

message appeal relies on production elements such as choice of actors, clothing, and music. To be successful, production need not be costly (Flynn et al. 1992). In fact, small, independent producers may be preferable if production quality is maintained.

- Campaigns should be intense enough to ensure impact (Flay, DiTecco, Schlegel 1980). Television messages should be aired at times when young people are most likely to be watching—and for best efficiency, at times when they are the primary viewers, particularly during the reruns of popular prime-time shows during after-school hours, since these shows tend to charge relatively low rates for advertising. Adequate reach and frequency should be achieved by using both paid and public-service time (Erickson, McKenna, Romano 1990). The statewide media campaigns in California, Minnesota, and Michigan are based on paid advertising funded by earmarked taxes. Paid media appear necessary to achieve substantial exposure to targeted youth populations at optimal times of the day. Campaigns should have sufficient duration (or else should run continuously) to impact youth throughout the critical years for smoking onset (Worden et al. 1988).

- Campaigns can be cost-effective. Evidence from the University of Vermont study (Flynn et al. 1992), which achieved a 35 percent reduction in weekly smoking, indicated that the cost per person for the estimated 2,605 young people (7 percent of the total population aged 10 through 15 in the broadcast area [U.S. Department of Commerce 1992a, b, c; R.R. Bowker 1992]) who may have been prevented from smoking by the four-year intervention was estimated to be \$233 when the costs of production and paid advertising were included, and \$77 when paid advertising alone was included. These costs compare favorably to those incurred in various smoking cessation programs (Altman et al. 1987), in which costs ranged from \$22 to \$339 per successful quitter. For the estimated 37,212 students in grades 5 through 10 residing in areas receiving this media campaign, the annual cost per student for the total campaign was \$4.08; for paid advertising only, the cost per student was \$1.34. Comparable total campaign costs per teenager in Minnesota, with a 95 percent audience reach but fewer exposures than in the Vermont study, were \$1.07 in 1989 and \$1.14 in 1990 (Culley 1992). Costs can also be contained if media spots are shared across states or reused after several years.

Public Policies to Prevent Tobacco Use Among Young People

Effect of General-Public Smoking Restrictions on Young People

Introduction

Public smoking restrictions are an important component of the social environment that supports non-smoking behavior (Rigotti 1989; Simonich 1991; Wasserman et al. 1991; Emont et al. 1993). They contribute to adolescents' perceptions that nonsmoking is normative and create a social climate where smoking is not acceptable. Restrictions convey the additional message that smoking creates health problems for smokers and nonsmokers alike. Finally, relative to the degree of compliance, these restrictions reduce the number of opportunities to smoke and thus make smoking less convenient. The net effect of these restrictions should be to reduce the psychosocial benefits of smoking to adolescents, making it less likely that those who experiment with smoking will continue to smoke and become dependent (USDHHS 1991).

History of Public Smoking Restrictions

As documented in the 1986 and 1989 Surgeon General's reports on smoking and health, restrictions on smoking in public before the 1970s were motivated primarily by concern over smoking as a potential fire hazard and by other safety concerns, such as distractions while driving (USDHHS 1986a, 1989). In the 1970s, new legislation was enacted, principally in the form of state-level clean-indoor-air acts, to protect the nonsmoking public from the health hazards and physical irritation caused by smoking. During the 1970s, 31 states passed legislation that introduced restrictions on smoking in public places and private facilities, such as workplaces or restaurants, or that extended existing regulations (USDHHS 1989). This and ensuing legislation was fueled by the accumulation of well-documented, well-publicized evidence of the disease risks associated with smoking (Rigotti 1989; USDHHS 1991). During the 1980s, tobacco-control efforts spread to the local level. By 1990, a total of 45 states, the District of Columbia, and at least 51 percent of cities with a population of 25,000

or greater had adopted some restrictions on smoking in public places (Rigotti and Pashos 1991; Coalition on Smoking OR Health 1992). However, only a fraction of these laws could be considered comprehensive enough to provide meaningful protection against environmental tobacco smoke, and municipal laws have tended to be more extensive and stronger than state laws (Rigotti and Pashos 1991; USDHHS 1991). The 1990s have seen the introduction of bills sponsored by the tobacco industry that include limited state restrictions on smoking in public but that also preempt more restrictive current or subsequent local ordinances. States with complete or partial preemption include Florida, Pennsylvania, Virginia, Nevada, Illinois, New Jersey, Iowa, and Oklahoma (Rigotti and Pashos 1991; Americans for Nonsmokers' Rights 1992c).

Smoking Restrictions in the School

Schools can create powerful environments for promoting a nonsmoking norm. Educational organizations such as the National School Boards Association (NSBA) (1987, 1989) and the Alliance for Health, Physical Education, Recreation, and Dance (1991) have endorsed the use of "tobacco-free policies" as a key component of efforts to create smoke-free schools.

In 1988, the NSBA, in collaboration with the ACS, the American Heart Association, and the American Lung Association, conducted a random-sample mail survey of school smoking policies in 2,000 of the more than 15,000 public school districts in the United States; 1,310 (66 percent) of the districts responded (NSBA 1989). Results from a similar, earlier NSBA study (NSBA 1987; USDHHS 1991) allowed an examination of policy trends over time. In 1988, 95 percent of all responding school districts had a written policy or regulation on tobacco smoking in schools. All of the written policies in the 1988 survey included restrictions on smoking by students; 96 percent addressed smoking by faculty, staff, and administration; and 92 percent addressed smoking by other adults. Of the districts responding to the 1988 survey, 17 percent totally banned smoking; that is, smoking by anyone was prohibited both on school premises and at school functions. Restrictions on adult smoking on school premises and at school functions more than doubled during the two years separating the surveys. For example, the proportion of districts that prohibited smoking by school personnel in school buildings increased from 11 percent in 1986 to 24 percent in 1988. In the 1988 survey, compliance by school personnel was described as "excellent" or "good" by 87 percent of districts with written policies, and 86 percent reported similar levels of compliance among students. Moreover, school districts with policies that banned smoking altogether reported greater

adherence to their policies than did districts with less stringent restrictions.

In October 1989, ASTHO conducted a survey of state health department personnel that included information on policies that address tobacco use (CDC 1991b). Thirty-nine states were found to have state-level regulations that restricted tobacco use in schools. Twenty-seven states banned smoking for students; eight states banned smoking for both students and staff (CDC 1991b). Since that survey, at least two more states have passed laws that prohibit any tobacco use in their schools.

Research on topics such as the effect of school smoking-restriction policies on student and adult tobacco use, attitudes toward tobacco use, and compliance with policy remains limited. Reports from national surveys (NSBA 1989) and from schools within Minnesota (Minnesota Department of Health 1991) indicate that restrictive smoking policies can gain widespread support and acceptance. Since 1985, Minnesota school districts have participated in intensive efforts to reduce tobacco use among adolescents (Griffin, Loeffler, Kasell 1988). Since beginning these efforts, the number of Minnesota school districts with tobacco-free policies for students, staff, and visitors increased from 3 to 361 school districts (83 percent of all districts). In May 1989, the Minnesota Department of Health conducted a survey in districts that had a tobacco-free policy in place for six or more months. Survey results indicated that a large majority of school districts had experienced broad acceptance and support for tobacco-free policies, a large number of perceived benefits, and few problems. For example, 62 percent of the districts reported having no problems implementing their tobacco-free policies, and 98 percent of all tobacco-free districts reported that they did not intend to weaken their policy (Minnesota Department of Health 1991).

Pentz, Dwyer, et al. (1989) examined the impact of school smoking policies on over 4,000 adolescents in 23 schools in California. The schools' written smoking policies were evaluated on whether they banned smoking on school grounds, restricted students from leaving school grounds, banned smoking near school, and included an education program on smoking prevention. Schools that had policies in all of these areas and emphasized prevention and cessation had significantly lower smoking rates than did schools with fewer policies and less emphasis on smoking prevention.

Drawing on reviews of existing policy and on preliminary evaluative research, several authors (Rashak et al. 1986; Brink et al. 1988; DiFranza 1989; NSBA 1989) have identified the following characteristics of effective school smoking policies.

- Smoking on school grounds, on school buses, and at school-sponsored events is prohibited for students, school personnel, and visitors.
- Schools vigorously enforce the policy and consistently administer penalties for violations.
- Disciplinary measures for noncompliance with policy are educational as well as punitive.
- Policy development includes active collaboration with teacher, student, and parent groups to give direction and build support for tobacco-free schools.
- All components of a school's smoking policy, including consequences for violations, are communicated in written and oral form to students, staff, and visitors.
- Districtwide educational programs addressing the prevention of tobacco use are initiated or expanded as part of the policy implementation process.
- Smoking-cessation programs or other incentives are developed for students, school personnel, and if possible, the public.
- Programs are periodically evaluated to provide information on acceptance and effectiveness of policy.
- Schools do not accept any contributions from the tobacco industry, including direct financial support and materials paid for by, or produced by or for, the tobacco industry.

Other Public Smoking Restrictions That Affect Youth

Smoking or tobacco use by minors (as opposed to the selling of tobacco products to minors) is prohibited by at least 21 states (USDHHS 1992b). In general, these laws are remnants of a previous era of smoking restrictions; for example, the Minnesota law dates back to the early 1900s (Minnesota Statutes Annotated 1987). Such laws are rarely enforced except when young people congregating to smoke constitute a nuisance.

Few smoking restrictions, other than school policies, are adopted specifically because of their effect on children. Major exceptions include restrictions on smoking in daycare facilities and restrictions on smoking by minors. In August 1992, legislation was introduced by U.S. Representative Richard Durbin and U.S. Senator Frank Lautenberg that would require federally funded programs to establish a nonsmoking policy wherever they provide direct services to children under age five (U.S. Congress 1992).

Restrictions on daycare facilities in particular are important because it has been estimated that in 1988, 13 percent of U.S. children aged five years and younger

(about 2.8 million) were being regularly cared for by a nonrelative in a home or facility other than the child's home (Dawson and Cain 1990). As of July 1992, 40 states restricted smoking to some extent in child daycare facilities, but only Alaska, Arkansas, Michigan, and Minnesota required at least one category of daycare facility to be smoke-free indoors (Coalition on Smoking OR Health 1992; Nelson, Sacks, Addiss 1993). In Minnesota, however, these laws apply only to licensed daycare centers and do not extend to licensed or unlicensed family daycare homes. In a 1990 national survey of licensed daycare centers, nearly 55 percent of centers reported that they were smoke-free indoors only; another 26 percent were smoke-free indoors and outdoors (Nelson, Sacks, Addiss 1993). Other public smoking restrictions are relevant to children because young people frequent specific locations and are influenced either directly by a law or policy, or indirectly by the norms of these institutions, including sports facilities, restaurants, and shopping malls.

Smoke-free sports facilities help break the connection between tobacco and sports that has been fostered by the tobacco industry (see "Public Entertainment" in Chapter 5). The directors of many university and professional-league stadiums and arenas have voluntarily made their facilities smoke-free. These facilities include Oriole Park at Camden Yards in Baltimore, Maryland; Tiger Stadium in Detroit, Michigan; the Hubert H. Humphrey Metrodome in Minneapolis, Minnesota; Texas Stadium in Irving, Texas; and basketball arenas in Phoenix, Arizona; Salt Lake City, Utah; and Minneapolis, Minnesota (Americans for Nonsmokers' Rights 1992a, b, c). At least 23 states restrict smoking in gymnasiums or arenas as part of their legislation for clean indoor air (Coalition on Smoking OR Health 1992).

Restaurants are among the most frequented public facilities in the United States, and some restaurants make specific marketing appeals to children or adolescents (Simonich 1991). By 1989, 44 states had included some restrictions on smoking in restaurants, and 51 percent of cities with a population of 25,000 or greater had passed local ordinances restricting smoking in restaurants (Coalition on Smoking OR Health 1992; Rigotti and Pashos 1991; Americans for Nonsmokers' Rights 1992a). The 1992 publication of the Environmental Protection Agency's findings on the effects of environmental tobacco smoke on children have led to calls for fast-food restaurants to eliminate their smoking sections (Melamed 1992; Action on Smoking and Health 1992); several have responded with pilot programs.

A new ordinance (effective since June 1992) that prohibits smoking in enclosed private malls in Howard County, Maryland, is believed to be the first of its kind in the United States (SmokeFree Educational Services, Inc. 1992). However, in Minnesota and elsewhere, a number

of malls have recently voluntarily adopted smoke-free policies (O'Brien 1991). Maine, New York, and Washington State specifically mention shopping centers in their legislation for clean indoor air (Coalition on Smoking OR Health 1992). As public places, shopping malls should be subject to existing state and local restrictions on smoking in public places, but the extent to which such laws are enforced for these facilities is unknown.

Effect of Smoking Restrictions on Adolescent Tobacco Use

Rigotti and Pashos (1991) concluded that an inverse relationship exists between smoking restrictions and smoking rates; the direction of causality, if any, between smoking rates and smoking restrictions could not be determined from the evidence available. Additional evidence is provided by two recent econometric studies. Simonich (1991) modeled actual cigarette consumption per capita for ages 14 and older as a function of price, income, advertising, and product differentiation; the model also included the nicotine content of cigarettes. The data set consisted of quarterly per capita consumption from 1959 through 1983. Simonich (1991) concluded that each time the proportion of all smokers in the United States who lived in states with smoking restrictions on restaurants or workplaces increased by 10 percent, the consumption of cigarettes would decrease by 6.5 percent. A study by Wasserman et al. (1991) specifically examined teenage cigarette smoking. Smoking data from the Second National Health and Nutrition Examination Survey were used to determine cigarette consumption. A state regulation index was constructed that was similar to one described in the Surgeon General's 1986 report on smoking and health (USDHHS 1986a). Teenage cigarette demand was modeled using price, the regulation index, and a series of covariates. These analyses showed that restrictive smoking regulations have a significant effect on teenage cigarette consumption; in fact, the effect is stronger for teenagers than for adults. The authors estimated that if the average score on the regulation index were to increase to the highest level (smoking restricted in private worksites), teenage cigarette consumption would decline by 41 percent. These researchers concluded from data on smoking prevalence that smoking regulations are most effective in preventing teenagers from starting to smoke, rather than in reducing their consumption.

Restrictions on Minors' Access to Tobacco

Introduction

Reducing the availability of tobacco to minors is important for a number of reasons. Making tobacco

more difficult to obtain makes it less likely that young persons experimenting with smoking will graduate to addiction. Adding legal sanctions to the purchase of tobacco will deter those young persons who are unwilling to break laws to obtain tobacco and will add to the perceived social unacceptability of tobacco use. Two cross-sectional studies provide preliminary evidence that suggests a negative relationship between tobacco access and tobacco use among young people (Jason et al. 1991; DiFranza, Carlson, Caisse 1992). Controlling the sale of tobacco to minors emphasizes the dangerous nature of tobacco products and places tobacco appropriately in the category of regulated products. These measures also reinforce and support the messages about tobacco that young people receive in school and other settings.

Tobacco Sources for Youth

When tobacco access laws are not enforced, young people purchase cigarettes from all available sources. Nearly all teen smokers have purchased a pack of cigarettes at least once (Gallup Organization 1993). The majority of minors who smoke purchase their own cigarettes. Small stores and gas stations are the major source of cigarettes for underage buyers; vending machines are more popular among the youngest adolescents; and the majority of adolescents who have never smoked believe it would be easy for them to buy cigarettes (Forster, Klepp, Jeffery 1989; Nova Scotia Council on Smoking and Health 1991; CDC 1992b; Gallup Organization 1993).

Vending machines provide an easy, if comparatively expensive, source of tobacco for young people. Tobacco industry figures show that in 1988, vending machines sales accounted for only 4 to 8 percent of all cigarettes sold, but young people tend to use vending machines more often than the general smoking public (National Automatic Merchandising Association 1989). Vending machines were either often or sometimes used by 38 percent of ninth-grade daily smokers in the COMMIT survey (Cummings et al. 1992). In a Minnesota survey, 53 percent of 10th-graders who were weekly smokers reported that vending machines were a major source of their cigarettes (Forster, Klepp, Jeffery 1989). In the TAPS, vending machines were either often or sometimes used by 20 percent of 12- through 15-year-old smokers but by only 12 percent of 16- and 17-year-olds (15 percent overall) (CDC 1992b). Vending machines were also used more frequently by younger smokers in a mall-intercept survey (conducted for the vending machine association) of 1,015 smokers aged 13 through 17 (National Automatic Merchandising Association 1989); only 2 percent of the 17-year-old smokers used vending machines, whereas 22 percent of the 13-year-olds did so (Response Research, Inc. 1989). However, a survey of

Canadian children found that those over 15 years old were more likely than younger children to use vending machines (Nova Scotia Council on Smoking and Health 1991).

Adults can be a source of tobacco for some adolescents. In the COMMIT survey of ninth-grade smokers, 17 percent indicated that they usually obtained their cigarettes from parents or other adults (Cummings et al. 1992). In a Canadian study, 25 percent of smokers aged 11 through 15 years had obtained tobacco from parents or guardians (Nova Scotia Council on Smoking and Health 1991). These figures do not discriminate between adults' intentionally supplying minors with tobacco and young persons' stealing cigarettes from adults.

Tobacco also may be obtained without purchase. In a survey of elementary and high school students in Chicago, 14 percent had received free tobacco samples on at least one occasion (Davis and Jason 1988). In a survey of 1,692 Georgia students in grades 7 through 12, about 5 percent of the students reported shoplifting cigarettes in the preceding 12 months (Cox, Cox, Moschis 1990).

Studies of Young People's Access to Tobacco

Since 1987, 13 studies have examined the degree to which minors could purchase cigarettes from retail establishments. Eight of those studies investigated purchases from vending machines as well as purchases from over-the-counter outlets; one additional study investigated sales through vending machines only.

In the 13 over-the-counter studies, illegal sales to minors ranged from a low of 32 percent in Kansas to a high of 87 percent in both South Dakota and Oregon; the approximate weighted-average was 67 percent across all studies (Table 8). The 13 studies indicated that minors' ability to purchase cigarettes is a function of the young people's gender and actual or perceived age, the statutory age of legal sale, and the community's previous enforcement activities. Although the range of noncompliance to age laws is wide, the majority of minors were able to buy cigarettes in all studies except those conducted in Kansas (32 percent were able to buy) and Missouri (46 percent were able to buy). Similar rates of noncompliance have been observed for smokeless tobacco use in one recent study (CDC 1993).

Of the nine studies that examined vending machine sales, illegal sales ranged from 82 to 100 percent; the approximate weighted-average rate of illegal sales was 88 percent (Table 9). Besides providing baseline data, six of the 13 over-the-counter studies and five of the nine vending machine studies also evaluated the effectiveness of various enforcement strategies. The majority of studies had a significant impact on minors' ability to

purchase cigarettes: the ability to buy decreased from a minimal reduction of 14 percent during six months following an educational program, to a maximum reduction of 93 percent during 18 months following a program of "stings," licensing, and fines (Table 8). Although an average rate of reduction (relative change) is difficult to calculate precisely, various enforcement strategies appear able to reduce the rate of illegal over-the-counter sales from 20 to 40 percent in less than a year.

Of the five studies that evaluated the effectiveness of restrictions on the sale of cigarettes through vending machines, the results are less clear (Table 9). In some instances, educational programs coupled with licensing and fines resulted in reductions in sales, while in other cases these tactics had no effect. In Minnesota, some success followed the passage of a local ordinance requiring locking devices that must be inactivated by an employee before a purchase can be made through a vending machine; results were more significant, however, when vending machines were entirely banned.

State and Local Laws Regarding Tobacco Distribution to Minors

A number of state and local laws legally restrict minors' access to tobacco, and legislative activity in this area is increasing (CDC 1991b; Coalition on Smoking OR Health 1992). All 50 states and the District of Columbia have adopted a minimum age of 18 for the sale of tobacco. Only Virginia does not also restrict the distribution of samples of tobacco products. Thirty-one states require vendors to have a license to sell tobacco products; 14 of these will revoke such license as a penalty for noncompliance, and only eight actually provide for an enforcer (USDHHS 1992b).

Over the past three years, cigarette sales through vending machines have been targeted as sources of tobacco for young people. Vending machines suggest a universal availability of cigarettes in our society, and their presence may discourage merchants from making efforts to control over-the-counter cigarette sales to minors. Because vending machines are self-service, it is difficult to attach responsibility and liability to a particular individual for illegal sales to minors from vending machines, and employees may not feel the same responsibility they might for over-the-counter sales.

Twenty-one states and Washington, D.C., have passed laws restricting vending machine sales (USDHHS 1992b). A rapidly growing number of cities have restricted this method of sale, and at least 30 cities in Minnesota, New York, California, Maryland, New Jersey, and Louisiana have totally banned cigarette vending machines (Coalition on Smoking OR Health 1992). Much of this activity has occurred since October 1989, when

Table 8. Published studies examining over-the-counter cigarette sales to minors, United States, 1989-1993

| Study and location | Number of stores or attempts | Baseline sales rate (%) | Follow-up sales rate (%) | Relative reduction in successful tries by minors (%) | Time period |
|--|--------------------------------|-------------------------|--------------------------|--|-----------------------|
| Altman et al. (1989) California | 412 | 74 | 39 | -47 | 6 months |
| Skretny et al. (1990) New York | 62 intervention, 58 control | NA NA | 77 86 | -10* | 2 weeks |
| Feighery, Altman, Shaffer (1991) California | approx. 169 (see comment) | 72 | 62 21 | -14 -71 | 6 months 11 months |
| Jason et al. (1991) Illinois | 20-30 | 60-70 | 36 3 | -40 -93 | 3 months 18 months |
| Altman et al. (1991) California | 97 | 76 | 59 | -22 | 12 months |
| Forster, Hourigan, McGovern (1992) Minnesota | 301 | 53 | 38 | -28 | 3 months |
| DiFranza et al. (1987) Massachusetts | 93 | 63 | NA | NA | NA |
| Nelson, Marso, Roby (1989) South Dakota | 30 | 87 | NA | NA | NA |
| Thomson and Toffler (1990) Oregon | 66 | 87 | NA | NA | NA |
| Centers for Disease Control [CDC], (1990) Colorado | 97 | 55 | NA | NA | NA |
| Hoppock and Houston (1990) Kansas | 67 | 32 | NA | NA | NA |
| CDC (1993) Missouri | 89 | 46 | NA | NA | NA |
| CDC (1993) Texas | 94 | 63 | NA | NA | NA |

*Not statistically significant.

*NA = Not available.

| Enforcement method | Comments |
|--|---|
| Community education, direct education of merchants, contact with management of chains/franchises | Minors' ages: 14-16; minimum legal age was 18 |
| Intervention stores were mailed an informational packet and a supply of warning signs containing that state's required wording prohibiting tobacco sales to persons under 18 | Minors' ages: 14-16; 40% of intervention stores and none of control stores posted warning signs, but no effect on sales rate was observed |
| Educational program (6 months); "sting" operations, citations, media publicity (after 5 more months) | Minors' ages: 14-16; minimum legal age was 18; stores visited varied between preintervention and post-intervention samples |
| Quarterly "stings," license suspension, fines of up to \$500 | Minors' ages: 12 and 13; all stores in local area visited before and after passage of local ordinance; proportion of local junior high school students reporting they were "regular smokers" decreased from 16% to 5% |
| None after initial educational campaign reported above (Altman et al. 1989) | Minors' ages: 14-16; minimum legal age was 18; study illustrates recidivism without continued enforcement |
| None, other than publicity surrounding new state law that increased penalties for sales to minors | Minors' ages: 12-15; minimum legal age was 18; all outlets visited multiple times by different minors; rates averaged |
| None, baseline study only | Minors' age: 11; minimum legal age was 18 |
| None, baseline study only | Minors' ages: 10-13; no minimum legal age in effect |
| None, baseline study only | Minors' ages: 11-17; minimum legal age was 18 |
| None, baseline study only | Minors' ages: 9-17; minimum legal age was 18 |
| None, baseline study only | Minors' ages: 12 and 15 |
| None, baseline study only | Minors' ages: 13-14; no law in effect, but new law making 18 the minimum age recently passed |
| None, baseline study only | Minors' ages 14-17; minimum legal age was 18 |

Table 9. Published studies examining vending machine sales to minors, United States, 1989-1992

| Study and location | Number of machines or attempts | Baseline sales rate (%) | Follow-up sales rate (%) | Relative reduction in purchases by minors (%) | Time period |
|---|--------------------------------|-------------------------|--------------------------|---|-----------------------|
| Altman et al. (1989) California | 30 | 100 | 100 | NS* | 6 months |
| Jason et al. (1991) Illinois | 3-6 | 100 | 50 0 | -50 -100 | 1 month 12 months |
| Feighery, Altman, Shaffer (1991) California | 25 | 84 | 93 83 | NS NS | 6 months 11 months |
| Forster, Hourigan, McGovern (1992) Minnesota | 79 | 82 | 80 | NS | 3 months |
| Forster, Hourigan, Kelder (1992) Minnesota | 77 | 86 | 30 48 | -65 -44 | 6 months 12 months |
| DiFranza et al. (1987) Massachusetts | 6 | 86 | NA† | NA | NA |
| Thomson and Toffler (1990) Oregon | 10 | 100 | NA | NA | NA |
| Hoppock and Houston (1990) Kansas | 10 | 100 | NA | NA | NA |
| Centers for Disease Control (1990) Colorado | 24 | 100 | NA | NA | NA |

*NS = Not significant.

†NA = Not available.

| Enforcement methods | Comments |
|--|--|
| Community education, direct education of merchants, contact with management of chains/franchises | Minors' ages: 14-16; minimum legal age was 18 |
| Letters to merchants, quarterly "stings," license suspension, fines up to \$500 | Minors' ages: 12 and 13; all machines in local area visited before and after passage of local ordinance |
| Educational program (6 months); "sting" operations, citations, media publicity (7-11 months) | Minors' ages: 14-16; minimum legal age was 18 |
| None, other than publicity surrounding new state law that increased penalties for sales to minors | Minors' ages: 12-15; minimum legal age was 18; all outlets visited multiple times by different minors; rates averaged |
| None, other than new local ordinance requiring installation of locking devices on vending machines | Minors' age: 15; at 1 year, 30% of machines were still out of compliance with the locking device law, 91% of machines without and 39% of machines with locking devices sold to a minor at 1-year follow-up |
| None, baseline study only | Minors' age: 11; minimum legal age was 18 |
| None, baseline study only | Minors' ages: 11-17; minimum legal age was 18 |
| None, baseline study only | Minors' ages: 12 and 15 |
| None, baseline study only | Minors' ages: 9-17; minimum legal age was 18 |

White Bear Lake, Minnesota, became the first city to abolish cigarette vending machines (Forster, Hourigan, Weigum 1990). Unfortunately, state legislation condoned by the tobacco industry in Iowa, Oregon, and Wisconsin includes a preemption prohibiting local governments from adopting more restrictive laws, thus ending community control over vending machine restrictions in these states.

The policies that cities and states have adopted to restrict cigarette vending machines, short of a total ban, include making simple requirements about placing the machines in view of an employee, restricting the machines to certain types of businesses or private facilities, requiring locking devices on the machines, or making policies that combine these regulations (Forster, Hourigan, Weigum 1990). Little is known about the effectiveness of these policies. A recent evaluation of a Saint Paul, Minnesota, ordinance that requires locking devices on all cigarette vending machines showed that purchase success was reduced from 86 percent before the law took effect to 19 percent three months later at locations where the locking devices were in place (Forster, Hourigan, Kelder 1992). However, 34 percent of the locations had not installed locking devices at three months; at one year, 30 percent still had not done so.

Laws that prohibit minors from purchasing or possessing tobacco—instead of laws that only prohibit merchants from selling tobacco to minors—have been adopted by a few states. The tobacco industry has actively supported these laws, which have been criticized by some health professionals as the industry's attempt to deflect responsibility for illegal sales from the merchants and the tobacco industry onto the children (DiFranza 1992b; Carol 1992). Laws prohibiting minors' possession of tobacco should be addressed only after effective regulation and enforcement at the retail level are in place.

Enforcement of Tobacco-Distribution Laws

Enforcement is important if laws that intend to restrict minors' access to tobacco are to be effective. A total ban on vending machine sales is clearly the easiest to enforce; more complicated, less restrictive laws require constant surveillance. In a 1990 study, the USDHHS, Office of Inspector General, found very few locations in the United States where state or local laws were being actively enforced (USDHHS 1992b). Results from preliminary cross-sectional studies in two communities that have evaluated compliance to tobacco-distribution laws suggest that the prevalence of tobacco use is reduced among youth in those communities (Jason et al. 1991; DiFranza, Carlson, Caisse 1992). However, more tightly controlled studies with biochemical confirmation of self-reported smoking status are needed to confirm this preliminary finding. A

reduction in the availability of tobacco products to minors can reasonably be expected only if retailers are licensed and random unannounced inspections are conducted frequently. In some jurisdictions, licensing fees are used to hire health inspectors needed to ensure enforcement (DiFranza 1992b).

As discussed earlier in this chapter, Section 1926 of the ADAMHA Reorganization Act (Public Law 102-321), commonly called the Synar amendment, stipulates that to receive the full complement of block grant funding for treating and preventing substance abuse, states must enforce laws prohibiting the sale and distribution of tobacco products to persons under the age of 18. From fiscal year 1994 through fiscal year 1996, states must demonstrate success in reducing the availability of tobacco products to children under 18. These statutory provisions will provide significant new leverage for increased enforcement of laws to reduce sales of tobacco products to youth.

Voluntary Compliance with Age-at-Sale Laws for Tobacco

Numerous attempts have been made to encourage merchants to comply voluntarily (i.e., in the absence of enforcement) with laws prohibiting sales to minors (Altman et al. 1989; Skretny et al. 1990; Feighery, Altman, Shaffer 1991). The most effective of these approaches was a program that managed to reduce the rate of successful tobacco purchases by minors from 74 to 39 percent (Altman et al. 1989), although about half of this improvement had disappeared within a year (Altman et al. 1991). The program had no effect on illegal sales from vending machines; 100 percent of these attempts were successful.

Recently, representatives of 91 regional and corporate headquarters of U.S. tobacco companies were interviewed about their beliefs, attitudes, knowledge, and practices regarding young people's access to tobacco (Altman et al. 1992). These individuals expressed at least moderate support for policies limiting teenage access to tobacco. Respondents' estimates of the frequency of sales to minors were far below the rates reported in studies that arranged for youth to try making tobacco purchases. Spokespersons from most companies reported having policies in place to prevent tobacco sales to minors; however, only about half of these representatives could state the legal age of tobacco sale in the state in which they lived.

At least one corporation, SuperAmerica, has demonstrated that internal programs to reduce cigarette sales to minors can be effective if accompanied by consistent surveillance. In response to an increase in the penalty for the sale of cigarettes to minors in Minnesota and to

convince all employees that the company did not want an illegal sale, SuperAmerica initiated a comprehensive companywide effort among its 670 stores across the nation to eliminate tobacco sales to minors (Hardman 1992). The company developed training materials, including a training video, that address key aspects of tobacco and alcohol sales. These materials cover product definitions, legal age for purchase, instructions on when and how to ask for identification, acceptable forms of identification, detection of false identification, instructions on when and how to refuse a sale, and the consequences of making an illegal sale. All employees—from managers to sales clerks—view the videotape, take a quiz on the contents, and sign a statement that they will adhere to company policies and procedures as a condition of employment. Printed guidelines, such as a booklet that shows samples of driver's licenses from all 50 states, are distributed to employees. In at least one division, area managers and company auditors have conducted up to three surveillance operations per month. Through ongoing educational efforts, rewards for compliant employees, and warnings or possible dismissal for repeatedly noncompliant employees, the company reports achieving approximately 90 percent compliance in their operations. Though the program has not been independently evaluated, it appears to be successful, has drawn significant public attention, and is attracting the interest of other businesses.

The It's the Law program, introduced by the Tobacco Institute in December 1990, is an educational campaign intended to discourage those who are underage from purchasing tobacco products and to help curb youth access to cigarettes through aggressive work with the retail community and by supporting new state laws (Tobacco Institute 1990a). The program consists of window decals, buttons, and a packet of educational materials for merchants. In a February 1992 letter to state governors, the Tobacco Institute stated that "over one million pieces of program materials have been distributed to thousands of retail outlets across the country" (Chilcote 1992, p. 2). The materials closely resemble those distributed by health officials and tobacco-control professionals in many communities. One version of the materials displayed a hand holding a lit cigarette with the text, "It's the law/You must be 18 (19) to buy tobacco products." This text, however, seems to suggest that it is illegal for minors to purchase tobacco, whereas in most states it is only illegal for merchants to sell tobacco to minors (Choi, Novotny, Thimis 1992). This inaccuracy is not a minor point; parents misinterpreting these decals may be reluctant to report a merchant who has sold tobacco to their child if they mistakenly believe their child has violated the law (SmokeFree Pennsylvania 1991).

During the summer of 1991, an experiment was conducted to determine the efficacy of the It's the Law program (DiFranza and Brown 1992). Teenagers 13 through 16 years old attempted purchases of tobacco from 156 retailers in Massachusetts. Only seven of the retailers were participating in the It's the Law program. Six of the seven participating retailers (86 percent) proved willing to illegally sell tobacco to the teenagers; 131 of 149 (88 percent) nonparticipating retailers proved willing to make such sales.

Model Laws to Restrict Distribution of Tobacco to Minors

Former Secretary of Health and Human Services Louis W. Sullivan, M.D., proposed to all states a Model Sale of Tobacco Products to Minors Control Act that contains the following provisions (PHS 1990):

- *Institute 19 years as the minimum age for legal tobacco sales.* One rationale for a minimum age of 19 is that many high school seniors are 18 years of age. Setting the minimum age at 19 would help keep tobacco out of high schools. Further raising the age to 21 would provide a parallel with alcohol laws and would facilitate the enforcement of both laws, since one system could be set up to enforce both laws.
- *Create a tobacco-sales licensing system similar to that used for alcoholic beverages.* Without a licensing system, health and law enforcement officials have no control over who sells tobacco. A licensing system provides enforcement officials with a list of retailers, thus facilitating educational and enforcement activities. Applicants for tobacco licenses could be required to pass a written examination (analogous to those required for a driver's license) to ensure that these vendors understand their legal responsibilities.
- *Establish a graduated schedule of penalties for illegal sales.* These penalties should include suspension or revocation of a retailer's license to sell tobacco because of repeated violations of the age-at-sale law.
- *Place primary responsibility for enforcement with a designated state agency; local law enforcement and public health officials should also participate and have input.* A comprehensive enforcement program can be funded, without increasing the tax burden, through the sale of tobacco retail licenses (Davis 1991; DiFranza 1992b). An additional source of revenue is the state excise tax on tobacco, especially that portion derived from illegal sales to minors. Several authors have called for an "illegal profits tax" to be levied on the profit that tobacco companies realize from the illegal sale of their products to minors (Slade 1988; DiFranza and Tye

1990; Cummings, Pechacek, Sciandra 1992; Glantz 1993).

- *Use civil penalties and local courts to assess fines.* Attempts to enforce access laws through criminal proceedings have proved troublesome. Police officials are reluctant to prosecute because it is time consuming and costly (USDHHS 1992b). Judges are reluctant to burden offenders with a criminal record for selling tobacco to minors and are more apt to suspend sentences or issue warnings with no fines (Feighery, Altman, Shaffer 1991). Civil enforcement allows violations to be handled through a ticketing or administrative mechanism and avoids the need for court hearings (Jason et al. 1991). Local health departments could provide such enforcement, similar to their role in performing restaurant inspections (Davis 1991).
- *Ban cigarette vending machines.* As discussed above, less restrictive measures against vending machine sales have been shown to be less effective than stronger measures in preventing tobacco sales to minors.

Additional features recommended for model laws include requiring that retailers post highly prominent

signs detailing that the law (for example) requires that tobacco be sold from behind the checkout counter, bans the sale of individual cigarettes and the distribution of free samples of tobacco products, and bans the distribution of tobacco through the mail (DiFranza 1992a).

A recent study (Choi, Novotny, Thimis 1992) analyzed the adequacy of state laws restricting minors' access to tobacco (Table 10). The study found that no states are meeting all the criteria set by the former Secretary of Health and Human Services. Only New Hampshire, Massachusetts, New Jersey, and Utah meet even moderate standards, and the majority of states have only basic protection against providing tobacco to minors.

As was discussed earlier in this chapter, as part of the ADAMHA Reorganization Act (Public Law 102-321), the sale and distribution of tobacco products to anyone under the age of 18 is to be banned in all states by October 1, 1993. A recent report that updates the data of Choi, Novotny, and Thimis (1992) examines the extent to which states have adopted and enforced youth access laws (USDHHS 1992b). All 50 states and the District of Columbia now ban the sale of tobacco to persons under the age of 18. Only Florida and Vermont, however, are

Table 10. Types of laws used by states to restrict minors' access to tobacco

| Category | Number of states | Regulations |
|---------------|------------------|---|
| None | 4 | No restrictions on the sale of cigarettes or other tobacco products to minors |
| Nominal | 5 | Law banning the sale of tobacco to minors below a minimum age |
| Basic | 38* | Law banning the sale of tobacco to minors aged < 18 years Penalties (fines) for the sale or distribution of tobacco products to minors |
| Moderate | 4 | Basic regulations, plus the following: Signs at points-of-sale warning about the illegality of the sale of tobacco products to minors; requirement of a state-issued retail tobacco license |
| Comprehensive | 0 | Moderate regulations, plus the following: Ban on all distribution of tobacco samples and coupons for free samples; commitment of resources for enforcement through license fees; no preemption clause prohibiting local communities from passing more restrictive minors' access laws; exemption for "sting" operations conducted at the local level |

Source: Choi, Novotny, Thimis (1992).

*Includes the District of Columbia.

enforcing their laws through their liquor control agencies (USDHHS 1992b). Low priority by police and the lack of a designated enforcer were seen as obstacles to enforcing youth access laws.

Warning Labels on Tobacco Products

Introduction

For this report, the term "labeling" refers to the provision of health-related information on packages and in advertising. Package warning labels can include either brief statements printed directly on tobacco packages or more detailed information placed on package inserts, similar to the requirements for pharmaceutical products.

History of Warning Labels on Tobacco Products

Shortly after the Surgeon General released the 1964 report of the Advisory Committee on Smoking and Health (PHS 1964), the Federal Trade Commission (FTC) proposed three administrative rules that would have required health warnings on cigarette packages and advertisements and imposed certain restrictions on cigarette advertising (FTC 1964a). In part, the FTC proposed that every cigarette advertisement and every pack, box, carton, and other container in which cigarettes were sold to the public carry one of the following warnings:

CAUTION—CIGARETTE SMOKING IS A HEALTH HAZARD: The Surgeon General's Advisory Committee on Smoking and Health has found that cigarette smoking contributes substantially to mortality from certain specific diseases and to the overall death rate.

CAUTION: Cigarette smoking is dangerous to health. It may cause death from cancer and other diseases.

In preparing its final ruling, published in June 1964 after a six-month comment period, the FTC found that cigarette advertisements were false and deceptive because they failed to disclose known health hazards (FTC 1964b). The ruling therefore required all cigarette advertising and every container in which cigarettes were sold to consumers to disclose prominently that cigarette smoking is dangerous and may cause death from cancer and other diseases. However, the final rule left the specific wording of the warning to the discretion of the tobacco manufacturers.

The Federal Cigarette Labeling and Advertising Act of 1965 (Public Law 89-92) preempted the FTC regulation before its scheduled enactment date. This legislation, the first federal statute to enact labeling requirements for tobacco products, marks one of the earliest efforts of the federal government to warn the public about the health

risks of smoking (see Table 11). However, the provisions of the Cigarette Labeling and Advertising Act were generally less stringent than the FTC regulations they replaced. For example, the act required that all cigarette packages contain the following health warning:

CAUTION: Cigarette Smoking May Be Hazardous to Your Health.

This statutory warning was weaker than the earlier proposed FTC warning in that it did not specifically mention the risk of death from cancer and other diseases. Further, whereas the FTC would have required warning disclosures on product advertisements, the Federal Cigarette Labeling and Advertising Act temporarily (through June 1969) prohibited any governmental body (including federal regulatory agencies, such as the FTC) or individual state from requiring a health warning in cigarette advertising. The Federal Cigarette Labeling and Advertising Act also prohibited any health warning on cigarette packages other than the statement required by the act itself.

On the other hand, the act required the FTC to transmit an annual report to Congress describing the effectiveness of cigarette labeling, discussing current cigarette advertising and promotional practices, and making recommendations for legislation. In its first report to Congress (FTC 1967), the FTC recommended extending the health warning to cigarette advertisements and strengthening the wording:

WARNING: Cigarette Smoking Is Hazardous to Health and May Cause Death from Cancer and Other Diseases.

In mid-1969, just before the expiration of the congressionally imposed temporary restrictions on its actions, the FTC proposed a rule that would have required all cigarette advertising "to disclose, clearly and prominently—that cigarette smoking is dangerous to health and may cause death from cancer, coronary heart disease, chronic bronchitis, pulmonary emphysema, and other diseases" (FTC 1969a).

The subsequent Public Health Cigarette Smoking Act of 1969 (Public Law 91-222) banned cigarette advertising on television and radio after January 1, 1971, and strengthened the package warning label (effective November 1970) to read as follows:

WARNING: The Surgeon General Has Determined That Cigarette Smoking Is Hazardous to Your Health.

Nonetheless, the labeling provisions of this law, like the Federal Cigarette Labeling and Advertising Act before it, were substantially less stringent than the FTC regulations they preempted. Furthermore, the statutory language of the act continued to omit specific references to the risks and

Table 11. Major legislation related to information and education about tobacco and health in the United States, 1965-1986

| Law | Date | Labeling requirements |
|--|------|--|
| Federal Cigarette Labeling and Advertising Act (Public Law 89-92) | 1965 | Required a health warning on cigarette packages Preempted other warnings on packages Temporarily preempted Federal Trade Commission (FTC) requirements of any health warning on cigarette advertisements |
| Public Health Cigarette Smoking Act (Public Law 91-222) | 1969 | Strengthened the health warning on cigarette packages Preempted other warnings on packages Temporarily preempted FTC requirement of any health warning on cigarette advertisements |
| Little Cigar Act (Public Law 93-109) | 1973 | None |
| Comprehensive Smoking Education Act (Public Law 98-474) | 1984 | Replaced the previous health warning on cigarette packages and advertisements* with a system requiring rotation of four specific health warnings Preempted other warnings on packages |
| Comprehensive Smokeless Tobacco Health Education Act (Public Law 99-252) | 1986 | Required the rotation of three health warnings on smokeless tobacco packages and advertisements (in circle-and-arrow format on advertisements) Preempted any other health warning on smokeless tobacco packages or advertisements (except billboards) |

Source: U.S. Department of Health and Human Services (1989).

*In 1972, an FTC consent order extended the requirement for a health warning on cigarette packages to include cigarette advertisements.

| Advertising requirements | Congressional reporting requirements | Other stipulations |
|--|--|---|
| | Annual report to Congress on health consequences of smoking (U.S. Department of Health, Education, and Welfare [USDHEW]) | None |
| | Annual report to Congress on cigarette labeling and advertising (FTC) | |
| Prohibited cigarette advertising on television and radio; preempted any state or local requirement or prohibition based on smoking and health with respect to cigarette advertising or promotion | Annual report to Congress on health consequences of smoking (USDHEW) | None |
| | Annual report to Congress on cigarette labeling and advertising (FTC) | |
| Extended broadcast ban on cigarette advertising to "little cigars" | | None |
| None | Biennial status report to Congress on smoking and health (U.S. Department of Health and Human Services [USDHHS]) | Created the Federal Interagency Committee on Smoking and Health (USDHHS) |
| | | Cigarette industry must provide a confidential list of cigarette additives [†] (USDHHS) |
| Prohibited smokeless tobacco advertising on television and radio | Biennial status report to Congress on smokeless tobacco use (USDHHS) | Required public information campaign on health hazards of using smokeless tobacco [†] (USDHHS) |
| | Biennial report to Congress on smokeless tobacco sales, advertising, and marketing practices (FTC) | Smokeless tobacco companies must provide a confidential list of additives and a specification of nicotine content in smokeless tobacco products [†] (USDHHS) |

[†]List of additives does not identify company or cigarette brand, no public disclosure of additives on packages or advertisements required, and no other public disclosure allowed.

[‡]No funds have been appropriated to carry out this campaign.

consequences of smoking and extended the preemption on requiring any additional health warning for cigarette packages. The FTC was again temporarily restricted (through June 1971) from issuing regulations that would require a health warning in cigarette advertising.

After the second congressional moratorium expired in late 1971, the FTC announced its intention to file complaints against cigarette companies for failure to warn in their advertising that smoking is dangerous to health. Negotiations among the companies and the FTC resulted on March 30, 1972, in consent orders requiring that all cigarette advertising "clearly and conspicuously" display the same warning required by Congress for cigarette packages (FTC 1981). That consent order specified the type size of the warning in newspaper, magazine, and other periodical advertisements of various dimensions; for billboard advertisements, the size of the lettering was specified in inches (FTC 1972).

In 1975, the U.S. government filed a complaint in the U.S. District Court for the District of Columbia against the cigarette companies for alleged violation of the consent order, including failure to display the health warning in some advertising, failure to display lettering of the specified size in billboard warnings, and failure to properly place the warning in some advertisements (FTC 1982). This action led to judgments in 1981 against the six major cigarette companies (U.S.A. v. Liggett et al. 1981; U.S.A. v. R.J. Reynolds 1981), in which the tobacco manufacturers were required to use larger lettering in the warnings displayed in billboard advertising. In 1981, the FTC also sent a staff report to Congress that concluded that the warning appearing on cigarette packages and in advertisements had become overexposed and "worn out" and was thus no longer effective (FTC 1981). The report pointed out that the existing warning was too abstract, generally difficult to remember, and not personally relevant. Further noting that a singular warning did not communicate sufficient information on the significant, specific risks of smoking, the report recommended changing the shape of the warning to a circle-and-arrow design (as is currently used in advertisements for smokeless tobacco products [see Figure 5]), increasing the size of the warning, and replacing the existing single warning with a rotational system of warnings.

Current Status of Warning Labels

The 1981 FTC staff report would eventually help prompt passage of the Comprehensive Smoking Education Act (Public Law 98-474), which became effective on October 12, 1984. Effective one year after being signed, this law required cigarette companies to rotate the following four warnings on all cigarette packages and in all cigarette advertisements:

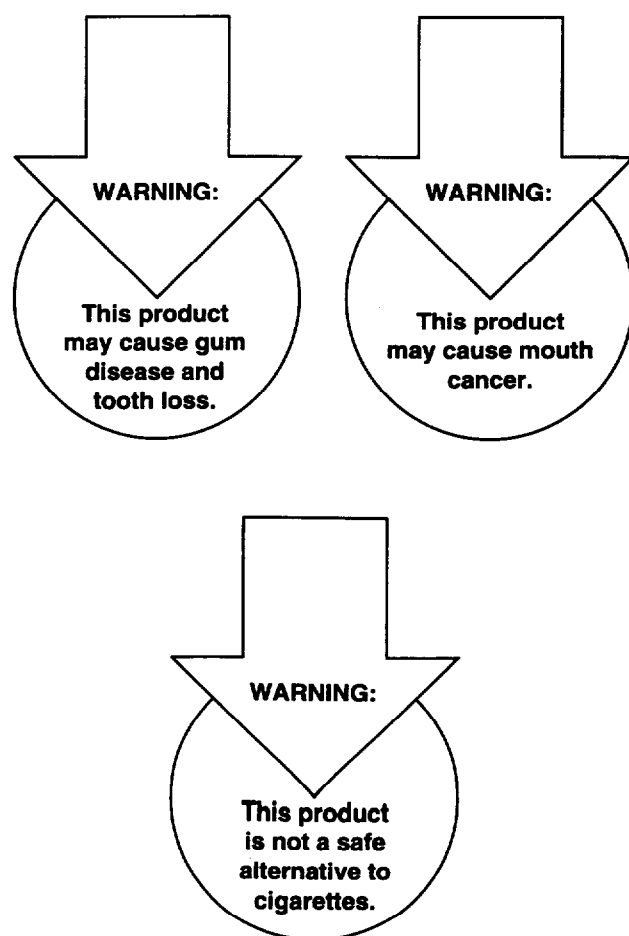
SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy.

SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

SURGEON GENERAL'S WARNING: Smoking by Pregnant Women May Result in Fetal Injury, Premature Birth and Low Birth Weight.

SURGEON GENERAL'S WARNING: Cigarette Smoke Contains Carbon Monoxide.

Figure 5. Health warnings required for smokeless tobacco advertisements (except billboards)



Sources: U.S. Department of Health and Human Services (1989); Federal Trade Commission (1981).

These rotational warnings retained, however, the rectangular visual format that the FTC staff had recommended abandoning. The congressional warnings were also substantively more passive in their wording than those suggested by the FTC. For example, the FTC had proposed the following two warnings to caution consumers on the risks of smoking during pregnancy:

Smoking increases the risk of death of your unborn child.

Smoking increases the risk of spontaneous abortion and stillbirth.

In 1986, Congress extended requirements for warning labels to smokeless tobacco products by passing the Comprehensive Smokeless Tobacco Health Education Act (Public Law 99-252). This act requires tobacco manufacturers to display and regularly rotate the following three warnings on all smokeless tobacco packages and on all smokeless tobacco advertising (except billboards):

WARNING: This product may cause mouth cancer.

WARNING: This product may cause gum disease and tooth loss.

WARNING: This product is not a safe alternative to cigarettes.

The act stipulates that the warnings displayed in advertisements appear in the circle-and-arrow format (see Figure 5) that the FTC recommended in 1981 for cigarettes (FTC 1981). The act prohibits federal agencies as well as state or local jurisdictions from requiring any other health warnings on smokeless tobacco packages and advertisements. However, states are not preempted from enacting additional advertising restrictions.

Limitations of Warning Labels

An unintended consequence of the federally mandated warning disclosure concerns product liability (U.S. Congress 1989; Gostin, Brandt, Cleary 1991). Surgeon General Luther Terry enjoyed widespread support from the general public and the health community when he endorsed package warning labels during congressional testimony. Dr. Terry commented that "the public is awaiting these steps. Such warnings could materially increase public awareness of the health hazard by providing concrete evidence of governmental concern" (U.S. Congress 1965, p. 33). Yet no one publicly anticipated that the display of a federally mandated warning would eventually shield tobacco manufacturers from product liability. Ironically, the tobacco industry has thus far been insulated from lawsuits by legislation it has resisted steadfastly since 1965 (U.S. Congress 1965, 1983, 1989).

In 1989, Congress considered a bill (H.R. 4543) that addressed this unintended protection, but the bill has not been approved.

Although tobacco manufacturers are legally obligated to disclose health warnings on their product packaging and advertising, and although Congress has enacted legislation that has increased the size, number, and specificity of the warnings, these legal requirements have not been as restrictive as the FTC has recommended. Moreover, requirements for warning disclosures on promotional items (e.g., T-shirts, caps, key chains, lighters) and sponsorship logos (such as the Virginia Slims tennis tournament or the Winston Cup National Association for Stock Car Auto Racing [NASCAR] races) are noticeably absent from current legislation. Only the printed materials (such as catalogues and wrapping accompanying promotional items) are required to carry warning labels. Thus, despite the statutory ban on broadcast advertising, widespread corporate sponsorship of televised events enables even very young viewers to see cigarette brand names displayed with no health warning (Aitken, Leather, Squair 1986; Blum 1991). The tobacco industry spent nearly \$100 million on sports and sporting events in 1990, a more than 10 percent increase over the previous year (FTC 1992). Spending on public entertainment and promotional items has also increased dramatically. In contrast, spending on magazine advertisements, which do carry warning disclosures, decreased by more than \$52 million (14 percent) from 1989 to 1990.

Federal law regarding health warnings for tobacco products continues to preempt state actions, even on advertisements displayed solely within their jurisdiction (such as event sponsorship and billboard, mass transit, and point-of-sale advertising). The tobacco industry favors the preemption, arguing that to permit local action would "invite censorship" in violation of the First Amendment and would abandon "Congress' consistent 25-year policy of nationally uniform regulation" (U.S. Congress 1990, p. 80).

Effectiveness of Warning Labels

Warning labels have a well-established history of use with products associated with medical risks or dangerous potential consequences for users. Labeling information intended to inform consumers of relative risk and benefit is also provided on many consumer goods (for example, nutrition labeling on packaged foods and energy-consumption information on energy appliances). Research on consumer response to such labeling information has yielded mixed results (Beltramini 1988), yet two basic factors appear to influence the usefulness of such labels (USDHHS 1987b; Centre for Behavioural

Research in Cancer 1992). First, to have an impact on consumers, warning labels must be designed to take into account those factors that might influence consumer response (e.g., a consumer's previous experience with the product, previous knowledge of the risks associated with the product's use, and level of education or literacy). Second, the labels should be designed in an attention-demanding format, and the information they bear should be specific rather than general and written in clear, non-technical language.

As was noted before, the Federal Cigarette Labeling Act of 1965 (Public Law 89-92) mandated cigarette warning labels so that "the public may be adequately informed that cigarette smoking may be hazardous to health." However, more specific communications objectives were not defined by any of the subsequent legislation. Information provision is clearly distinct from information impact (Jacoby, Chestnut, Silberman 1977). Research indicates that merely placing a warning on a label or an advertisement is not sufficient for information processing (Beltramini 1988). One can generally infer that the goal of warning labels for cigarettes has been to increase public knowledge about the hazards of smoking, but without more specific goals it is difficult to evaluate whether the labels have had an impact on consumer decision-making or behavior. Moreover, it is unclear which "public" Congress intended to be "adequately informed." Is the public that segment of the general populace who currently smoke, that segment who could potentially begin to smoke (principally young people), or that portion of the public (principally adults) who have decided to try to quit smoking? Clearly, a warning can communicate effectively to one segment of the public without having an impact on the others.

Without clear objectives or operational definitions, no ready standards are available to evaluate the effects of warning labels; and although warning labels have been required since 1966, little had been reported about their effectiveness in meeting any objective (USDHHS 1987b). Currently, there are no controlled studies that permit definitive assessment of the independent impact of cigarette warning labels on knowledge, beliefs, attitudes, or smoking behavior. The few available empirical studies deal with the visibility of cigarette warnings in advertising and consistently indicate that the Surgeon General's warnings are given little attention or consideration by viewers. Research on package warning labels is even scarcer.

In a 1978 Starch Message Report survey, only 2 percent of adults exposed to cigarette ads in 24 different magazines read the Surgeon General's warning in those ads (FTC 1981). Similarly, a 1978 study for the Brown and Williamson Tobacco Company found that only 2 percent of the respondents read the entire warning in seven ads

for Kool cigarettes; the average time spent "examining" the warning was less than a second. In an advertising copy test conducted for the Liggett & Meyers Tobacco Company in 1976, no respondents read the entire warning (FTC 1981).

More recent studies suggest that little attention is paid to the post-1985 rotational warnings. To examine adolescent viewing of tobacco advertisements, Fischer et al. (1989) adapted the market research methodology of eye-tracking. A computer recorded eye movement as subjects viewed five different tobacco advertisements with no time constraints. The average viewing time of the warnings totaled only 8 percent of the total advertisement viewing time. These data further indicate that more than 40 percent of subjects did not even view the warning. An additional 20 percent looked at the warning but failed to actually read it. Given such strong evidence of negligible viewing and processing of warning labels, Fischer et al. (1989) concluded that existing warnings are unlikely to effectively counter the images of independence, romance, and fun inherent in tobacco advertising.

Evidence from other studies suggests that imagery draws attention away from the text of the warnings (Richards and Zakia 1981; Zerner 1986). The FTC suggested that cigarette companies were explicitly designing advertising to "divert or distract attention away from the health consequences of smoking" (FTC 1981, p. 2-2). Intentionally or not, the sheer volume of cigarette advertising, all of which attempts to incorporate the basic themes of product satisfaction, positive image associations, and risk minimization (Popper 1986), may overwhelm the health-promoting effect of warnings in advertisements (Schwartz 1986).

Research indicates that novel warning formats are more likely to capture viewer attention (Cohen and Srull 1980). The potential communications effectiveness of the more pointed post-1984 warnings may have been diminished with the retention of the original rectangular shape of the pre-1985 warnings (Bhalla and Lastovicka 1984). Similarly, although the shape of the warnings in smokeless tobacco advertisements may have been novel initially, the size and color of these warnings may now have a reduced effect (Popper and Murray 1989).

Some studies suggest that warning labels may not be readable in some advertising media. Davis and Kendrick (1989) found that under typical driving conditions, the average motorist could read an entire warning in about one-half of billboard advertisements on streets and in only 5 percent of billboard advertisements on highways. Stationary observers could not read the warnings in any of the transit advertisements studied. All warnings in the study were in compliance with the congressionally mandated FTC warning-size templates.

By contrast, subjects could almost always read the brand names and identify the advertisement's notable imagery.

Despite the negligible attention and poor readability reported across these studies, there is some evidence that consumers have moderate awareness of the current four warning messages. Using a warning recognition test (rather than a test of the prominence or strength of the message) to assess basic awareness and attention, Lieberman Research (unpublished data) found that one-half of smokers (but fewer than one-half of nonsmokers) were able to correctly recall one of the rotational warnings. Nearly all recalled the single pre-1985 warning. However, Fischer et al. (1989) obtained different results in their masked recall test with adolescents. After adolescents viewed a series of ads, the researchers covered up the advertisement headings, all specific references to cigarette brand names, and the Surgeon General's warning. Three-fourths of participants could identify the masked warning as a health message, but only 19 percent could recall even the general theme of the warning. These data may suggest that adolescents are generally aware of the presence of warning labels in tobacco ads but are far less informed than adults are of the specific health messages. Similarly low levels of warning recall among young adults were found for the smokeless tobacco warnings (Popper and Murray 1989).

Research in communication effectiveness (Day 1973) suggests that when viewers actually attend and read them, warnings do more than merely provide information. Warnings can also produce potentially affective and behavioral impacts (Beltramini 1988). Analyses of the wording and format of mandated health warnings have suggested reasons for the limited affective and behavioral impact that can occur even under optimal conditions of attention and processing. For example, use of any conditional words such as *can* and *may* can dramatically reduce the effect of the entire warning (Linthwaite 1985). Since two of the current rotational warnings include the word *may* (see Table 12), consumers may minimize the inherent health warnings of these messages (Dumas 1992). Furthermore, although the information presented in the current warnings is more detailed and more absolute than the pre-1985 single warning, it is also presented in a more impersonal manner. Readers may be more likely to believe, learn from, and act on warnings that are personally relevant than on warnings that are abstract and technical (Fishbein 1977).

Analysis of the general public's knowledge of the health risks of smoking could provide some evidence of the impact of warnings. Although such knowledge has clearly increased since 1966, when the first health warning label was required, the effect of the warnings cannot be isolated from a number of other information sources,

such as reports of the Surgeon General or reported research in the news (FTC 1974; Murphy 1980; USDHHS 1987a). Similarly, it is impossible to determine any independent effects of health warnings on aggregate cigarette sales (FTC 1967, 1969b) or to isolate the independent effects of advertising on those aggregate sales. Indeed, the two effects counter one another and therefore confound research. However, a recent and extensive discussion of the issues in the Australian publication *Health Warnings and Contents Labelling on Tobacco Products* reports formative data on providing more noticeable and informative labels to consumers and assembles a compendium of warnings worldwide (Centre for Behavioural Research in Cancer 1992).

Perhaps the most powerful indirect indicator of the effect of cigarette warnings is the number of smokers and consumers who remain unaware of the health risks of smoking. After a comprehensive review of studies on health-risk awareness, including publicly generated studies and those conducted by the tobacco industry, the FTC concluded that significant numbers of consumers and still higher numbers of smokers were unaware of even the most rudimentary risk information about smoking (FTC 1981). It was this lack of consumer awareness that led the FTC in 1981 to call for a larger and more attention-demanding format and for expanded (16 different) rotational warnings for cigarettes.

Effect of Tobacco Taxation

Introduction

Tobacco is taxed in a variety of ways by federal, state, and local government. The most important of these taxes are the federal and state excise taxes on cigarettes and the general state sales tax applied to tobacco products in most states. Historically, these taxes have been seen as an effective way to generate revenues, as with taxes on alcohol. However, in recent years, increased taxation of tobacco products has been supported as a public health measure aimed at discouraging smoking and other tobacco use.

History of Tobacco Taxation

Federal Tobacco Taxes

During the late eighteenth and early nineteenth centuries, the federal government experimented with excise taxes on tobacco products. However, because of opposition from both producers and consumers, the taxes imposed in 1794, 1812, 1816, and during the Civil War were repealed and finally reduced to one cent per pack. During the first half of the twentieth century, federal taxes were, as before the Civil War, increased to help

Table 12. Health warnings required on tobacco packages and advertisements in the United States, 1966–1993

| Health warnings | Effective dates | Packages | Advertisements |
|---|---------------------------------------|----------|----------------|
| Cigarettes | | | |
| CAUTION: Cigarette Smoking May Be Hazardous to Your Health. | January 1, 1966– October 31, 1970 | X | |
| WARNING: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health. | November 1, 1970– October 11, 1985 | X | |
| | March 30, 1972– October 11, 1985 | | X* |
| SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy. | October 12, 1985–present | X | X† |
| SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Re- duces Serious Risks to Your Health. | October 12, 1985–present | X | X† |
| SURGEON GENERAL'S WARNING: Smoking by Pregnant Women May Result in Fetal Injury, Premature Birth and Low Birth Weight. | October 12, 1985–present | X | X† |
| SURGEON GENERAL'S WARNING: Cigarette Smoke Contains Carbon Monoxide. | October 12, 1985–present | X | X† |
| Smokeless tobacco | | | |
| WARNING: This product may cause mouth cancer. | February 27, 1987–present | X | X† |
| WARNING: This product may cause gum disease and tooth loss. | February 27, 1987–present | X | X† |
| WARNING: This product is not a safe alternative to cigarettes. | February 27, 1987–present | X | X† |

Source: Federal Trade Commission (1981).

*Required by Federal Trade Commission consent order. All other warnings required by federal legislation.

†The four warnings mandated for cigarette advertisements on outdoor billboards are slightly shorter versions of the same messages.

‡The warnings on advertisements must appear in a circle-and-arrow format (see Figure 5). No warnings are required on outdoor billboards.

finance U.S. military involvement. The last of a series of increases took place on November 1, 1951, during the Korean War, when the tax was increased from seven to eight cents per pack. The tax remained at that level for the next 30 years.

Over the past decade, however, the federal tax on cigarettes has been increased significantly. These recent increases were motivated by a different goal—the need to raise revenues to deal with the increasing federal budget deficit. The first of these deficit-motivated increases occurred on March 1, 1983, as part of the Tax Equity and Fiscal Responsibility Act of 1982, when the tax was doubled to 16 cents per pack. This increase was intended as a temporary measure that would be repealed by October 1, 1985. However, after being extended several times, the doubling of the tax was made permanent in 1986.

As part of the Omnibus Budget Reconciliation Act of 1985, a tax of 24 cents per pound was levied on snuff, a tax of 8 cents per pound was imposed on chewing tobacco, and a tax of 45 cents per pound was applied to pipe tobacco. The Omnibus Budget Reconciliation Act of 1990 further increased federal taxes on cigarettes from 16 cents to 20 cents per pack on January 1, 1991; a scheduled additional increase of 4 cents per pack was levied on January 1, 1993. As of 1993, federal taxes on other tobacco products are 36 cents per pound for snuff, 12 cents for chewing tobacco, and 67.5 cents for pipe tobacco. This represents a tax of less than 3 cents per can of snuff or pouch of chew; the tax on a pack of cigarettes is 24 cents. Yet even though federal taxes on tobacco have increased recently, they have become a less important source of revenue for the federal government. In 1950, tobacco excise taxes accounted for 3.36 percent of all federal revenues; by 1989, they accounted for only 0.44 percent of revenues (Congressional Budget Office [CBO] 1990).

State and Local Tobacco Taxes

In 1921, Iowa became the first state to impose an excise tax on cigarettes, followed in 1923 by Georgia, South Carolina, South Dakota, and Utah. By the end of the 1920s, six additional states had enacted a cigarette excise tax. By 1940, more than half of all states levied taxes on cigarettes, and by 1950, only a handful of states were not imposing an excise tax. In 1969, North Carolina became the last state to enact an excise tax on cigarettes. As with the federal government, the imposition of, and increases in, state cigarette taxes have partly represented attempts to raise revenue rather than to lower smoking prevalence. Warner (1981) argues that this financial motive is especially clear in the history of excise taxes on cigarettes in the six major tobacco-producing states. The

average date when these states instituted a cigarette excise tax was 1939—one year earlier than the average for the remaining states, and many years before the widespread publicity on the health hazards of smoking. Just before the negative publicity, the average tax rate for these six states was 2.5 cents per pack, a figure only slightly less than the other states' average of 2.9 cents per pack. As is discussed later, the difference has increased greatly since then.

Some evidence suggests that state governments have recently used cigarette excise taxes as a major part of antismoking campaigns. This conclusion can be drawn from reviewing the number of increases in state excise tax rates after the mid-1950s release of the first scientific studies that linked smoking to poor health, and particularly after the 1964 release of the initial Surgeon General's report on smoking and health (PHS 1964). For instance, during the latter half of the 1950s, more than eight tax increases occurred per year among the states, whereas fewer than three per year occurred each year in the early 1950s. Similarly, in the year after the 1964 Surgeon General's report, there were a record 22 increases in state excise taxes on cigarettes.

The established pattern of tax increases continued during the period when the Fairness Doctrine permitted antismoking messages on television and radio, and again after the 1971 ban on television and radio advertising (Warner 1981). Moreover, as Warner (1981) notes, the once negligible difference between the tax rates in the tobacco-producing states and in the remaining states widened significantly over this period. This difference has continued to widen since 1981. By January 1, 1992, the average tax rate in the tobacco-producing states was 7 cents per pack, whereas the average tax rate in the remaining 44 states and Washington, D.C., was 26 cents per pack.

The active use of cigarette and other tobacco taxes to discourage tobacco use in some states and the relative inaction in others results in large differences in taxes and, consequently, in cigarette prices among states. For example, the cigarette excise tax ranges from less than 3 cents per pack in Virginia to 60 cents per pack in Hawaii (see Table 13). When local taxes are added, the differences become even larger in some locations. The differences in taxes and prices create incentives for the casual smuggling (i.e., involving relatively small quantities, generally for personal use) and organized smuggling (i.e., involving large quantities, generally for resale) of cigarettes from low-tax localities to high-tax localities and create incentives for other tax-evasion activities.

The relative ease of transporting cigarettes across localities has encouraged some people to profit from this activity (Advisory Commission on Intergovernmental Relations [ACIR] 1977, 1985). Although casual smuggling

Table 13. State* cigarette taxes, July 1, 1993

| State | Excise tax rate (cents per 20-cigarette pack) | Sales tax [†] (cents per pack) | Total state tax (cents per pack) |
|----------------------|--|--|-------------------------------------|
| Alabama | 16.5 | 7 | 23.5 |
| Alaska | 29.0 | 0 | 29.0 |
| Arizona | 18.0 | 9 | 27.0 |
| Arkansas | 31.5 | 9 | 40.5 |
| California | 35.0 | 15 | 50.0 |
| Colorado | 20.0 | 0 | 20.0 |
| Connecticut | 47.0 | 12 | 59.0 |
| Delaware | 24.0 | 0 | 24.0 |
| District of Columbia | 65.0 | 13 | 78.0 |
| Florida | 33.9 | 12 | 45.9 |
| Georgia | 12.0 | 6 | 18.0 |
| Hawaii | 60.0 | 9 | 69.0 |
| Idaho | 18.0 | 9 | 27.0 |
| Illinois | 30.0 | 13 | 43.0 |
| Indiana | 15.5 | 9 | 24.5 |
| Iowa | 36.0 | 11 | 47.0 |
| Kansas | 24.0 | 9 | 33.0 |
| Kentucky | 3.0 | 9 | 12.0 |
| Louisiana | 20.0 | 8 | 28.0 |
| Maine | 37.0 | 11 | 48.0 |
| Maryland | 36.0 | 10 | 46.0 |
| Massachusetts | 51.0 | 9 | 60.0 |
| Michigan | 25.0 | 7 | 32.0 |
| Minnesota | 48.0 | 14 | 62.0 |
| Mississippi | 18.0 | 11 | 29.0 |
| Missouri | 13.0 | 7 | 20.0 |
| Montana | 19.3 | 0 | 19.3 |
| Nebraska | 34.0 | 9 | 43.0 |
| Nevada | 35.0 | 13 | 48.0 |
| New Hampshire | 25.0 | 0 | 25.0 |
| New Jersey | 40.0 | 12 | 52.0 |
| New Mexico | 21.0 | 9 | 30.0 |
| New York | 56.0 | 8 | 64.0 |
| North Carolina | 5.0 | 6 | 11.0 |
| North Dakota | 44.0 | 11 | 55.0 |
| Ohio | 24.0 | 8 | 32.0 |
| Oklahoma | 23.0 | 8 | 31.0 |
| Oregon | 28.0 | 0 | 28.0 |
| Pennsylvania | 31.0 | 11 | 42.0 |
| Rhode Island | 37.0 | 14 | 51.0 |
| South Carolina | 7.0 | 8 | 15.0 |
| South Dakota | 23.0 | 7 | 30.0 |
| Tennessee | 13.0 | 14 | 27.0 |
| Texas | 41.0 | 13 | 54.0 |
| Utah | 26.5 | 9 | 35.5 |
| Vermont | 20.0 | 9 | 29.0 |
| Virginia | 2.5 | 7 | 9.5 |
| Washington | 54.0 | 13 | 67.0 |
| West Virginia | 17.0 | 10 | 27.0 |
| Wisconsin | 38.0 | 10 | 48.0 |
| Wyoming | 12.0 | 0 | 12.0 |

Sources: Tobacco Institute (1992); Action on Smoking and Health (1993).

*Includes the District of Columbia.

†Sales tax information is for November 1, 1992.

had long been a problem, states reported that organized smuggling increased significantly after the tax increases of the mid- to late-1960s. Some states were discouraged from adding further taxes that would motivate increased smuggling and result in a net loss of revenues generated by cigarette taxes. In 1978, in response to pressure from states with high cigarette taxes, the Federal Contraband Cigarette Act (Public Law 95-575) was enacted. This act prohibited the single-transaction transport, receipt, shipment, possession, distribution, or purchase of more than 60,000 cigarettes not bearing the tax indicia of the state in which the cigarettes were initially sold. The act dealt only with the organized smuggling of cigarettes, described by the ACIR as the major problem, and ignored the less problematic casual smuggling (Kleine 1993). The ACIR (1985) suggests, however, that the law was even more effective than its proponents would have predicted.

California and Massachusetts recently enacted two large increases in their excise taxes on tobacco. In November 1988, California voters passed Proposition 99, which went into effect in January 1989. This law increased California's state excise tax on cigarettes from 10 cents per pack to 35 cents per pack. As was mentioned earlier, one of the notable features of Proposition 99 is that 20 percent of the additional revenue raised from the tax increase is earmarked for the state's antismoking activities. Legislation similar to Proposition 99 was passed in Massachusetts in November 1992. This measure, which took effect on January 1, 1993, includes a 25-cent increase in the state excise tax and a 25 percent increase in the tax on chewing tobacco.

Besides the specific taxes applied to cigarettes, 45 states and Washington, D.C., have general sales-taxes that apply to cigarettes. In all but four of these states, the sales-tax base includes the excise tax. This arrangement adds an additional 5 to 14 cents per pack to the price of cigarettes in these states (see Table 13).

State taxes on other tobacco products have also become more widespread. By January 1, 1992, a total of 37 states had imposed a tax on at least some tobacco products other than cigarettes; only 14 states were collecting such taxes in 1964. The same time period witnessed similar activity at the local level. By fiscal year 1991, 373 cities had imposed additional taxes on cigarettes, and 49 cities were levying taxes on other tobacco products. In addition, 38 counties were charging their own cigarette taxes, and 29 counties were assessing additional taxes on other tobacco products. The largest of these local cigarette taxes are those imposed in New York City (8 additional cents per pack) and in Chicago (24 additional cents per pack, including city and county excise taxes).

Cigarette Tax Increases and Cigarette Prices

After scientific evidence of the harmful health consequences of cigarette smoking appeared in the mid-1950s, states began to increase cigarette excise taxes not only to raise revenues but to discourage people from smoking. Because the combined federal and state taxes accounted for almost half of the average retail price of cigarettes, these state tax increases resulted in increases in the real price of cigarettes (i.e., the price of cigarettes relative to the price of all goods and services, as measured by the National Consumer Price Index) (Table 14). The relative price of cigarettes also rose as a result of the state tax increases. This trend was accelerated after the 1964 release of the first Surgeon General's report on smoking and health. The result was that between 1955 and 1971, the nominal price of cigarettes had risen by over 70 percent (almost half of this increase was attributed to the state tax increases), and the real price of cigarettes had risen by over 13 percent.

These increases in real cigarette prices were short-lived. The rapid inflation of the 1970s, coupled with the relative stability of state excise taxes on cigarettes, led to a sharp drop in real cigarette prices between 1971 and 1981. Federal taxes remained fixed at 8 cents per pack during this period. As was discussed earlier, the emergence of organized smuggling in response to the growing differences in state and local taxes discouraged states from continuing to increase cigarette taxes. Combined federal and state taxes, as a percentage of retail cigarette prices, fell from 47 percent at the beginning of this period to 33 percent in 1981. The absolute cost of producing cigarettes fell throughout this period, largely because of a decrease in the average quantity of tobacco per cigarette as the market share for "low tar" cigarettes increased (Harris 1987). The overall result was that between 1971 and 1981, the real price of cigarettes declined by almost 28 percent.

Beginning in 1982, this downward trend in real cigarette prices was reversed as state taxes rose in anticipation of the doubling of the federal excise tax on cigarettes that was scheduled for January 1, 1983. These combined tax increases led to the largest single-year jump in prices (from 1982 to 1983). However, Harris (1987) argues that the main cause of the increase in the real price of cigarettes from 1981 through 1986 was not the increase in either the federal tax or state taxes, but rather the increases in the wholesale prices of cigarettes because of markups by manufacturers. He contends that most of these markups were not justified by increases in the cost of production. Instead, he suggests that markups were the result of a coordinated price increase by the six firms that dominate the tobacco industry. More recent data lend support to Harris's argument: although state and

Table 14. Cigarette taxes and cigarette prices per pack, 1955-1991

| Year | Average state tax (cents) | Average federal tax (cents) | Average cigarette price (cents) | Taxes as percentage of average price* | Real† average state tax‡ (cents) | Real† average federal tax (cents) | Real† average cigarette price (cents) |
|------|---------------------------|-----------------------------|---------------------------------|---------------------------------------|----------------------------------|-----------------------------------|---------------------------------------|
| 1955 | 3.5 | 8.0 | 22.7 | 48.7 | 13.1 | 29.9 | 84.7 |
| 1956 | 3.8 | 8.0 | 23.2 | 47.4 | 14.0 | 29.9 | 85.3 |
| 1957 | 3.9 | 8.0 | 23.8 | 48.8 | 13.9 | 28.5 | 84.7 |
| 1958 | 4.0 | 8.0 | 25.0 | 48.0 | 13.8 | 27.7 | 86.5 |
| 1959 | 4.2 | 8.0 | 25.6 | 46.6 | 14.4 | 27.5 | 88.0 |
| 1960 | 4.7 | 8.0 | 26.1 | 48.9 | 15.9 | 27.0 | 88.2 |
| 1961 | 4.7 | 8.0 | 26.1 | 48.6 | 15.7 | 26.8 | 87.3 |
| 1962 | 5.1 | 8.0 | 26.9 | 48.3 | 16.9 | 26.5 | 89.1 |
| 1963 | 5.2 | 8.0 | 26.8 | 49.4 | 17.0 | 26.1 | 87.6 |
| 1964 | 5.6 | 8.0 | 27.9 | 49.3 | 18.1 | 25.8 | 90.0 |
| 1965 | 5.9 | 8.0 | 28.2 | 49.8 | 18.7 | 25.4 | 89.5 |
| 1966 | 6.9 | 8.0 | 30.0 | 51.4 | 21.3 | 24.7 | 92.6 |
| 1967 | 7.1 | 8.0 | 30.5 | 50.8 | 21.3 | 24.0 | 91.3 |
| 1968 | 8.4 | 8.0 | 32.3 | 49.2 | 24.1 | 23.0 | 92.8 |
| 1969 | 9.1 | 8.0 | 32.8 | 48.9 | 24.8 | 21.8 | 89.4 |
| 1970 | 10.2 | 8.0 | 37.1 | 47.7 | 26.3 | 20.6 | 95.6 |
| 1971 | 10.7 | 8.0 | 38.9 | 46.8 | 26.4 | 19.8 | 96.0 |
| 1972 | 11.6 | 8.0 | 40.0 | 47.7 | 27.8 | 19.1 | 95.7 |
| 1973 | 12.1 | 8.0 | 40.3 | 48.4 | 27.3 | 18.0 | 90.8 |
| 1974 | 12.1 | 8.0 | 41.8 | 47.6 | 24.5 | 16.2 | 84.8 |
| 1975 | 12.2 | 8.0 | 44.5 | 44.5 | 22.7 | 14.9 | 82.7 |
| 1976 | 12.4 | 8.0 | 47.9 | 41.4 | 21.8 | 14.1 | 84.2 |
| 1977 | 12.5 | 8.0 | 49.2 | 40.5 | 20.6 | 13.2 | 81.2 |
| 1978 | 12.9 | 8.0 | 54.3 | 37.1 | 19.8 | 12.3 | 83.3 |
| 1979 | 12.9 | 8.0 | 56.8 | 35.5 | 17.8 | 11.0 | 78.2 |
| 1980 | 13.1 | 8.0 | 60.0 | 34.5 | 15.9 | 9.7 | 72.8 |
| 1981 | 13.2 | 8.0 | 63.0 | 33.1 | 14.5 | 8.8 | 69.3 |
| 1982 | 13.5 | 8.0 | 69.7 | 29.9 | 14.0 | 8.3 | 72.2 |
| 1983 | 14.7 | 12.0 | 81.9 | 26.8 | 14.8 | 12.0 | 82.2 |
| 1984 | 15.3 | 16.0 | 94.7 | 33.2 | 14.7 | 15.4 | 91.1 |
| 1985 | 15.9 | 16.0 | 97.8 | 32.3 | 14.8 | 14.9 | 90.9 |
| 1986 | 16.2 | 16.0 | 104.5 | 30.8 | 14.8 | 14.6 | 95.3 |
| 1987 | 16.9 | 16.0 | 110.0 | 29.9 | 14.9 | 14.1 | 96.8 |
| 1988 | 18.2 | 16.0 | 122.2 | 28.1 | 15.4 | 13.5 | 103.3 |
| 1989 | 21.8 | 16.0 | 127.5 | 26.5 | 17.6 | 12.9 | 102.8 |
| 1990 | 24.7 | 16.0 | 144.1 | 26.4 | 18.9 | 12.2 | 110.3 |
| 1991 | 25.9 | 20.0 | 153.3 | 25.6 | 19.0 | 11.7 | 112.6 |

Source: Tobacco Institute (1992).

*Percentages cannot be calculated directly from the tax and price information, since taxes are weighted average taxes for the entire fiscal year, whereas prices and percentages are generally as of November 1.

†Real taxes and prices are obtained by dividing the actual taxes and prices by the National Consumer Price Index, with the average of 1982-1984 being the benchmark. All data are for the fiscal year ending June 20.

‡State taxes are a weighted average of the tax in taxing states, including Washington, D.C. (42 in 1955, 51 in 1970 and after). Price refers to the median retail price in all taxing states.

federal taxes have increased since the late 1980s, the percentage of the retail price of cigarettes accounted for by these taxes actually fell from 33 percent in 1981 to 26 percent in 1991 (Tobacco Institute 1992). The combined effect of increases in federal and state taxes and in manufacturer's price resulted in the real price of cigarettes increasing by over 60 percent between 1981 and 1991. This upward trend in real cigarette prices is expected to continue at least through 1993, as the federal tax increases to 24 cents per pack as part of the 1990 deficit-reduction agreement. Therefore, although taxes accounted for a smaller percentage of the increased retail price of cigarettes from 1981 to 1991, the increased taxes, along with manufacturers' price increases, were still passed on to consumers, and the real price of cigarettes increased.

Effect of Excise Taxes on Tobacco Use

One of the fundamental principles of economics, illustrated by a downward-sloping demand curve, states that as the real price of any commodity rises, consumption of that commodity falls. Some researchers have speculated that the consumption of an addictive product, such as cigarettes, might be an exception to this rule. However, numerous econometric studies, including several recent studies that explicitly model the addictive aspects of cigarette smoking, confirm that this fundamental economic principle does indeed apply to cigarettes. Thus, since increases in cigarette excise taxes generally result in increased cigarette prices, these tax increases may be effective in reducing cigarette consumption.

Economists use the concept of price elasticity of demand to describe the sensitivity of consumption to changes in price. The price elasticity of demand is defined as the percentage change in consumption that results from a 1 percent increase in price. For example, a price elasticity of -0.5 implies that a 10 percent increase in price would reduce consumption by five percent. A brief review of recent U.S. studies of cigarette demand follows.

Aggregate Data Studies

One set of recent studies of cigarette demand used aggregate data. Price elasticity estimates obtained from these studies ranged from -0.14 to -1.23; the majority of these estimates fell within the narrower range from -0.20 to -0.50. All but two of the estimates were obtained from econometric studies that besides examining the effect of price, used income, demographic variables, and other policy-related variables to explain differences in cigarette consumption. Failing to include such potentially important determinants of demand could lead to biased estimates of the effects of price and other policies on

cigarette smoking. Several of these studies made theoretical and empirical attempts to model the addictive aspects of cigarette consumption. In contrast with the econometric analyses, Peterson et al. (1992) used an epidemiologic approach similar to the quasi-experimental approach of Baltagi and Goel (1987). Both studies obtained estimates of the price elasticity of demand that were consistent with those obtained from econometric studies.

Differences in the estimates obtained from these studies partly resulted from differences in theoretical and empirical modeling methods. For example, the studies that used a pooled time series of state cross-sections might provide estimates of the price elasticity that exceed the true value of the elasticity if cigarette smuggling is ignored, since studies based on aggregate data use state cigarette sales figures as their measure of consumption. That is, states with relatively low cigarette taxes and prices may sell a substantial number of cigarettes to residents of nearby states where prices are higher. Thus, the sales figures from the states with lower cigarette taxes and prices will overstate cigarette consumption within those states, whereas those with higher taxes and prices will understate consumption. Many of the most recent studies, however, including those by Baltagi and Levin (1986), Becker, Grossman, and Murphy (1992), and Chaloupka and Saffer (1992), have controlled for this problem. Similarly, if the addictive aspects of consumption are ignored, the estimated price elasticity may be biased. Again, many of these recent studies, including Baltagi and Levin (1986), Becker, Grossman, and Murphy (1992), and Keeler et al. (1992) estimated demand equations that explicitly model the addictive aspects of consumption. In addition, at the aggregate level, cigarette prices and quantity are simultaneously determined by the interaction of cigarette supply and demand. Ignoring this simultaneity would lead to biased estimates of the effects of cigarette prices on demand. Bishop and Yoo (1985) and Porter (1986) explicitly modeled this relationship and estimated price elasticities of demand that fell within the -0.20 to -0.50 range generally found in other studies based on aggregate data. Finally, two of these studies, Keeler et al. (1992) and Flewelling et al. (1992), considered the effects of the relatively large change in the California cigarette excise tax. Their estimated price elasticities suggest that the impact of price on demand is independent of the level of price.

Even with the differences in data, theoretical modeling, and estimation techniques, one general conclusion can be drawn from these aggregate studies—increases in cigarette prices will reduce cigarette consumption. At least part of this reduction is likely due to adolescents' quitting smoking, reducing the amount they smoke, or not taking up smoking in the first place (USDHHS 1991).