduce or eliminate penalties for retailers who participated in education programs.

Effectiveness

- We found insufficient evidence to determine the effectiveness of retailer education without reinforcement when implemented alone in reducing minors' access to and use of tobacco products.

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- Only three studies qualified for our review, and none of these measured youth tobacco use or purchase behaviors.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review are based on three studies.[122,126,127] Three additional studies were identified but did not meet our quality criteria and were excluded from the review.[128–130] The three reviewed studies evaluated mailed educational messages or a combination of mailed messages and face-to-face encounters. Although one study observed an increase (+21.3 percentage points) in the number of retailers requiring proof of age from youth making test purchase attempts and two studies observed absolute reductions in retailer sales rates of 9 and 27.5 percentage points, respectively, none of the studies provided measurements of differences or changes in youth tobacco use or purchase behaviors. Therefore, we were unable to determine the effectiveness of retailer education without reinforcement, by itself, in increasing retailer compliance with laws prohibiting the sale of tobacco products to minors.

Because we could not establish the effectiveness of the intervention, we did not examine situations in which it would be applicable, information about economic efficiency, or possible barriers to implementation.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of this intervention because of the small number of qualifying studies and lack of measurement of youth tobacco use or purchase behaviors.

Community Education about Minors' Access to Tobacco Products When Implemented Alone: Insufficient Evidence to Determine Effectiveness

These interventions attempt to disseminate information community-wide to focus public attention on the issue of youth access to tobacco products. The educational components include community-wide assessments of compliance by tobacco retailers, with results disseminated through mass media events, news coverage, and presentations to civic groups and local governments. The interventions can also include community and school meetings and activities as well as direct contact with local governments through testimony, petitions, letters, and phone calls.

In this review, we distinguished between community education efforts (reviewed here) and community mobilization, in which the education efforts fostered or were coordinated with additional interventions directed at minors' access to tobacco products (see Reducing Tobacco Use Initiation—Community Mobilization Combined with Additional Interventions).

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Effectiveness

- We found insufficient evidence to determine the effectiveness of community education when implemented alone in reducing minors' access to and use of tobacco products.
- We identified no studies that evaluated this intervention.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

Our search identified no studies in which community education interventions were implemented and evaluated alone. We therefore had insufficient evidence to determine whether community education, by itself, is effective in increasing community awareness of the issue of youth access to tobacco products.

Because we could not establish the effectiveness of this intervention, we did not examine situations in which it would be applicable, information about economic efficiency, or possible barriers to implementation.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of this intervention in reducing minors' access to tobacco, because no qualifying studies of community education alone were identified.

Increasing Tobacco Use Cessation

Interventions to increase the number of tobacco users who successfully quit include efforts to increase the number of people who attempt to quit, efforts to improve the success rate for quit attempts, and efforts that support both of these goals. We reviewed two approaches appropriate for communities (increasing the unit price for tobacco products and mass media education); five approaches that can be implemented in healthcare systems (provider reminder systems alone; provider education programs alone; provider reminder systems and provider education programs together, with or without client education materials; provider feedback systems; and reducing client out-of-pocket costs for effective cessation therapies); and one intervention appropriate for both communities and healthcare systems (telephone cessation support).

In conducting this review of the evidence, the Task Force noted that spontaneous and unassisted rates of tobacco use cessation among tobacco users are low (3%–10%).[6,13] Although the interventions reviewed in this section showed relatively small effects (increases of 2.2 to 4.1 percentage points), they represent relatively large improvements in the success rates for tobacco use cessation. Task Force assessments and conclusions of the evidence on effectiveness reflect these aspects of tobacco use cessation.

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Increasing the Unit Price for Tobacco Products: Recommended (Strong Evidence of Effectiveness)

Excise tax increases at the municipal, state, or federal level can raise the unit price for tobacco products. In several states, excise tax increases on tobacco products resulted from successful state ballot initiatives. Although other factors affect tobacco product pricing, excise tax increases have historically resulted in an equivalent or larger increase in tobacco product prices.[22]

Effectiveness

- Increases in tobacco product price are consistently effective in reducing tobacco use (a 10% price increase results in approximately a 4% decrease).

Applicability

- These findings should be applicable to most adults in the United States.

Other Effects

- Price increases also reduce tobacco use among adolescents and young adults.

Barriers

- Increasing the excise tax on tobacco products requires passage of legislation or a statewide referendum.

The findings of our systematic review are based on 17 aggregate studies, which were consolidated from 51 papers that evaluated the effectiveness of price increases for tobacco products in reducing tobacco use.[23,29,30,33,132–178] Because many of these papers analyzed the same data during similar, identical, or overlapping periods of time, we decided to consolidate papers into aggregate studies on the basis of similarities in location, the period of study, and the dataset employed. Five additional studies were identified but did not meet our quality criteria and were excluded from the review.[179–183]

The 17 aggregate studies reviewed evaluated the effect of tobacco product price on tobacco use in California; Massachusetts; Oregon; 11 Western states; national evaluations conducted in the 1990s, 1980s, and 1970s; and three studies conducted in Canada, three in the United Kingdom, and one each in Austria, Finland, Switzerland, and New Zealand.

Price elasticity of demand (the percentage change in consumption that results from a 1% change in price) was the most common measure used in these studies to estimate the effect of tobacco product price increases. Of the 17 aggregate studies, 13 included measurements of price elasticity of demand, which generally showed decreases in consumption. For example, in 10 aggregate studies that measured cigarette sales data, a 10% increase in product price would result in a 4.1% decrease in population consumption (range,

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2.7% to 7.6%). Similar effects were seen in all measures of changes in tobacco prevalence and amount smoked.

Overall, this body of evidence documented consistent effectiveness of increases in tobacco product price in reducing tobacco use, regardless of the measurements reported or calculated, the setting or period of time evaluated, or differences in the control of potential confounders.

Four studies using measures other than price elasticity of demand (for example, measurements of tobacco product sales or consumption) showed that tobacco use declined in response to price increases, whereas excise tax decreases significantly slowed this decline.

These results should be applicable to most adults in the United States. All of the reviewed studies evaluated the effect of price on the consumption of cigarettes. Some also evaluated the effect of price increases on consumption of smokeless tobacco, cigars, and pipe tobacco. Studies demonstrated the effectiveness of state excise tax increases and federal excise tax increases in reducing tobacco consumption; effectiveness was also shown for whites, African Americans, Hispanics, men and women, across most social classes, and among people with incomes below median or with less than a high school education.

A positive effect of increasing the unit price for tobacco products is a decrease in tobacco use among adolescents and young adults (discussed under Reducing Tobacco Use Initiation). One potential negative effect of increases in tobacco product excise taxes is an increase in smuggling (illegal cross-border transport and sale of untaxed tobacco products). No recent studies of the effects of organized smuggling in the United States were identified in this review, however, and an analysis in 1985 reported a significant reduction in activity following federal legislation in 1978.[184]

Effects of tobacco product price increases that might reduce (but would not eliminate) the potential health benefits of more cessation and less consumption include legal individual cross-border purchases of tobacco products; substitution of tobacco products (e.g., smokeless tobacco for cigarettes) created by unequal taxation on different kinds of tobacco products; and modification of individual tobacco use patterns, such as smoking cigarettes longer or changing to a higher-tar, higher-nicotine brand.[148]

Econometric analyses were included in the studies qualifying for review of effectiveness. A separate economic evaluation was not conducted for this intervention review.

Passage of legislation or a statewide referendum is needed to increase the excise tax and may therefore present a barrier to implementation. Political op-

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position has historically been well organized and funded at the municipal, state, and federal levels. Reports on both successful and unsuccessful state initiatives that proposed an increase on tobacco product excise taxes have been published.[34–36]

In conclusion, the Task Force recommends increasing the unit price for tobacco products on the basis of strong evidence of effectiveness in increasing the number of people who stop using tobacco. Raising the unit price for tobacco products, through increases in excise taxes for tobacco products, is consistently effective in reducing tobacco use, regardless of the measure used. The findings of this review should be applicable to most adults in the United States. Tobacco product price increases also reduce tobacco use among adolescents and young adults. The need for passage by a state legislature or a referendum can be a significant barrier to efforts to raise excise taxes on tobacco products.

Mass Media Education

Mass media messages (broadcast and print) are disseminated to provide cessation information, motivation to assist tobacco users in their efforts to quit, or both. In our review, we distinguished among three subtypes of mass media interventions—campaigns, cessation series, and cessation contests—which differ in the duration, intent, and intensity of the media messages. Each is addressed separately below.

Mass Media Education Campaigns Combined with Other Interventions: Recommended (Strong Evidence of Effectiveness)

Mass media campaigns employ brief, recurring messages over time (weeks to years) to provide information or motivation to tobacco users and others (family members, households, peers) with the goal of increasing or improving efforts to quit using tobacco products. The messages, developed through formative research, are disseminated through paid broadcast time and print space, donated time and space (as public service announcements), or a combination of the two. Campaigns can focus on cessation or can include cessation themes within a broader range of tobacco messages (including messages directed at reducing tobacco use among youth, reducing secondhand smoke exposure, or both). Mass media campaigns can be combined with other interventions, such as an excise tax increase or additional community-wide education efforts.

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Effectiveness

- Mass media education campaigns, when combined with other activities, were effective in increasing tobacco use cessation by approximately 2 additional quitters per 100.
- These interventions were also effective in reducing tobacco use in the population, as measured in states and in communities. Changes in tobacco use include reductions in consumption (by approximately 12.8%) and reductions in the prevalence of tobacco use (by approximately 3 people per 100 tobacco users).

Applicability

- These findings should be applicable to most people in the United States.

Other Effects

- Mass media education campaigns can increase the number of people who seek help from telephone "quit" lines.

The findings of our systematic review are based on 15 studies that evaluated the effectiveness of mass media campaigns in reducing tobacco use.[138–140,185–196] Another 14 papers provided information on studies already included in the review.[75,135,197–208] Three studies measured the effect of a mass media campaign in increasing use of a telephone cessation information service: these results are described below (see Multicomponent Interventions that Include Client Telephone Support).[209–211] Six studies did not meet our quality criteria and were excluded from the review.[212–217] All of the reviewed studies evaluated the combination of a mass media education campaign coordinated or concurrent with at least one other intervention: an excise tax increase (6 studies), community education programs such as the distribution of self-help cessation information (12 studies), individual or group cardiovascular disease risk factor reduction or smoking cessation counseling (7 studies), and other mass media efforts (2 studies).

The reviewed studies measured changes in tobacco use in terms of changes in individual tobacco use cessation, changes in population consumption (measured by statewide sales of cigarettes), and changes in the prevalence of tobacco use in the study population. In general, the studies observed increases in tobacco use cessation and decreases in population consumption and prevalence.

Five studies evaluated the effect of combined interventions including mass media campaigns on tobacco use cessation among groups of recruited tobacco users. In study periods of one to five years' duration, the median difference in cessation between intervention group participants and comparison group participants (who were potentially exposed to the media component in

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three studies) was an increase of 2.2 percentage points (representing approximately 2 additional people per 100 who quit using tobacco; range, 2 to 35).

Three studies, with follow-up periods of two to eight years, evaluated the effect of statewide mass media campaigns when combined with additional interventions (excise tax increase, community and school education activities) on consumption of cigarettes as determined by sales of taxed cigarette packs. In all three states, overall tobacco consumption declined at a greater rate than in the rest of the United States (median 12.8% decrease).

Finally, seven studies measured changes in tobacco use prevalence in communities exposed to a mass media campaign combined with additional interventions. Six studies observed decreases in tobacco use prevalence over study periods of 6 months to 20 years, and five of these studies included a concurrent comparison population. In these studies, tobacco use prevalence decreased in the intervention population by a median of 3.4 percentage points (range, −7 to +0.2) when compared with the unexposed community.

The results of these studies provide strong evidence of the effectiveness of mass media education campaigns, when combined with other activities, in increasing tobacco use cessation and reducing tobacco consumption.

These findings should be applicable to people throughout the United States. All of the reviewed studies focused on cigarette use. These studies included statewide and regional campaigns in the United States, national campaigns in Scotland, and regional campaigns in Finland. Studies were conducted in large cities as well as in smaller communities. In the United States, studies were also conducted specifically among Hispanics and among Vietnamese men.

Mass media campaigns, when combined with additional interventions, can also be effective in reducing tobacco use among youth (see Reducing Tobacco Use Initiation), especially when the campaign includes a variety of targeted messages and broadcast times. In California, Oregon, and Massachusetts, for example, campaigns included messages for children and adolescents as well as messages about the health effects of exposure to environmental tobacco smoke. Several studies noted significant increases in the use of telephone cessation information or support services ("quit" lines) when the media messages told audiences about these services.

The findings of our systematic review of economic evaluations of community-wide interventions to increase cessation among adult tobacco users are based on two cost-effectiveness studies (one conducted in the Netherlands[218] and the other in Scotland[219]). Both studies reported program costs per quitter. In addition, the study in Scotland reported program cost per life-years saved, which was converted to dollars per QALY based on preference weights provided by Fiscella and Franks (a standard economic approach used to ad-

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just health-related quality-of-life measures on a continuum from 0.0 [death] to 1.0 [optimal health]).[220]

The intervention conducted in the Netherlands evaluated the effect of a mass media campaign, a self-help manual, a hotline, and a nine-session group cessation program. Self-reported seven-day abstinence was determined at six-month follow-up. Costs included were wages, overhead, calls to the hotline, participant time, transportation, and charges for the group session. The effect size was estimated as the difference in smoking prevalence before and after the intervention. The self-reported cessation rate was 11% for participants using the self-help manual alone and 22% for participants using the self-help manual combined with the cessation program. Based on this effect size, adjusted program cost per quitter ranged from $796 to $1593.

The study conducted in Scotland consisted of a mass media campaign, telephone help line, and information booklet. At the 12-month follow-up, 9.8% of program participants reported having quit smoking for at least six months. Costs included research, production, design fees, printing, dissemination, staff salaries, and overhead. The adjusted program cost per quitter in this study ranged from $298 to $655. Adjusted program cost per QALY ranged from $151 to $328. The range was based on lower and upper bound estimates of adult participants.

The primary barrier to the implementation of mass media campaigns is the funding needed to develop and maintain an extended-duration, high-intensity campaign using paid and targeted broadcast times to deliver messages that resonate with target audiences. Cooperation between tobacco control programs can reduce program development costs. The barriers encountered by the tobacco control program in the state of California provide important lessons on the need for both public and political support and vigilance in maintaining an effective campaign.[221,222]

In conclusion, the Task Force recommends mass media education campaigns combined with additional interventions on the basis of strong evidence of effectiveness in increasing tobacco use cessation and in reducing tobacco consumption. The findings of this review should be applicable to most people in the United States. An additional benefit of these campaigns can be an increase in the number of people who call in to dedicated telephone cessation support services' quit lines.

Mass Media Education—Cessation Series: Insufficient Evidence to Determine Effectiveness

Cessation series consist of broadcasted instructional segments designed to recruit, inform, and motivate users of tobacco products to try quitting and to succeed. Cessation series can be coordinated with pre-series broadcast or

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print promotion, community education (e.g., distribution of self-help cessation materials), and organization of cessation groups in the community. The series can extend for a period of several weeks to several months. Techniques include nightly or weekly segments on news or informational programs giving expert advice or sharing peer group experiences on cessation issues (e.g., dealing with the symptoms of withdrawal). The series can encourage tobacco users to join a community-wide quit effort. Over the course of the broadcasts, viewers can receive ongoing support and assistance from cessation experts and recruited peers.

Effectiveness

- We found insufficient evidence to determine the effectiveness of mass media education cessation series in increasing the number of people who quit using tobacco products.
- Evidence was insufficient because of inconsistent results and inadequate comparison groups.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review are based on nine studies that evaluated the effectiveness of cessation series in increasing tobacco use cessation.[223–231] Eleven additional studies were identified but did not meet our quality criteria and were excluded from the review.[208,232–241] Ten other reports provided information on studies already included in the review.[242–251]

All of the reviewed studies evaluated the effectiveness of cessation series combined with other interventions, such as community education (typically, access to or distribution of self-help cessation manuals), organized cessation groups or programs, or telephone cessation support (quit lines). Eight studies evaluated televised cessation series broadcast over periods of 20 days to three months, and one study evaluated a week-long newspaper cessation series. Five of the nine studies in the review evaluated broadcast cessation series conducted in the Chicago metropolitan area (in one of three waves) between 1985 and 1987. These studies were evaluated separately because of differences in the study populations or settings.

The reviewed studies provided insufficient evidence to determine the effectiveness of mass media eduction cessation series in increasing tobacco use cessation. The differences in cessation observed in these studies might be the result of (*1*) baseline differences in motivation to quit between intervention and comparison smokers and (*2*) the small group cessation sessions provided to the intervention group participants.

Because we could not establish the effectiveness of mass media cessation series in increasing the number of people who successfully quit using tobacco

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products, we did not examine situations in which they would be applicable, information about economic efficiency, or possible barriers to implementation.

No harms or benefits of mass media cessation series were identified.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of mass media cessation series in increasing the number of people who successfully quit using tobacco products because of inconsistent results and inadequate comparison groups.

Mass Media Education—Cessation Contests: Insufficient Evidence to Determine Effectiveness

Cessation contests are community-wide events of short duration that use mass media to recruit and motivate users of tobacco products to participate in a program to quit by a certain date or during a specified time period. Cessation contests use both mass media and such small media as posters and flyers as the primary tool for promotion and to recruit tobacco product users in the community. Contests can increase cessation in the community by changing tobacco product users' attitudes about cessation, recruiting users to initiate a quit attempt, and motivating those who attempt to quit to remain abstinent through incentives or by mobilizing support from family, friends, and other participants. We evaluated contests that offered additional incentives for participation and successful cessation, as well as targeted quit events conducted without additional incentives.

Effectiveness

- We found insufficient evidence to determine the effectiveness of mass media education cessation contests in increasing the number of people who quit using tobacco products.
- Evidence was insufficient because only one study met the quality criteria for this review, and that study lacked sufficient evidence on which to base a recommendation.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review are based on one study.[252] We identified another 16 studies that did not meet our quality criteria and were excluded from the review.[234,253–267] Three other papers provided information on the study already included in the review.[268–270]

The single reviewed study evaluated a multicomponent smoking cessation program in New York City. Interventions included a cessation manual and video, telephone cessation support, and the opportunity to participate in smoking cessation contests.

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Although the single reviewed study showed some improvements in self-reported cessation at a six-month follow-up, the evidence was insufficient to determine the effectiveness of mass media cessation series in increasing the number of people who successfully quit using tobacco products because the evidence in this single study was not sufficient to support a recommendation.

Because we could not establish the effectiveness of mass media cessation contests in increasing the number of people who successfully quit using tobacco products, we did not examine situations in which the programs would be applicable, information about economic efficiency, or possible barriers to implementation.

No harms or benefits of mass media cessation contests were identified.

In conclusion, evidence was insufficient to determine the effectiveness of mass media education cessation contests in increasing the number of people who successfully quit using tobacco products because only a single study, showing only moderate improvement, qualified for review.

Provider- and System-Based Interventions

We reviewed six interventions that can be implemented by healthcare systems and providers to increase cessation of tobacco use by clients. We did not evaluate the effectiveness of provider counseling to tobacco-using clients or the effectiveness of specific clinical therapies, which have been thoroughly reviewed by others.[2,6,7,17]

Healthcare Provider Reminder Systems: Recommended (Sufficient Evidence of Effectiveness)

Provider reminder systems can identify clients who use tobacco products and prompt providers to discuss cessation with their clients or advise clients to quit at every encounter. Because even brief provider advice has a demonstrated effect on getting clients to quit,[6,17] increasing the delivery of advice by providers should increase the number of clients who quit.

Reminders can be delivered by a variety of methods, including chart stickers, vital sign stamps, medical record flowsheets, and checklists, and the content of the reminders can vary. Provider reminder systems are often combined with other interventions, such as provider education and client education. Here we review provider reminder systems used alone; multicomponent interventions including provider reminders are considered below (see Healthcare Provider Reminder Systems with Provider Education, with or without Client Education).

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Effectiveness

- Provider reminder systems were effective in increasing the number of clients who quit smoking by approximately 4 additional clients per 100.
- Provider reminder systems were also effective in increasing the number of clients whom providers advise to quit smoking by approximately 13 additional clients per 100.
- These systems were also effective in increasing the determination of client smoking status by providers by approximately 32 additional clients per 100.

Applicability

- These findings should be applicable to most clinical setting in the United States.

Other Effects

- The use of provider reminder systems may also increase delivery of other preventive services.

The findings of our systematic review are based on seven studies evaluating the effectiveness of provider reminder systems when used alone.[271–277] One additional paper was identified but did not meet our quality criteria and was excluded from the review.[278] The reviewed studies prompted providers with chart prompts or stickers, "expanded vital signs" that indicate whether or not a client uses tobacco, and flowsheets. In one study, analysis was based on receipt of a consultation that encouraged implementation of a provider reminder system, not on actual implementation of the reminder system.

The seven reviewed studies used diverse measures to document changes in client smoking status, provider delivery of advice to quit, and client smoking cessation. The median improvement in determining client smoking status was 32.5 percentage points (range, 26 to 57.6; four studies); that is, the intervention resulted in determining the smoking status of approximately 32 additional clients per 100, with results ranging from 26 to 58 additional clients per 100. These results were measured 8 to 24 months after implementation (median, 15 months). For provider delivery of advice to quit, a median change of 13 percentage points was observed (range, 7 to 31; five studies) in assessments extending 2 to 24 months after implementation (median 8 months). One study reported a difference in biochemically confirmed smoking cessation of 4 percentage points six months after a clinic visit. These findings provide sufficient evidence that healthcare provider reminder systems are effective in increasing the number of tobacco-using clients who receive advice to quit from their providers.

These findings should be applicable in most clinical settings in the United States. Studies were conducted in primary care clinics, family practice clin-

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ics, and pulmonary clinics. Most studies did not provide demographic information about client populations.

Two studies[274,276] evaluated provider reminder systems that included preventive services in addition to delivering advice to quit to tobacco-using clients. Improvements were observed in some or all of the prompted activities. No other positive or negative effects were identified in this review.

We did not find any economic evaluations of provider reminder systems.

Although one potential barrier to the implementation of a provider reminder system could be the administrative burden, this was not identified as a problem in any of the reviewed studies, and most of the reminder systems (e.g., "expanded vital signs") were easily implemented.

In conclusion, the Task Force recommends provider reminder systems on the basis of sufficient evidence of effectiveness in increasing the number of tobacco-using clients whom providers advise to quit (because this outcome has been previously shown to increase subsequent tobacco use cessation[17]). These findings should be applicable to most clinical settings in the United States. An additional benefit of provider reminder systems can be increased delivery of other preventive services.

Healthcare Provider Reminder Systems with Provider Education, with or without Client Education: Recommended (Strong Evidence of Effectiveness)

These multicomponent interventions to increase tobacco use cessation include efforts to educate and to prompt providers to identify and to intervene with tobacco-using clients, as well as to provide supplementary educational materials when appropriate. The interventions consist of a provider reminder system and a provider education program, and may or may not include client education materials (e.g., self-help cessation manuals).

A multicomponent intervention can provide an integrated approach to increasing and improving tobacco use cessation by clients. Goals of the interventions include educating, motivating, and prompting providers to increase and improve their interaction with tobacco-using clients, as well as improving client cessation by increasing knowledge and motivation to quit and to remain abstinent. The multicomponent interventions evaluated in this section include at least one provider-directed component.

Effectiveness

- These interventions were effective in increasing the number of clients who quit smoking by approximately 5 additional clients per 100.
- The interventions were also effective in increasing the number of tobacco-

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using clients who received advice to quit from their healthcare provider by approximately 20 additional clients per 100.

Applicability

- These findings should be applicable to most clinical settings in the United States and to a variety of provider specialties.

Other Effects

- The use of provider reminder systems plus provider education, with or without client education, may also increase delivery of other preventive services.

The findings of our systematic review are based on 31 studies that evaluated the effectiveness of these interventions in reducing tobacco use among clients.[272,275,279–307] One study measured changes in adolescent tobacco use initiation and is not considered further in this section.[290] Fifteen additional papers provided information on studies already included in the review.[308–322] Six additional studies were identified but did not meet our quality criteria and were excluded from the review.[323–328]

Overall, studies that measured providers' delivery of advice to quit using tobacco and the number of clients who quit showed significant improvements. For example, the 20 studies that evaluated the effectiveness of a multicomponent intervention combining at least a provider reminder system and a provider education program found a median change of 20 percentage points (range, 5 to 60) in the number of clients receiving advice to quit from their providers and a median change of 5 percentage points (range, −1 to +26) in the number of clients who quit using tobacco (in follow-up periods of five weeks to 12 months). Similar results were found in the subsets of studies that evaluated interventions using only a provider reminder system and a provider education program (seven studies); interventions that also included client education materials (13 studies); and interventions that included provider reminders and client education but not provider education (three studies). Interventions that included only provider education are discussed below (see Healthcare Provider Education Alone).

These results show that healthcare provider reminder systems plus provider education programs, whether or not combined with client education, are effective in increasing the number of tobacco-using clients who receive advice to quit from their healthcare providers.

These findings should be applicable to a variety of healthcare settings and provider specialties. Studies were conducted in health maintenance organizations (HMOs), private practices, academic health care centers, physician training programs, and public health clinics, among providers in primary

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care, internal medicine, family medicine, obstetrics, pediatrics, and dentistry. One study focused on reducing use of smokeless tobacco.

Provider reminder systems can include prompts for additional preventive services. No other positive or negative effects were identified in the review.

We did not find any economic evaluations of these interventions.

The burden of administering provider reminder systems is a potential barrier to their implementation.

In conclusion, the Task Force recommends multicomponent interventions including provider reminder systems and provider education, with or without client education, on the basis of strong evidence of effectiveness in increasing the number of providers who advise their clients to quit smoking and in increasing the number of clients who quit. These findings should be applicable to most clinical settings in the United States and to relevant clinical specialties. Reminder systems can include prompts for additional preventive services.

Healthcare Provider Education Alone: Insufficient Evidence to Determine Effectiveness

The goal of provider education is to increase providers' knowledge about tobacco use and cessation, to change their attitudes and practices, and increase or improve their interactions with clients who use tobacco. These interactions can include identifying more tobacco-using clients, increasing delivery of advice to quit, improving the quality of advice to quit, and both increasing and improving providers' efforts to assist clients in their attempts to quit and to remain tobacco-free.

Information can be delivered in a variety of ways, including lectures, written materials, videos, and continuing medical education seminars. Physicians, nurses, physician assistants, students, and office staff can receive this education.

Provider education efforts are frequently combined with other interventions, such as provider reminders and client education efforts. Multicomponent interventions that include provider reminders are considered above (see Healthcare Provider Reminder Systems with Provider Education, with or without Client Education).

Effectiveness

- We found insufficient evidence to determine the effectiveness of provider education alone in increasing the number of people who quit using tobacco products.
- Evidence was insufficient because (*1*) few studies measured the effect of the intervention on tobacco use cessation and (*2*) the results of studies that

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measured changes in the number of clients whom providers advise to quit smoking were inconsistent.

- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review are based on 16 studies that evaluated the effectiveness of provider education interventions when implemented alone.[272,275,285,294,301,302,329–338] Two additional papers provided information on studies already included in the review.[339,340] Nine other studies were identified but did not meet our quality criteria and were excluded from the review.[327,341–348]

Provider education techniques evaluated in the reviewed studies included day-long seminars, lectures for practitioners and for resident physicians, lectures and office visits or contacts, small group tutorial sessions, mock interviews with feedback, and education materials. The provider education sessions ranged from two hours to three days (median, two and a half hours) in the 11 studies that provided this information.

The 16 qualifying studies reported a total of 19 measures of change in provider counseling skills or behaviors and 2 measures of client tobacco use. Of the 10 studies that measured differences in provider delivery of advice to quit, 4 observed either no effect or a negative effect (median change 2.2 percentage points; range, −5 to 73). Only two studies reported differences in client tobacco use cessation, showing small increases (1.7 and 5.2 percentage points, respectively). Five studies measured differences in provider determination of client smoking status, with percentage differences ranging from 0.1 to 35 percentage points (median, 8).

These results provide insufficient evidence to determine whether healthcare provider education alone is effective in changing providers' knowledge, attitudes, and practices about tobacco use or in increasing the number of people who stop using tobacco products.

Because we could not establish the effectiveness of these interventions, we did not examine situations in which they would be applicable, information about economic efficiency, or possible barriers to implementation.

No harms or benefits of provider education alone were identified.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of provider education interventions when implemented alone in increasing the number of people who quit using tobacco products. Evidence was insufficient because (*1*) few studies evaluated the effect on client tobacco use cessation and (*2*) studies that evaluated provider delivery of advice to quit had inconsistent results.

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Healthcare Provider Feedback and Assessment: Insufficient Evidence to Determine Effectiveness

Feedback interventions inform and motivate providers by assessing their performance in identifying client tobacco use status, delivering advice to quit, or both. Assessment techniques include chart reviews and the use of computerized records. These interventions can be combined with other activities, such as provider reminders and provider education, and these combinations were considered in our review.

Provider assessment and feedback can motivate providers to increase and improve their interactions with clients in such areas as advising clients to stop using tobacco. Evaluation of provider assessment and feedback is timely because (*1*) clinical information systems are improving and are increasingly common; (*2*) effective cessation therapies are available, and an increase in provider interactions with tobacco-using clients could increase the use of these therapies; and (*3*) quality assurance approaches such as the Healthplan Employer Data and Information Set (HEDIS) are being used more often.

Effectiveness

- We found insufficient evidence to determine the effectiveness of provider assessment and feedback in increasing either provider advice to clients to quit using tobacco or the number of clients who quit using tobacco products.
- Evidence was insufficient because the small number of available studies did not measure these outcomes.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review of the effectiveness of provider assessment and feedback interventions in changing provider behaviors toward tobacco-using clients are based on three studies.[349–351] Two additional studies were identified but did not meet our quality criteria and were excluded from the review.[352,353]

A provider assessment and feedback program was evaluated alone in one study, and in combination with other components in two studies that included a provider education program and a provider reminder flowsheet. In all three studies, provider documentation or recognition of a client's tobacco use status was only 1 of up to 26 preventive care practices for which assessment and feedback were provided. Only one study used a computer system to collect information and enable providers to obtain feedback information.

None of the qualifying studies attempted to measure changes in provider delivery of advice to quit or whether clients quit using tobacco. The three studies did, however, provide measures of effectiveness in increasing provider recognition of client tobacco use status, showing a median increase of

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21 percentage points (range, 13 to 39) in study periods that ranged from three months to six years. This improvement, however, provides insufficient evidence to determine the effectiveness of healthcare provider feedback alone in changing providers' knowledge, attitudes, and practices about tobacco use or in increasing the number of people who stop using tobacco products.

Because we could not establish the effectiveness of these interventions, we did not examine situations in which the programs would be applicable, information about economic efficiency, or possible barriers to implementation.

An additional benefit of increased provider delivery of other preventive care practices was found in two studies. No other positive or negative effects were identified in this review.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of provider assessment and feedback interventions, when implemented alone, in increasing either provider advice to clients to quit using tobacco or the number of clients who quit using tobacco products. Evidence was insufficient because the small number of available studies did not provide measurements of provider advice to clients to quit using tobacco or the number of clients who quit using tobacco products.

Reducing Client Out-of-Pocket Costs for Effective Cessation Therapies: Recommended (Sufficient Evidence of Effectiveness)

Reducing the financial barriers that may prevent clients from using effective cessation therapies such as nicotine replacement,[6] other pharmacologic therapy,[6] behavioral therapies such as cessation groups,[6] or a combination of these approaches is intended to increase the use of effective therapies, increase the number of people who try to quit, and increase the number of people who succeed in quitting.

Effectiveness

- Reducing client out-of-pocket costs is effective in increasing the number of people who successfully quit using tobacco by approximately 8 clients per 100.
- The intervention is also effective in increasing the number of people who use cessation therapies by approximately 7 clients per 100.

Applicability

- These findings should be applicable in a variety of clinical settings in the United States, in rural and mixed rural-urban settings.

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Other Effects

- Clients may use nicotine gum beyond the recommended length of time.

Barriers

- Insurance requirements to combine pharmaceutical therapies with behavioral programs may discourage some clients from trying to quit.

The findings of our systematic review are based on five studies that evaluated the effectiveness of reducing clients' out-of-pocket costs for nicotine gum or nicotine replacements.[354–358] In two studies, nicotine gum or a nicotine replacement were provided as part of, or in addition to, a behavioral program. Access to a behavioral program was provided but rarely used in a third study. In three studies, nicotine gum or nicotine replacement was provided free of charge to participants in the intervention group. In one study, the out-of-pocket costs of the combination of behavioral program and nicotine replacement were $10 for intervention group clients and $52.50 for comparison group clients.

Overall, studies showed improvement in both the use of cessation therapies and the number of clients who quit using tobacco. For example, three studies reported a median difference in use of cessation therapies of 7 percentage points (range, 6.5 to 28). Four studies that measured changes in the number of people who stopped using tobacco showed a median increase of 7.8 percentage points (range, 2.1 to 11) in follow-up periods that ranged from 6 to 12 months (median, 9 months). These findings show that reducing client out-of-pocket costs for tobacco cessation therapies is effective in increasing both the use of these therapies and the number of tobacco users who quit.

These findings should be applicable to different settings and populations. Studies were conducted in the United States; in HMOs, private practices, and a Department of Defense hospital; in rural and mixed rural-urban settings; and among a low-income population.

A potential harm of nicotine replacement therapy was found in the extended use of nicotine gum beyond the recommended duration (four months) in one study. No other potential benefits or harms were identified in this review

The findings of our systematic review of economic evaluations are based on two studies.[355,356] One study,[355] a cost-effectiveness analysis that reported program cost per quitter, was conducted in a healthcare setting in Washington State for employees enrolled in a health plan. The intervention consisted of insurance coverage for clients in a behavioral program that included nicotine replacement, with a 12-month follow-up. Four types of insurance coverage, with different out-of-pocket costs to users, were available: (*1*) standard coverage: a 50% co-payment for the behavioral program and the usual $5 co-

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payment per prescription for nicotine replacement therapy; (*2*) reduced coverage: a 50% co-payment for both the behavioral program and nicotine-replacement therapy; (*3*) flipped coverage: no co-payment for the behavioral program but a 50% co-payment for nicotine-replacement therapy, and; (*4*) full coverage: no co-payment for the behavioral program and the usual $5 co-payment per prescription for nicotine replacement therapy. Costs measured included drugs, personnel, and cost of the behavioral program. Development, marketing, and implementation of the coverage plan were not included in the analysis. The adjusted program costs per quitter were $135, $141, $149, and $195 for standard, reduced, flipped, and full coverage, respectively.

The second study[356] was a cost–benefit analysis conducted in Vermont, reporting net benefit. The intervention, conducted at a rural family practice clinic with low-income clients, consisted of brief physician advice and a prescription for free nicotine gum, with a six-month follow-up. Costs measured included physician time, nicotine gum, smoking cessation booklets, and client time. Development, promotion, and evaluation costs were not included. The adjusted quit rate for the intervention group was 9.4%. When costs and benefits from averted illness were compared, the intervention was shown to be cost-saving.

Potential barriers to increased use of effective cessation therapies are created by coverage requirements that tie pharmacotherapy to behavioral therapy interventions. Recent reviews have identified each strategy as effective alone.[6] The combinations demonstrate higher cost-effectiveness[359] but also limit the use of effective therapies for smokers who are unwilling to participate in the behavioral program. Including proactive telephone counseling as a behavioral therapy option might reduce these barriers.[360]

In conclusion, the Task Force recommends reducing out-of-pocket costs on the basis of sufficient evidence of effectiveness in increasing the number of people who use cessation therapies and in increasing the number of people who successfully quit using tobacco. This approach has been tried successfully in a variety of clinical settings in both rural and rural-urban settings. A potential harm is that clients may continue to use nicotine gum beyond the recommended length of time. Healthcare coverage requirements for behavioral programs along with pharmaceutical therapies may discourage clients who do not wish to be part of the behavioral programs.

Multicomponent Interventions That Include Client Telephone Support: Recommended (Strong Evidence of Effectiveness)

Telephone support for people trying to stop using tobacco provides counseling or assistance in quitting and in staying tobacco-free. Depending on the

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program, tobacco users or healthcare providers can initiate contact. Telephone support can include trained counselors, healthcare providers, or taped messages in single or multiple sessions that usually follow a standardized protocol for providing advice and counseling. Telephone support is usually combined with other interventions, such as client education materials, individual or group cessation counseling, or nicotine replacement therapies.

Telephone contact is intended to increase the motivation of tobacco users to attempt to quit, and can help to reduce relapses by providing support and assistance to recent quitters. In community settings, telephone support typically provides access to self-help cessation materials and available local resources (such as group sessions), and may provide counseling and motivation sessions. In clinical settings, telephone follow-up calls usually support other clinical cessation interventions such as provider counseling, group cessation sessions, or nicotine replacement or other therapies.

Effectiveness

- These multicomponent interventions were effective in increasing the number of people who stop using tobacco by approximately 3 people per 100.

Applicability

- These findings should be applicable to most adults in a variety of clinical and community-wide settings in the United States.

The findings of our systematic review are based on 32 studies that evaluated the effectiveness of telephone cessation support.[248,285,288,289,293,297,300,304,361–384] Sixteen additional papers provided information on studies already included in the review.[309,310,312,315–319,321,385–391] Seven additional studies were identified but did not meet our quality criteria and were excluded from the review.[216,328,392–396]

In all of the reviewed studies, telephone support was coordinated with additional interventions including client education (29 studies), provider-delivered counseling (17 studies), nicotine replacement (4 studies), a smoking cessation clinic (1 study), and a televised cessation series (1 study). Telephone support was reactive (the caller initiated all contact) in 5 studies and proactive (the provider initiated contact or the caller initiated contact, with provider follow-up) in 27 studies.

Thirty studies compared differences in tobacco use cessation based on use of or exposure to telephone support. In follow-up periods of 5 weeks to 34 months (median, 12 months) the median difference was an increase in tobacco use cessation of 2.6 percentage points (range, −3.4 to +23). Studies that compared telephone support plus client education to client education alone found similar increases in cessation. These findings show that multicomponent interventions that include client telephone support are effective in increasing tobacco use cessation.

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These findings should be applicable in many settings and to many populations throughout the United States. Studies were conducted in HMOs, private practices, public health clinics, medical centers and hospitals, and resident training programs. Provider specialties included dentistry, obstetrics, gynecology and family planning, primary care, family practice, and internal medicine. Clients included hospitalized smokers, veterans, pregnant women, African Americans, and smokers over 60 years of age. One study focused on reducing the use of smokeless tobacco.

We found no other positive or negative effects of telephone cessation support.

The findings of our systematic review of economic evaluations are based on five cost-effectiveness studies.[389,397–400] Two studies reported program costs per quitter,[398,400] and three studies[389,397,399] reported program costs per life-year saved ratios, which were converted to cost per QALY using preference weights reported by Fiscella and Franks (a standard economic approach used to adjust health-related quality-of-life measures on a continuum from 0.0 [death] to 1.0 [optimal health]).[220]

Both studies reporting program costs per quitter evaluated interventions to increase tobacco use cessation among pregnant women. The first study was conducted in Southern California in an HMO setting.[398] The intervention consisted of a combined prenatal nutrition counseling and smoking cessation program aimed at reducing the incidence of low-birthweight infants. The smoking cessation program consisted of an eight-week home correspondence program that included weekly telephone calls to an automated answering service. Smoking cessation increased by 12 percentage points over the comparison group cessation rate of 38%. Costs included salaries, overhead, supplies, printing, phone, and postage. Adjusted program cost per quitter was $677. The second study was a nationwide modeled intervention in the United States.[400] It consisted of a single 15-minute counseling session conducted by a nonmedical counselor, instructional material, and two follow-up telephone calls. The change in cessation was an increase of 15 percentage points modeled from earlier randomized trials of smoking cessation among pregnant women. Costs included instructional materials, staff time, overhead, and training. The adjusted program cost per quitter was $292. The difference in program cost between the two studies can be explained by the fact that the first study looked at a comprehensive intervention using more resources.

Of the three studies reporting program costs in terms of life-years saved, two studies looked at interventions conducted in hospital settings with adult clients who smoked. One study was conducted at the Mayo Clinic in Minnesota,[397] and the other was conducted at HMO hospitals in Oregon and Washington.[389] The comparison group quit rates for the studies were 10.7% and 9.2 %, respectively; the intervention group showed cessation increases

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of 12 percentage points and 4 percentage points above the comparison quit rates, respectively. The Mayo Clinic intervention consisted of two programs: an individual nicotine-dependency treatment program and a relapse prevention program. The relapse prevention program included telephone follow-up calls, letters, and a mailed survey. The comparison group consisted of clients who received no program. Costs included personnel, supplies, telephone, drugs, and capital equipment. The adjusted program cost per QALY was $2532. The HMO hospital intervention consisted of a 20-minute bedside counseling session, a video, self-help materials, and follow-up calls. Costs included program development, personnel, communications, and overhead. The adjusted program cost per QALY of this intervention was $1248. The Mayo Clinic intervention had a higher program cost per QALY in spite of showing a higher net effect size, because programs costs of this intervention included letters, surveys, and treatment for nicotine dependency in addition to counseling and telephone calls. The third study,[399] conducted at a Boston hospital with clients who had had an acute myocardial infarction, modeled an intervention consisting of nurse-managed smoking-cessation counseling including telephone support after discharge. The comparison group—clients exposed to standard smoking cessation counseling designed for survivors of acute myocardial infarction—had a quit rate of 45%. Cessation increased by 26 percentage points in the intervention group. Costs included were personnel and instructional materials. Time spent on the phone, follow-up time, program development, and training costs were not included. The adjusted program cost per QALY was $73.

Lack of client awareness of, or interest in, support lines can limit the effectiveness of this intervention. Making clients aware of this available support (e.g., though media messages) is one way to increase use of support (quit) lines.

In conclusion, the Task Force Recommends telephone cessation support on the basis of strong evidence of effectiveness in increasing tobacco use cessation when implemented with other interventions (e.g., other educational approaches or clinical therapies) in both clinical and community settings. Effective interventions combined at least proactive telephone support and client cessation materials.

Reducing Exposure to Environmental Tobacco Smoke

Interventions to reduce exposure to environmental tobacco smoke (ETS) require or encourage the establishment of smoke-free areas in workplaces, in public areas, and in the home in an effort to reduce tobacco-related morbid-

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ity and mortality. Having smoke-free areas can reduce exposure to ETS and ETS-related illness and death.[12,13,401] Smoke-free policies can change the attitudes and behaviors of smokers and increase both the number of people who try to quit and the number of attempts made by each person. Smoke-free policies may also improve the success rate for each quit attempt by reducing opportunities for relapse.[402] Smoke-free policies also challenge the perception of smoking as a normal adult behavior.[403] By changing this perception, these policies can change the attitudes and behaviors of adolescents, resulting in a reduction in tobacco use initiation.[404]

The interventions reviewed here are smoking bans and restrictions to address exposure in the workplace and in public areas and community education to reduce exposure to ETS, especially among children, in the home environment.

Smoking Bans and Restrictions: Recommended (Strong Evidence of Effectiveness)

Smoking bans and restrictions are policies, regulations, and laws established by private, nongovernment, and government groups and agencies. Smoking bans entirely prohibit smoking in geographically defined areas, whereas smoking restrictions limit smoking to designated areas. Smoking bans and restrictions can be implemented with additional interventions, such as education and tobacco use treatment programs.

Businesses establish smoking policies to protect employees and customers from exposure to ETS in the workplace. Accrediting agencies (e.g., the Joint Commission on Accreditation of Healthcare Organizations) set regulations to protect employees and patrons within their organizations. Federal, state, or local laws are implemented to protect people from ETS exposure in public areas, and to establish minimum standards for both public and private workplaces. Standards for regulations and laws establishing smoking restrictions often include the size, location, and ventilation requirements for designated smoking areas.

Effectiveness

- Smoking bans and restrictions were effective in decreasing the amount of ETS by approximately 72%.
- Bans and restrictions were also effective in reducing exposure to ETS by approximately 60%.

Applicability

- These findings should be applicable to most indoor workers in the United States.

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Other Effects

- Smoking bans and restrictions also helped to reduce cigarette consumption and to increase the number of people who quit smoking.
- We found no adverse economic impacts on business or tourism as a result of these policies.

Barriers

- Preemption, the adoption or existence of a law at the state level that supersedes or precludes stronger local laws, can prevent implementation of smoking bans or restrictions.

The findings of our systematic review are based on 10 studies that evaluated the effect of smoking bans and restrictions on exposure to ETS.[405–414] Seven additional studies were identified but did not meet our quality criteria and were excluded from the review.[415–421]

The 10 studies provided a total of 12 measures of the effect of smoking bans and restrictions on exposure to ETS. Overall, 9 of the 10 studies observed reductions or differences in ETS exposure in workplaces that had smoking bans or restrictions. In four studies that measured environmental components of ETS (such as nicotine vapor) before and after implementation of the smoking ban or restriction, the median change, assessed 6 to 12 months after implementation of the ban or restriction, was a decrease of 72% (range, 44% to 97%). Six studies provided a total of eight measures of differences in self-reported exposure to ETS. In assessments conducted 4 to 18 months after implementation, the median change in self-reported ETS exposure was a decrease of 60% (range, 4% increase to 94% decrease).

Four studies evaluated the effect of smoking restrictions, four studies measured the effect of smoking bans, and two studies measured differences in workplace ETS exposure for both. In general, reductions in ETS exposure were greater in workplaces that had smoking bans than in those with only smoking restrictions.

These results show that smoking bans and restrictions are effective in decreasing both the amount of and exposure to ETS.

These results should be applicable to most indoor workers in the United States. Smoking bans and restrictions were evaluated in a variety of settings including hospitals and medical centers, healthcare provider offices, government or public sector workplaces, and a university. Studied bans and restrictions were created through a government law, private-sector policies, workplace policies, and local ordinance. Studies on representative samples of indoor workers in the states of California and Missouri, and on large, diverse samples of government employees in Texas and HMO employees in Oregon showed that smoking bans and restrictions reduced self-reported ETS expo-

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sure in workplaces community-wide. No studies evaluated the effect of smoking bans or restrictions in public settings outside of the workplace, such as public transportation systems or sports and entertainment venues.

A number of additional benefits of smoking bans and restrictions were described in the studies in this review. Workers exposed to a workplace smoking ban or restriction reported a greater reduction in daily consumption of cigarettes (median, −1.2 cigarettes per day, nine qualifying studies[409,410,412,422–427]) than did workers not exposed to a workplace smoking policy. Four studies of workplace smoking bans[423,425–427] found that tobacco users exposed to the ban quit at a greater rate than did tobacco users who were not exposed to a ban in the workplace. Six studies[428–434] (in seven reports) identified in this review evaluated the economic impact of smoking ordinances and found no adverse economic effects on businesses (including bars and restaurants) or on tourism.

The findings of our systematic review of economic evaluations are based on one study conducted in the United States, which modeled the costs and benefits of a proposed national smoke-free environment act to restrict or ban smoking inside all nonresidential buildings regularly entered by 10 or more people per week.[435] Costs included implementation of the restriction or ban by the establishment, construction and maintenance of smoking lounges, and enforcement. Benefits included savings on medical costs by averting heart disease, the value of lives saved, costs averted by reduced smoking-related fires, and productivity improvements. The net present benefit to society (benefits minus costs) was in the range of $42 to $78 billion. This range was based on high and low estimates of benefits and costs.

A major barrier to efforts by local governments to adopt smoking bans is preemption, which is the passage or presence of a state law with weaker restrictions that prevents implementation and enforcement of stronger local laws. (Eliminating preemption statutes is one of the tobacco objectives of *Healthy People 2010*[15] [Table 1–1].) Political opposition to legislative efforts to reduce ETS exposures in all workplaces and in a variety of public areas can be significant, and may include organizations representing tobacco users, businesses concerned about potential changes in revenue, and groups sponsored by the tobacco industry.

In conclusion, the Task Force recommends smoking bans and restrictions on the basis of strong evidence of effectiveness in decreasing both the amount of, and exposure to, environmental tobacco smoke. The findings of this review should be applicable to most indoor workers in the United States. Additional benefits of these interventions include reductions in daily consumption

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of cigarettes among workers exposed to bans or restrictions and increases in tobacco use cessation by smokers exposed to workplace smoking bans.

Community Education to Reduce Exposure to Environmental Tobacco Smoke in the Home: Insufficient Evidence to Determine Effectiveness

Community education includes all efforts to increase knowledge and to change attitudes about the health effects of exposure to environmental tobacco smoke (ETS). Techniques may include mass media messages, small media messages (including educational materials), and counseling provided outside of healthcare settings.

Community education provides information to parents, other occupants, and visitors about the health risks for nonsmoking adults and for children caused by smoking in the home (infants and children get most of their ETS exposure in the home[436]). Information is disseminated to households to motivate (*1*) tobacco users to reduce exposures to ETS in the household by quitting or by smoking outdoors, (*2*) nonsmokers in the household to assist smokers in their efforts to quit, and (*3*) members of the household to establish home smoking bans or restrictions. The combination of reduced indoor smoking and increased cessation will result in a reduction in indoor ETS exposure and, therefore, a reduction in tobacco-related illness and death.

Effectiveness

- We found insufficient evidence to determine the effectiveness of community education to reduce exposure to ETS in the home.
- Evidence was insufficient because of the small number of available studies and limitations in their design and execution.
- Insufficient evidence means that we were not able to determine whether or not the intervention works.

The findings of our systematic review are based on one study.[437] Two additional studies were identified but did not meet our quality criteria and were excluded from the review.[438,439] The reviewed study evaluated the effect on infant exposure to ETS of education provided by nurses during home visits. At one-year follow-up, the difference in ETS exposure between intervention and comparison households was a reduction of 4 percentage points; overall exposure, however, increased in both study arms. The inconsistency of these findings provides insufficient evidence to determine the effectiveness of community education in reducing home exposure to ETS.

Because we could not establish the effectiveness of this intervention, we did not examine situations in which it would be applicable, information about economic efficiency, or possible barriers to implementation.

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Potential benefits of education to reduce ETS exposure in the home include motivating tobacco users in the household to try to quit. No harms were identified.

In conclusion, the Task Force found insufficient evidence to determine the effectiveness of community education in reducing exposure to ETS in the home because of the small number of available studies and limitations in their design and execution.

USE OF THESE RECOMMENDATIONS

The evidence reviews and recommendations presented in this chapter provide a list of effective options to support efforts by states, communities, and healthcare systems to reduce tobacco use and exposures to environmental tobacco smoke. Prevention programs and planners can compare their current prevention activities with these recommendations, take steps to ensure that existing interventions are adequately implemented and funded, and consider additional interventions in the ongoing effort to build and maintain comprehensive tobacco prevention programs.

Based on evidence of effectiveness documented in the scientific literature, recommendations from the Task Force support the following population-based tobacco prevention and control efforts:

- Clean indoor air legislation prohibiting tobacco use in indoor public and private workplaces.
- Federal, state, and local efforts to increase tobacco product excise taxes as an effective public health intervention to promote tobacco use cessation and to reduce the initiation of tobacco use among youth.
- The funding and implementation of long-term, high-intensity mass media campaigns using paid broadcast times and media messages developed through formative research.
- Proactive telephone cessation support services (quit lines).
- Reduced or eliminated co-payments for effective cessation therapies.
- Reminder systems for healthcare providers.
- Combinations of efforts to mobilize communities to identify and reduce the commercial availability of tobacco products to youth.

In reflecting the available evidence on effectiveness, recommendations from the Task Force confirm the importance of coordinated or combined intervention efforts in tobacco prevention. Evidence of effectiveness in efforts to reduce tobacco use among youth through access restrictions, to disseminate anti-tobacco messages through mass media, and to assist tobacco users in their efforts to quit via telephone comes predominantly from studies that implemented these interventions in combination with other strategies.

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The contribution to our available evidence on the effectiveness of multicomponent intervention efforts should be fully appreciated by program planners. The available evidence on effectiveness for any single-component intervention is small and is concentrated in evaluations of policy interventions. In this review, only one single-component program intervention—healthcare provider reminder systems—had a sufficient body of evidence on effectiveness to support a Task Force recommendation for use. For the multicomponent reviews described in this chapter, readers are encouraged to go beyond the short recommendation summaries and to learn more about the intervention combinations described in the studies contributing to the recommendation from the Task Force.

A comprehensive tobacco prevention program is often interpreted to represent concurrent intervention efforts to promote or assist tobacco use cessation, to reduce tobacco use initiation, and to implement clean indoor air policies. The *Community Guide* reviews suggest that effectiveness within each of these strategic directions (cessation, initiation, reducing secondhand smoke) demands a similar comprehensive approach in the combination and coordination of interventions.

Recommendations from the Task Force also confirm the effectiveness (and the importance) of laws and policies in tobacco prevention. State and community clean indoor air laws are effective in reducing exposure to secondhand tobacco smoke. Excise taxes on tobacco products are effective in reducing tobacco use among both adults and youth. Healthcare system policies reducing out-of-pocket costs for effective cessation therapies increase and improve client cessation efforts. Although public policies have political implications and opposition, these effective intervention options should not be prematurely "taken off the table" for consideration by prevention programs and planners.

Although these reviews include summary measurements of the magnitude of effect, readers are strongly advised to also consider the size and scope of their target population for the intervention when drawing comparisons. Mass media campaigns and policies (excise tax increases, clean indoor air legislation) deliver an intervention impact across a very broad (and potentially very large) population. Interventions with effects of relatively small magnitude, when applied across an entire community, can contribute to significant change within the population.

In many states, preemption is a major barrier to the implementation of effective tobacco prevention policies and programs. It is a direct obstacle to the adoption of local clean indoor air ordinances and to local efforts to restrict youth access to tobacco products from commercial sources. In settings where effective options are blocked, programs should determine whether or not effective intervention combinations are still feasible to address the prevention

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objective. In some cases, program resources may be better spent on implementing effective interventions to address other prevention goals. Programs must also remain vigilant for the introduction of new preemption legislation.

The work of the Task Force on Community Preventive Services complements an array of useful evidence reviews and guidelines[2,3,6,17,84,440,441] available to tobacco prevention and control programs. These reviews, employing different methods to select, appraise, and summarize the available evidence, report similar findings and evidence-based conclusions.

In summary, *Community Guide* reviews provide programs and planners with a (*1*) concise summary on effectiveness of interventions and recommendations for use; (*2*) convenient guide to specific studies contributing to the evidence-based conclusions on effectiveness; and (*3*) complementary review to support similar conclusions across the available guidelines. The reviews and the recommendations provided in this chapter, therefore, can contribute in different ways to tobacco prevention and control efforts across a range of audiences, settings, and situations.

CONCLUSION

This chapter summarizes conclusions and recommendations to date from the Task Force on interventions to reduce the initiation of tobacco use, to increase tobacco use cessation, and to reduce exposure to ETS. To reduce the initiation of tobacco use, the Task Force recommends increasing the unit price for tobacco products; mass media education campaigns combined with other interventions; and community mobilization combined with additional interventions to restrict minors' access to tobacco products. Evidence was insufficient to determine the effectiveness of restricting minors' access to tobacco through the following interventions when implemented alone: sales laws directed at retailers; laws directed at minors' purchase, possession, or use of tobacco products; active enforcement of sales laws; retailer education with reinforcement; retailer education without reinforcement; and community education.

To increase cessation of tobacco use, the Task Force recommends increasing the unit price for tobacco products; mass media campaigns combined with other interventions; healthcare provider reminder systems; provider reminders combined with provider education; reducing client out-of-pocket costs for effective cessation therapies; and multicomponent interventions that include client telephone support (quit lines). Evidence was insufficient to determine the effectiveness of mass media cessation series; mass media cessation contests; healthcare provider education alone; and healthcare provider feedback and assessment.

To reduce exposure to ETS, the Task Force recommends smoking bans and

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restrictions. Evidence was insufficient to determine the effectiveness of community education to reduce exposure to ETS in the home.

Details of these reviews have been published[18–19] and these articles, along with additional information about the reviews, are available at www.thecommunityguide.org/tobacco.

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