
Chapter 1

The Scientific Rationale for Comprehensive, Community-Based, Smoking Control Strategies

CONTENTS

| | |
|--|----|
| Introduction | 3 |
| Background: Efforts To Control Tobacco Use | 5 |
| Patterns of Smoking Behavior | 8 |
| Role of Public Information Campaigns | 11 |
| Results of Early Tobacco Control Efforts | 12 |
| Approaches to Influencing the Individual | 14 |
| Approaches to Influencing the Environment | 17 |
| Comprehensive Control Strategies | 21 |
| Affecting the Initiation Process | 23 |
| Affecting the Cessation Process | 25 |
| References | 28 |

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Chapter 1

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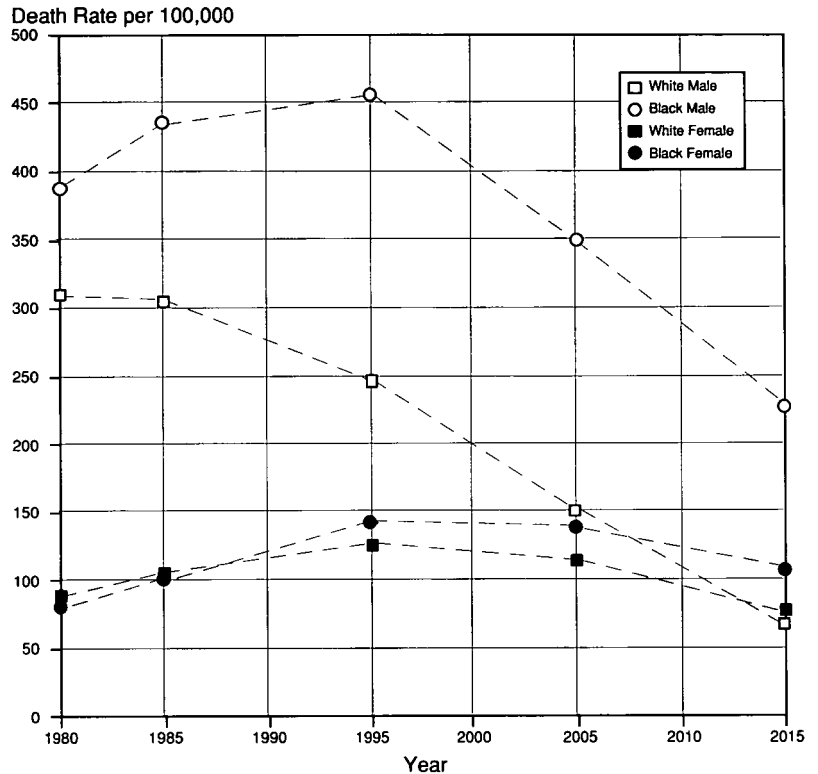
INTRODUCTION

The use of tobacco predates the discovery of the New World by Columbus, and tobacco was one of the major cash crops of the early American colonies (Robert, 1967). Efforts to control tobacco use have a history almost as long and colorful, including King James I's "Counterblaste to Tobacco" in 1604 (International Agency for Research on Cancer, 1986). However, in the last century the use of tobacco has become more widespread and more hazardous. The development of machines that could manufacture cigarettes in the late 1800's and safety matches at the turn of the century set the stage for mass marketing of cigarettes. This mass marketing of cigarettes in the United States resulted in a rapid rise in per capita cigarette consumption that began around 1910 and provided one of the first demonstrations that advertising could create demand for a product where no previous demand existed (Whelan, 1984).

Coincident with the increasing use of cigarettes was a change in the tobaccos used to manufacture U.S. cigarettes (International Agency for Research on Cancer, 1986). The smoke from those tobaccos was milder and easier to inhale and had a pH that prevented absorption of nicotine across the oral mucosa; users had to inhale the smoke into the lung to absorb substantial amounts of nicotine. The deep inhalation of tobacco smoke, with the subsequent deposition, retention, and absorption of the smoke's toxic and carcinogenic substances, dramatically changed the risks associated with tobacco use and resulted in the proliferation of lung cancer and other smoking-related diseases.

During the 1930's and 1940's, the rapidly rising rates of lung cancer in men led scientists to investigate possible causes of the epidemic, using the newly developed tools of case-control and cohort epidemiologic studies. By the mid-1950's, data from these studies allowed the scientific community to conclude that cigarette smoking clearly was hazardous to health (Study Group on Smoking and Health, 1957), and the public health community began its continuing effort to reduce the burden of tobacco-related disease by reducing smoking initiation and promoting smoking cessation.

Figure 1
Actual (1980) and projected (1985 to 2015) lung cancer death rates, ages 55 to 84*



*Forecast age standardized mortality rates using 1980 population.

The rapid rise in lung cancer death rates during this century can be closely linked to the rise in cigarette consumption by men and women of both black and white races. A model presented later in this volume (Chapter 3) predicts future lung cancer death rates based on the recent and projected future changes in smoking prevalence (see Figure 1). This model predicts that changes in smoking behavior that have already occurred will produce a decline in the lung cancer death rates for white males within the next decade, but the rates for women and for black males would not be expected to fall until after the year 2000. This prediction is based on a continuation of the current trends in smoking behavior. If the rate of smoking cessation can be increased, then an even more substantial fraction of the expected mortality from lung cancer can be averted. The comprehensive strategies for controlling tobacco use described in this volume offer the best hope of reversing and ultimately eliminating the epidemic of lung cancer that has characterized this century.

This volume synthesizes what has been learned in the past 40 years of efforts to control tobacco use. As with most successful public health efforts, the current state of the art in control of tobacco use is built on a broad base of scientific investigation and includes the equally broad experience of successful and unsuccessful program activities that evolved in parallel with our scientific knowledge (Cullen, 1989).

**BACKGROUND:
EFFORTS
TO CONTROL
TOBACCO USE**

Frequently, it is the operational experience with what works or does not work at the programmatic level that forms the core of interventions tested in controlled scientific investigations. It should come as no surprise, therefore, that current concepts of effective approaches to controlling tobacco use frequently outstrip both the tools needed to evaluate them and the data needed for definitive proof of their impact (US DHHS, 1990a). This volume presents our current best judgment of what constitutes an effective, comprehensive strategy to control tobacco use, and it draws extensively, and without apology, on the broad bodies of understanding developed by both controlled scientific investigation and the trial-and-error experience of interventions conducted in the community (Schwartz, 1987; US DHHS, 1990a).

The clear identification of cigarette smoking as a major health risk led to efforts to persuade current smokers to quit and to keep new smokers from beginning. Early approaches relied heavily on providing information about the risks of smoking (see Chapter 4). Although the impact of information campaigns was demonstrated by an increased awareness of smoking-related health risks and a decline in per capita consumption of cigarettes in the population at the time of the campaigns, it rapidly became apparent that information alone would not solve the problem. Knowledge of the health risks of smoking was transmitted to smokers and is probably a major motivational force in cessation attempts, but the vast majority of these cessation attempts failed, leaving most smokers wanting to quit but unable to do so.

In assessing the limited success of the educational campaigns against smoking, it is important to recognize that these campaigns were not presented in isolation (Schwartz, 1969). Rather, they were confronting the tobacco companies' much larger effort to promote smoking and to confuse the public about the risks of tobacco use (Whelan, 1984). In contrast to other health-based information campaigns, the effort to provide information on the risks of smoking was, and is, conducted against the backdrop of a multibillion-dollar advertising and promotional campaign that encourages cigarette smoking (Centers for Disease Control, 1990; Davis, 1987).

The tobacco industry responded to the initial burst of information on the risks of tobacco use with a combination of (1) a media effort designed to cast doubt on the level of scientific certainty about the risks and (2) a series of modifications to cigarettes (filters and lower tar content) designed to convince the public that the risk had been removed. It is not known how effective the antismoking public information campaign might have been if it had been delivered in the absence of the tobacco industry's much larger, competing campaign (Warner, 1977).

The recognition that information alone would not eliminate tobacco use shifted the focus of control strategies to the individual; programs were developed to help adults in their efforts to quit smoking and to prevent adolescents from beginning to smoke (see Chapter 4). The goal of these programs was to create psychological change within the individual that would enable successful change in smoking behavior and resistance to environmental stimuli that induce the start of smoking or a return to the practice after quitting. This focus on the individual presumed that the major determinants of smoking behavior are within the individual, a premise that turned out to be faulty, in part because many of the forces that promote smoking initiation and smoking cessation are sociological in nature rather than purely psychological. Also, the difficulty of attracting smokers and the limited resources for behavioral change that many smokers bring to such programs predict a very limited impact for individual-centered approaches relative to population-wide programs.

To broaden the appeal of individual-centered approaches, self-help programs and telephone hotlines to counsel smokers were developed (Glynn et al., 1990). These strategies did, indeed, attract a larger fraction of the smoking population, but their less intensive methods are also less effective at creating behavioral change by the smoker, leading to a lesser individual effect on a larger number of smokers.

Research on the determinants of smoking behavior and the observation that declines in cigarette consumption corresponded to changes in smokers' social and economic environment (Warner, 1977) led to a recognition that a focus on the larger social environment, rather than on the individual, could be an effective strategy for controlling tobacco use (see Chapter 5). Environmental changes that are believed to influence smoking initiation and smoking cessation include

- Increased tobacco costs;
- Antitobacco media campaigns;
- Declining social acceptability of smoking;
- Limitations on where smoking is allowed; and
- Restricted access for minors.

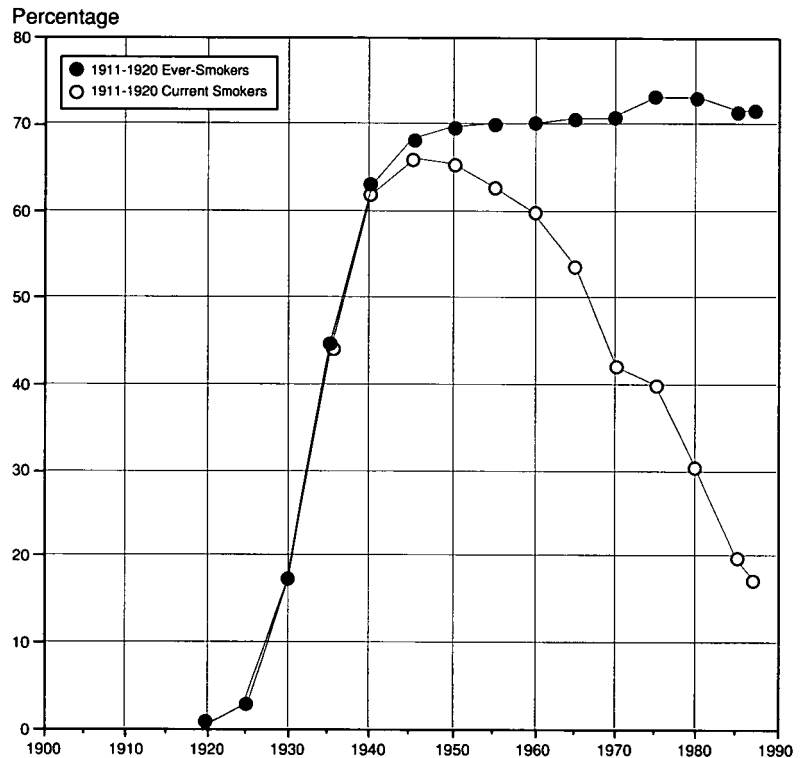
The impact of these changes is diffuse and, therefore, difficult to link to any change in the smoking behavior of an individual. However, the underlying premise of these social environment-centered efforts is that removal of environmental stimuli and reinforcements for smoking and the simultaneous creation of environmental disincentives for smoking markedly alter the personal psychological and sociological utility of smoking. This leads to higher rates of smoking cessation and lower rates of smoking initiation. If barriers to smoking are raised, the social reinforcement of smoking changed to social disapproval, and the smoker continually bombarded with messages to quit, then it is less likely that adolescents experimenting with cigarettes will continue on to dependence, more likely that smokers will attempt to quit, and, once they have quit, less likely that they will relapse.

As efforts to control tobacco use began to incorporate these social environmental approaches, it was realized that the two approaches, individual and environmental, were not competing strategies, but that they could be combined in a way that might synergistically increase their effect on smoking behavior (see Chapter 6). The combination of changing the environment to discourage smoking while simultaneously providing resources to increase smokers' ability to control their own behavior has the potential to effect substantial, sustained, population-wide change in smoking behavior (Pomrehn et al., 1990-91). These changes in the individual and in the social environment often occur incrementally and at a modest pace. Therefore, smoking behavioral changes may lag behind changes in policies or social norms. Changes in the social environment would be expected to have a modest initial impact that increases with time as the social changes percolate through the environment in which the smoker lives.

As the basis for current, comprehensive, community-based efforts to control tobacco use, this combined approach recognizes that individual and environmental inputs can be provided at multiple levels, through multiple channels, and over a relatively continuous time. Persistent and inescapable messages to quit are provided to the smoker concurrent with repeated offers of support and assistance in the quitting process (US DHHS, 1990a).

The description of control strategies presented in this volume recognizes that there is no single solution to the problem of tobacco use. Different programs have impact on different points in the process of initiation, maintenance, and cessation of smoking behavior. More than one program may simultaneously influence an individual to alter smoking behavior, and a single program may have different effects on

Figure 2
Smoking prevalence among men born from 1911 to 1920
(through 1987)



individuals at different stages of smoking behavior. The recognition that smokers use the cigarette to interact and cope with their environment has led to current efforts to change both the smoker and the smoker's environment.

PATTERNS OF SMOKING BEHAVIOR

The prevalence of cigarette smoking is not uniformly distributed across the U.S. population. Cigarette smoking varies with age, gender, race, education, year of birth, and other factors (Pierce and Hatziandreu, 1989). These differences are important for assessing the disease risks associated with tobacco use, and knowledge of these patterns is essential to the development of strategies to control tobacco use.

The initiation of regular smoking is confined almost completely to those under the age of 25, and 90 percent of cigarette-smoking initiation is complete by age 21 among current cohorts (Pierce and Hatziandreu, 1989). Figure 2 shows the pattern of smoking initiation and cessation for men born in the years 1911 through 1920; initiation of smoking occurred only in early life, and the major change in smoking behavior after age 25 was cessation. This general pattern (smoking

initiation early in life and cessation later in life) appears among all subgroups of the population, but different subgroups have different rates and ages of initiation, achieve different rates of peak smoking prevalence, and have different rates of cessation (Harris, 1983). For instance, the rates of cessation are lower and prevalence of smoking is higher among individuals at lower socioeconomic levels and with lower levels of formal education (Pierce and Hatziaandreu, 1989). In addition, differences in the pattern of smoking behavior between black Americans and white Americans (see Chapter 3) include a much smaller decline in the prevalence of smoking among blacks (Fiore et al., 1989).

Gender differences in patterns of smoking behavior are illustrated in Figures 3 and 4, which contrast the smoking behavior of men and women born during different decades of this century, from 1901 through 1970. The men born in the first few decades took up smoking early in the century and early in life and reached a very high peak prevalence of smoking. In contrast, the women born during the same periods began to take up smoking later in the century and consequently later in life, and they reached peak prevalence levels that were much lower than those of their male counterparts (Harris, 1983). The gender-related differences in smoking behavior among the cohorts born later in the century are far smaller, and the patterns of smoking behavior for men and women in the most recent birth cohort (1961 to 1970) are almost identical.

These differences in smoking behavior are important to the understanding of comprehensive strategies to control tobacco use because they explain the requirement for multiple channels and multiple interventions. Because of the diversity of smoking subgroups, no single approach should be expected to work for all smokers, and no single channel can be expected to reach all smokers.

The comprehensive strategies described in this volume are based on the premise that (1) specific programs to alter smoking behavior can be aimed at different points in the process of initiating, maintaining, and quitting smoking behavior and (2) a concerted effort to attack smoking behavior at each of these points will yield results far greater than those expected from the sum of the programs applied independently. Furthermore, there is an assumption that smokers must be reached within and by the structures where they live and work; therefore, a comprehensive strategy must include participation by a broad and representative selection of the groups and social structures that constitute the community in which the smoker lives (Thompson et al., 1990-91).

Figure 3
Changes in smoking prevalence among U.S. males born from 1901 to 1970 (through 1987)

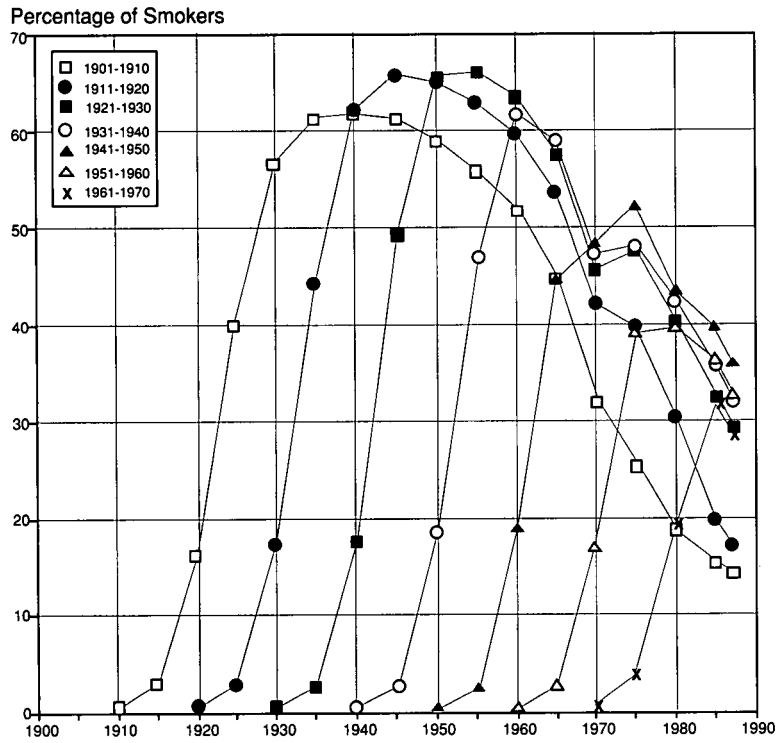


Figure 4
Changes in smoking prevalence among U.S. females born from 1901 to 1970 (through 1987)

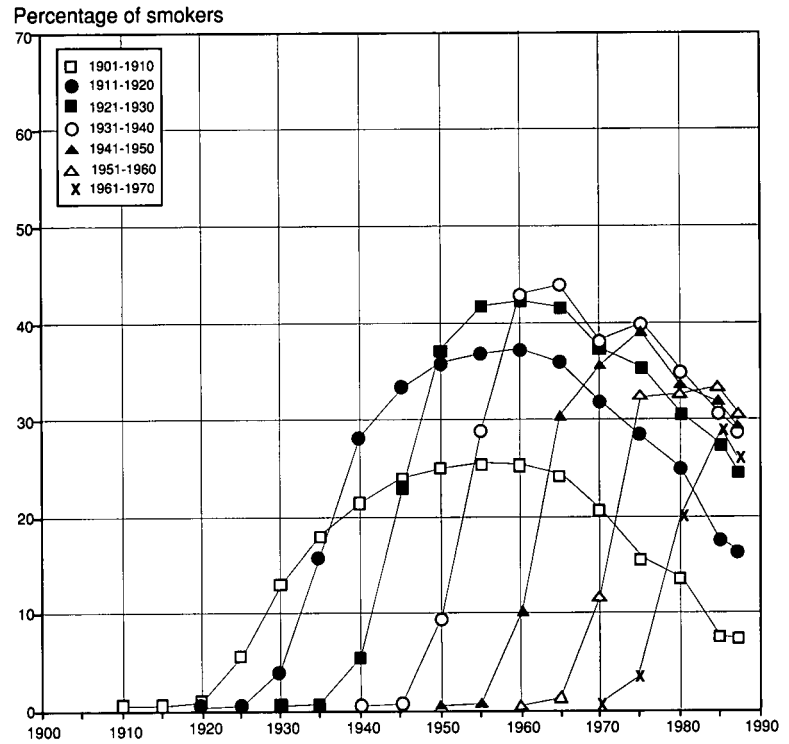
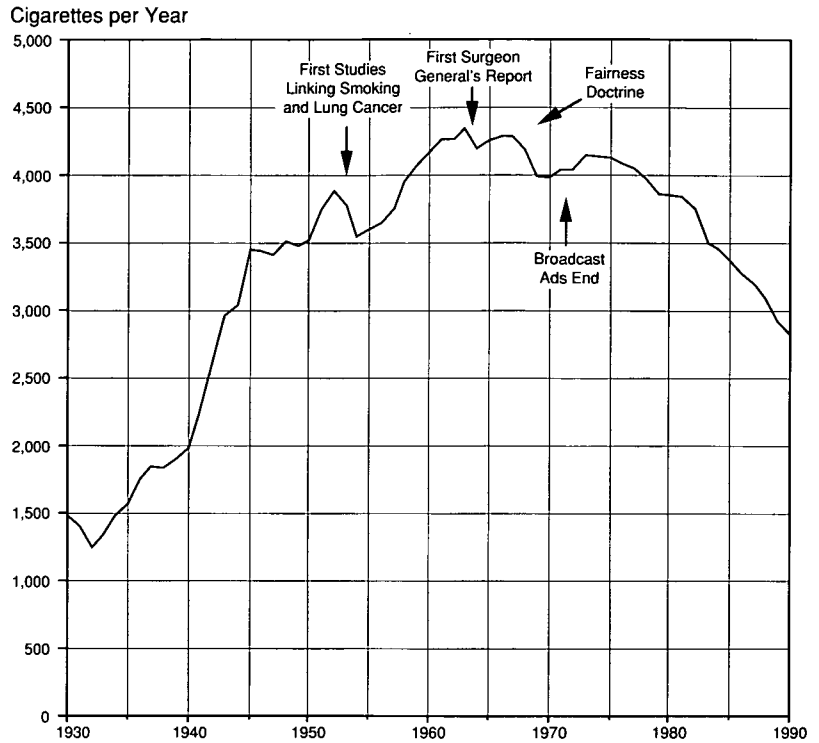


Figure 5
U.S. per capita cigarette consumption for adults, aged 18 and older (1930 to 1990)



ROLE OF PUBLIC INFORMATION CAMPAIGNS

One of the earliest responses to the scientific data that established the risks of smoking was an information campaign to communicate the health risks of cigarette smoking with the expectation that relaying the risk information to the smoking public would lead to changes in smoking behavior. Clearly, these information campaigns have been successful in communicating risk information at the simplest level: In recent surveys, more than 80 percent of current smokers agreed that smoking is harmful and even that it is harming them as individuals (Pierce and Hatziaandreu, 1989). Information campaigns have been less successful, though, at transmitting an understanding of the magnitude of the risks associated with smoking (Shopland et al., 1990).

The expected change in smoking behavior did occur, but it was far more limited than had been hoped (US DHHS, 1989), suggesting the individual smoker's difficulty with breaking his or her dependence on tobacco. Figure 5 shows the changes in cigarette consumption during this century and suggests the relation of such changes to media information campaigns. Per

capita consumption of cigarettes declined with each of these major informational events:

- A substantial downturn in consumption coincided with the lay media's presentation of scientific evidence establishing the risks of smoking in the mid-1950's.
- A smaller downturn occurred with the publication of the first Surgeon General's Report in 1964 (US DHEW, 1964) and the resultant media coverage.
- A major downturn in per capita cigarette consumption also occurred during the late 1960's; between 1967 and 1970, mandated antitobacco spots were shown on television to counter cigarette advertisements. When cigarette advertisements were banned from television in 1970, the bulk of the antitobacco advertising campaign also disappeared, and per capita cigarette consumption again increased.

Information alone is often dismissed as a means of influencing smoking behavior, but information about smoking-associated disease risks provides much of the motivational substrate for individual cessation efforts and is likely to trigger cessation attempts. It is clear, however, that these informational campaigns of themselves were unable to create and sustain cessation in the majority of smokers.

RESULTS OF EARLY TOBACCO CONTROL EFFORTS

The decline in smoking prevalence over time within a given birth cohort has led to the suggestion that aging is the dominant influence on smoking cessation. But the attribution of cessation to advancing age ignores the fact that activities to control tobacco use have increased over the last four decades, concurrent with the aging of the individuals that make up the birth cohorts. By examining the changes in smoking prevalence for the four oldest birth cohorts of males, one can see that the point where smoking prevalence begins to decline in each cohort is in the mid-1950's, which suggests that events in the social environment influenced all of the different cohorts simultaneously, regardless of age. The four earliest cohorts are cited because men born later would not have completed the initiation of smoking by the time of the 1950's campaigns.

Figures 6 and 7 present these data more clearly, showing the percentage of former smokers in each of these four earliest cohorts of black and white men, plotted by calendar year. The percentage of former smokers among white males in the earliest cohorts begins to rise in the 1950's. There appears to be an effect of age, with the oldest cohorts having the highest percentage of former smokers, but all of the cohorts show steep rises in the proportion of former smokers during the 1950's and 1960's, which suggests that the major effect is related to calendar year rather than to age.

Figure 6
Percentage of former smokers, black males born from 1901 to 1940 (through 1987)

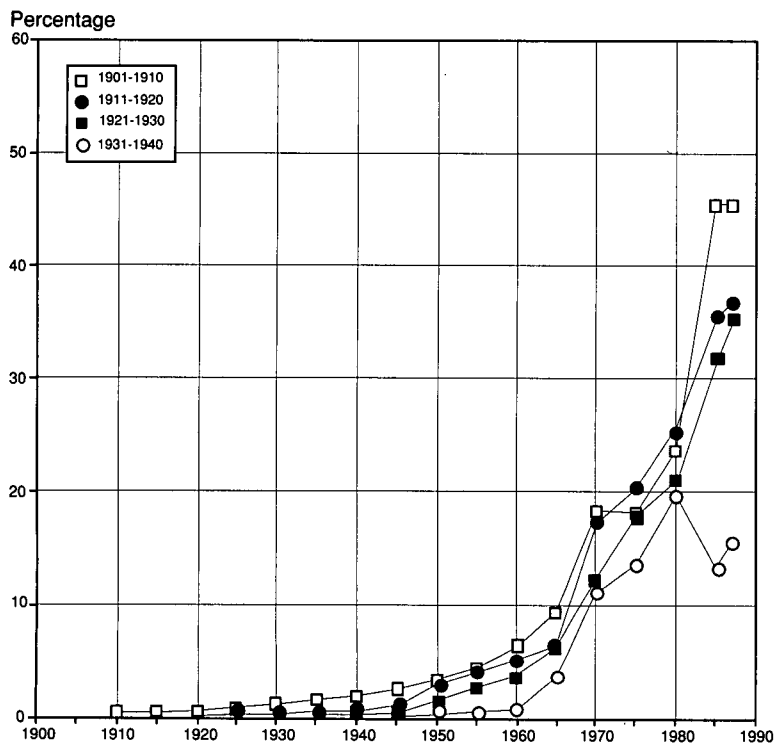
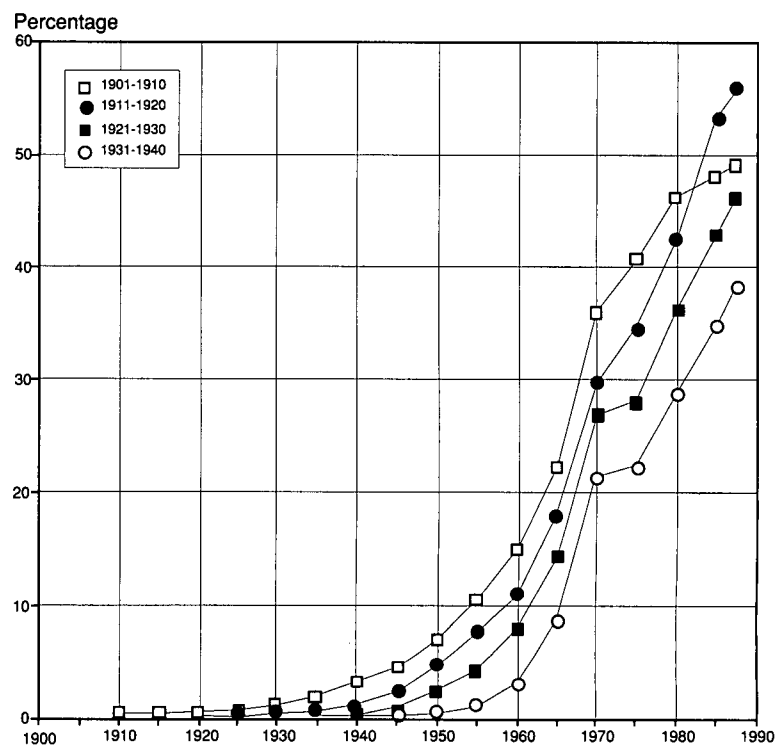


Figure 7
Percentage of former smokers, white males born from 1901 to 1940 (through 1987)



The change in the percentage of former smokers that occurs with calendar year is quite different for black males than for white males. Among the white males, a sharp upturn in the prevalence of former smokers begins in the 1950's and accelerates during the late 1960's. For black males, the prevalence of former smokers remains almost zero until the late 1960's. This difference between white and black males is even more evident when the fraction of smokers who have quit during each 5-year period (Figures 8 and 9) is plotted against the calendar year. Both black and white males show large changes in smoking prevalence during the period of counter-advertising on television (1967 to 1970), but only white males show a change in smoking behavior during the first wave of public information on the risks of tobacco use (in the mid-1950's), which relied much more heavily on print media.

The question of racial differences in source or timing of information transfer can be explored through comparison of the 5-year quit rates in the same birth cohorts of white women (Figure 10). The pattern in the white female cohorts is similar to that of black men rather than that of white men, with very little change in smoking behavior until 1965 to 1970. This suggests that the absence of an effect in black men corresponding to the early public information campaigns is not solely a racial phenomenon. The early studies of smoking-related disease risk were conducted largely with white males (US DHHS, 1982), so the absence of data on women and on black men may have prevented these groups from relating the risk information to themselves. On the other hand, the counter-advertising campaign of the late 1960's used messages and themes that addressed a range of issues in addition to health risks (Warner, 1977). This broader range of messages may have reached women and black males unaffected by the earlier health messages and may have been responsible for the greater level of smoking cessation in all racial and gender groups.

For all of the racial and gender groups, the rates of cessation plummeted when the antismoking spots were removed from television. This observation lends further support to the theory that the intensive media campaign against smoking had a profound effect on smoking behavior (US DHHS, 1989; Warner, 1977).

The provision of information to the smoker on the disease risks of smoking did not lead to successful cessation by the majority of smokers. The recognition that most smokers who wanted to quit were unable to do so on their own led to the development of programs that would produce change within smokers that would help them to break their addiction. The goals of these programs included providing smokers with the

Approaches to Influencing The Individual

Figure 8
Percentage of black male current smokers quitting over 5-year intervals

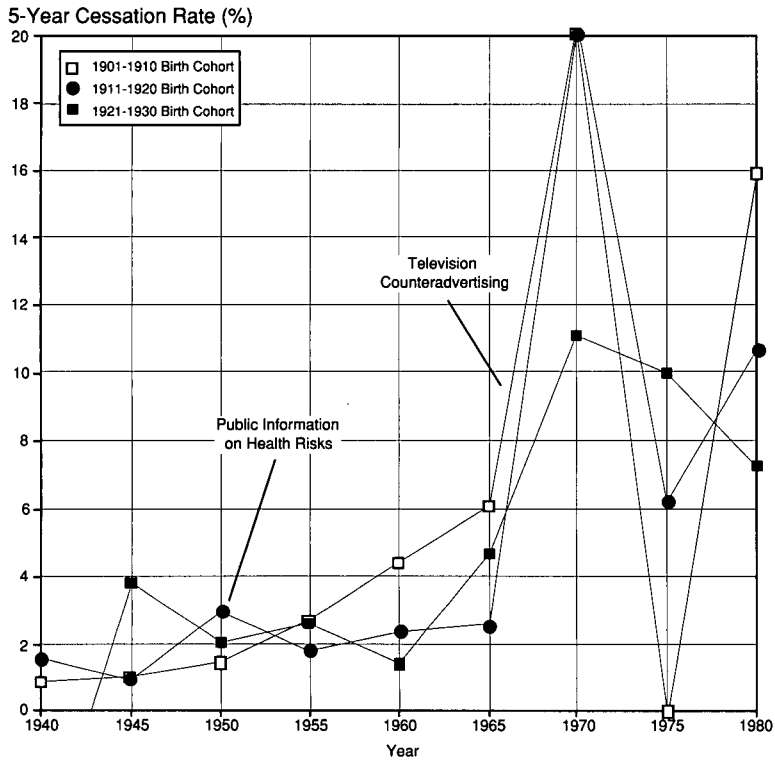


Figure 9
Percentage of white male current smokers quitting over 5-year intervals

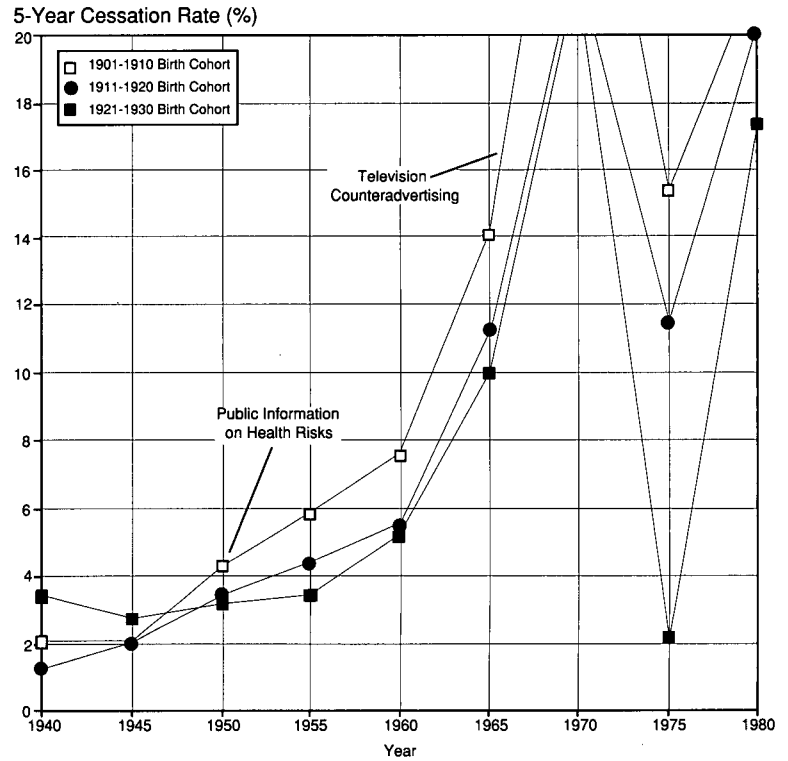
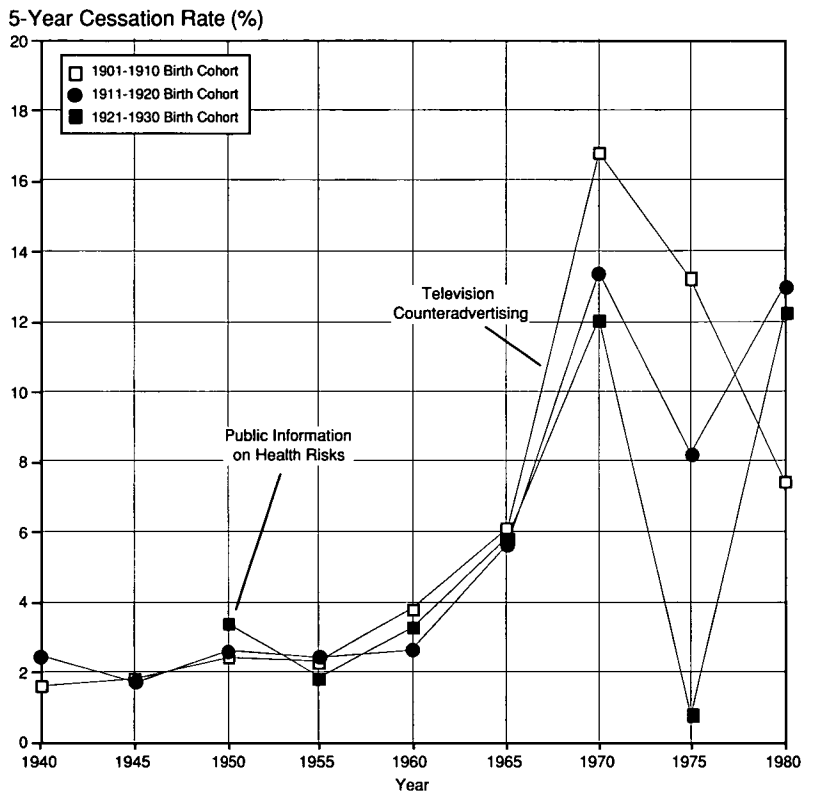


Figure 10
Percentage of white female current smokers quitting over 5-year intervals



tools to change their behavior, changing the behavioral conditioning surrounding smoking, and altering the coping strategies used by smokers (see Chapter 4). However, the common link in all of these approaches was the attempt to alter the individual so that he or she could make the desired change in behavior in spite of environmental influences that promote smoking.

It was believed that the individual could be strengthened and retrained to eliminate dependence on cigarettes, and the multicomponent programs described in this volume have demonstrated that it is possible to produce long-term cessation in a large proportion of smokers willing to complete these programs. The major problem with clinic-based cessation programs has been the difficulty of convincing smokers to participate. An overwhelmingly large percentage of those who successfully quit smoking, and an even larger fraction of those who *attempt* to quit, do not use a clinic-based cessation program but try to quit on their own (Fiore et al., 1990; US DHHS, 1990b).

A companion problem has been program costs. One concept that emerges from evaluations of the various clinic programs presented in Chapter 2 is that the more intensive the program, the more likely it is to be successful. Programs with a greater number of sessions, professional rather than volunteer leaders, and more extensive followup and maintenance support show better results. As a result, the current state-of-the-art clinic-based cessation programs are expensive in time, energy, and dollars. The high costs for individuals, for insurance companies, and for health care providers are barriers to access.

It is unlikely, however, that cost alone is the major reason why clinic-based cessation programs get little use, since other, more expensive prevention efforts (such as diagnosis and management of essential hypertension) have enjoyed excellent results. It is more likely that the major limitation is the low demand for these programs by U.S. smokers. The long-term financial benefit for the individual and for society may outweigh the short-term cost, but those short-term costs, coupled with smokers' perceptions of little need for the programs, have markedly constrained the impact of clinic-based cessation programs on the prevalence of smoking.

Approaches to Influencing The Environment

The limited impact of clinic-based cessation programs, together with growing recognition of the importance of environmental factors in smoking behavior, led to the shift in tobacco control strategies described in Chapter 5. The association of shifts in global measures of U.S. tobacco use, such as per capita consumption, with changes in the environment, such as the shrinking social acceptability of smoking, has led to attempts to alter those environmental factors as a means of altering smoking behavior.

Raising the cost of cigarettes as a public health strategy has been accomplished through increased excise tax on tobacco, and the manufacturers have also substantially increased the cost of cigarettes (Grise, 1991). As described in Chapter 5, increases in the excise tax have generally resulted in a substantial and immediate fall in cigarette consumption, but the effect dissipates with time (Tobacco Institute, 1990). The experience in California, which raised its excise tax on tobacco by 25 cents on January 1, 1989, is presented in Figure 11, wherein California's per capita cigarette consumption is contrasted with that for the rest of the United States (California Department of Health Services, 1990). There was a rapid decline in per capita consumption coinciding with the California tax increase that was not present in the rest of the country. Analysis of those data suggests that there was a 5 percent decline in per capita cigarette consumption attributable to the increase in the tax (J. Elder, personal communication).

Figure 11
Impact of California state tax increase on per capita consumption of cigarettes, adults aged 18 and over

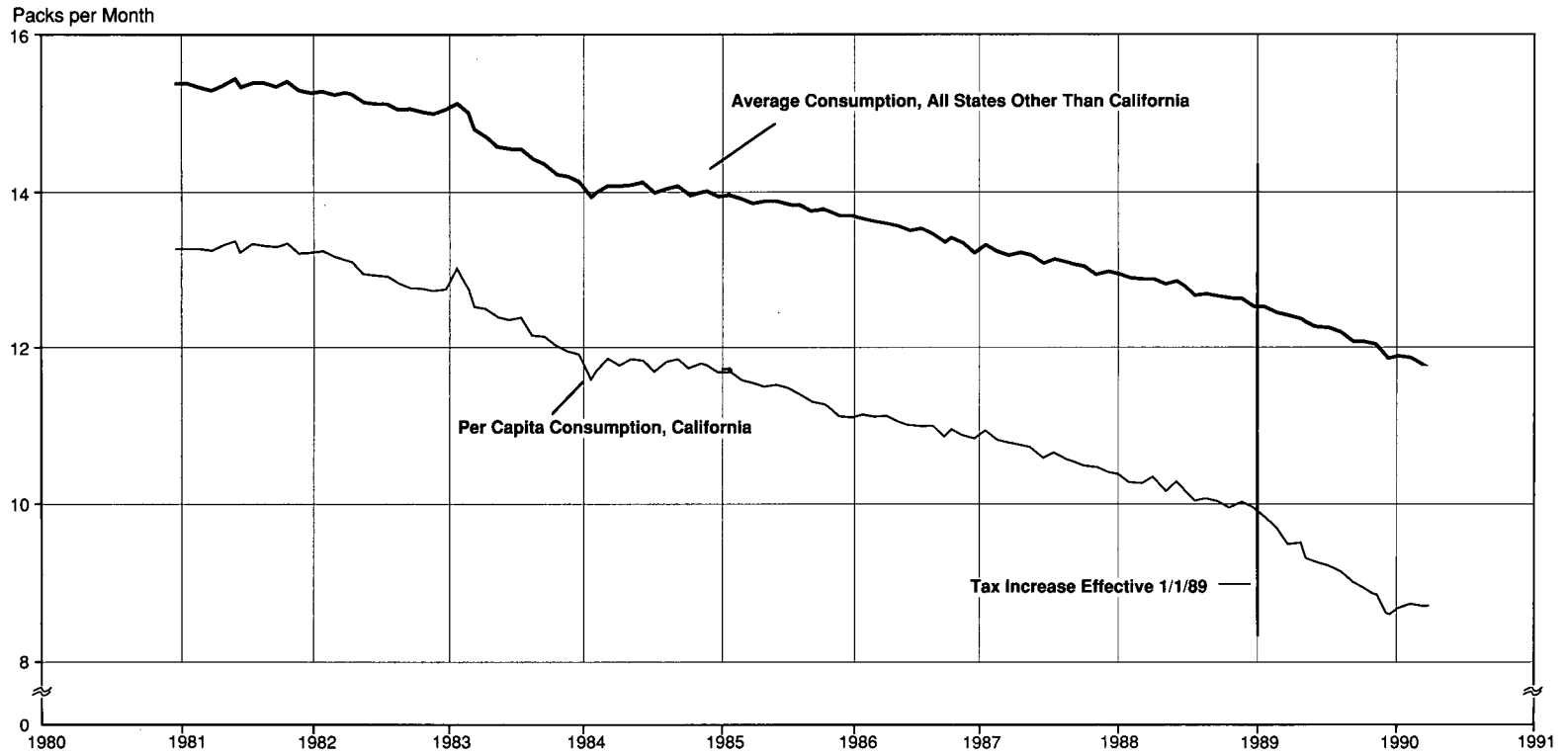
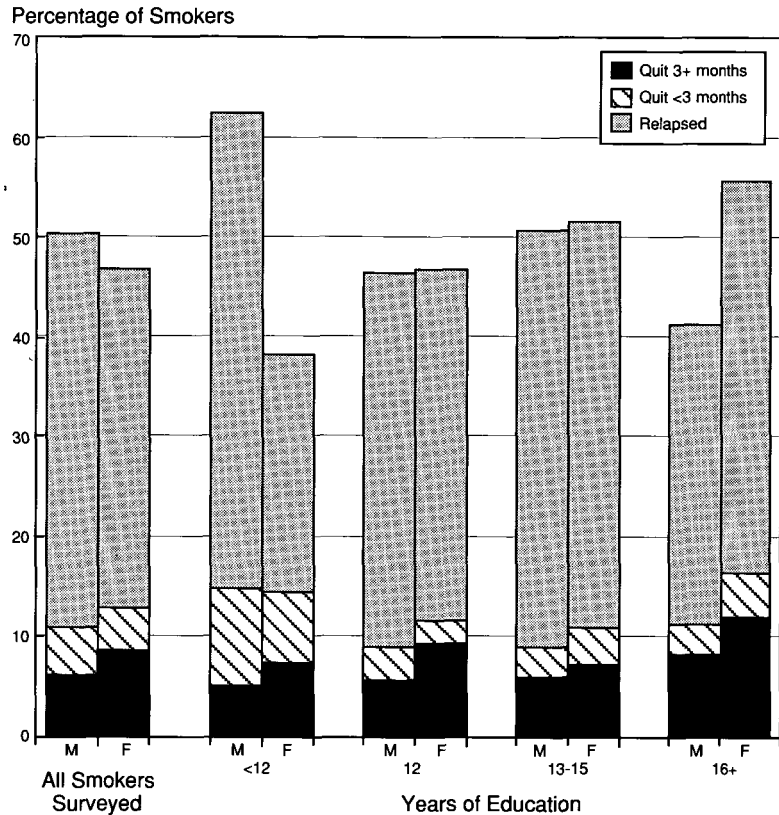


Figure 12
Smoking relapse rates, by gender and level of education
(California smokers, 1990)



One concern about using cost as a strategy to control tobacco use has been that the resulting decreases in tobacco consumption may be transitory; they may reflect large numbers of smokers trying to quit around the time of the tax increase, then relapsing, with no long-term change in the prevalence of smoking in the population. Evidence to support this concern is provided by a survey of California smokers conducted 18 months after the 1989 excise tax increase (California Department of Health Services, 1990). Figure 12 shows the status of all those who had been smoking 12 months prior to the survey. About one-half of those Californians who had been smoking 12 months prior to the survey made an attempt to quit, in contrast to approximately one-third of smokers in national surveys. However, the fraction of those who were smoking 12 months previously and who currently had been nonsmokers for 3 months or more is no larger in California than in the national surveys. This suggests that the tax may

have stimulated an increase in the number of cessation *attempts* but not increased the number of smokers *able to quit* successfully.

Because the majority of current smokers began smoking before the age when it is legal to buy cigarettes in most states, the access of minors to cigarettes is seen as an important precondition for the initiation of smoking behavior (US DHHS, 1989). The disparity between the consequences of cigarette use and the availability of cigarettes to minors through legitimate channels is greater than for any other dependence-producing substance in our society. More than 80 percent of children are able to purchase cigarettes over the counter, and minors essentially have no difficulty buying cigarettes from vending machines (see Chapter 4). The fact that this country's single largest cause of death and disability is sold to children through unattended vending machines has galvanized legislators in an increasing number of jurisdictions to restrict or ban the sale of cigarettes through vending machines (Tobacco-Free America, 1990), and it has promoted efforts to educate merchants and enforce the law prohibiting sales to minors (US DHHS, 1990c).

The social acceptability of cigarette smoking has been declining since at least the early 1970's (US DHHS, 1989). This decline is based on concerns about the disease risks of exposure to environmental tobacco smoke as well as irritation and annoyance produced by exposure to others' tobacco smoke. By early 1971, the probability that environmental tobacco smoke exposure could cause a substantial disease risk had been clearly announced by then U.S. Surgeon General, Jesse L. Steinfeld, M.D. (Steinfeld, 1972). The body of scientific data on this topic that developed subsequently and the national reviews of those data (US DHEW, 1972, 1975, and 1979; US DHHS 1982 and 1986; National Research Council, 1986; U.S. Environmental Protection Agency, in press) have led to increasing restrictions on where smoking is allowed (Pertschuk and Shopland, 1989). Regulations that established separate seating areas in airplanes and restaurants and banned smoking in public places put smokers on notice that their behavior annoyed a substantial number of nonsmokers, and the new rules empowered those nonsmokers to express that annoyance. The outcome was a slow but steady erosion of the rewards of smoking and a change in the smoker's self-image. A large part of the smoker's dependence on the cigarette is conditioned by the personal psychological and sociological utility of smoking. Removing this utility undercuts the foundation of tobacco addiction.

A more recent outgrowth of the increasing concern about the risks associated with exposure to environmental tobacco smoke has been absolute bans on smoking at worksites, on airlines, and in other locations (Shopland et al., 1990) (see

Chapter 5). These bans reinforce the social unacceptability of smoking by incorporating it into the norms for workplace behavior, and they keep the smoker from smoking on the job. Eliminating smoking at work may prevent young smokers from learning to use the cigarette to deal with workplace stress and may give older smokers experience in coping with life stresses without cigarettes, thereby improving their chances for success when they try to quit smoking. In addition, a smoker who has quit may be less likely to relapse in a work environment where smoking is not permitted.

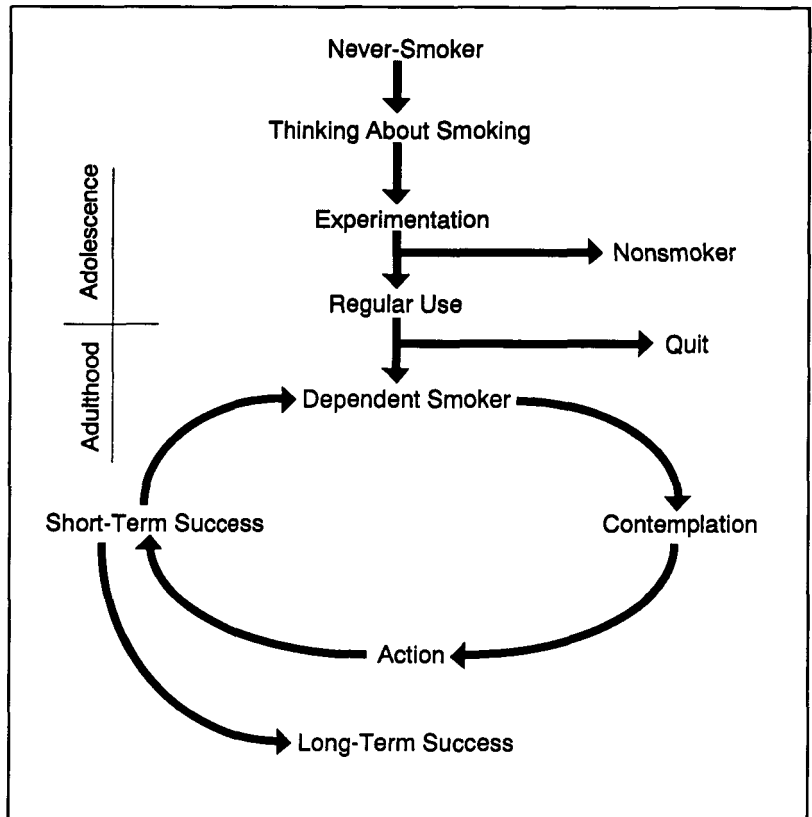
The specific relationship of advertising and promotion to smoking initiation and tobacco use is not clear, but it is clear that tobacco advertising presents images of smoking and smokers that are attractive to adolescents (Fischer et al., 1989). A concern is that the advertising images are most attractive to those adolescents with the least objective verification of their self-worth from their own social environment. This effect may explain the differences in smoking behavior between adolescents in school and adolescents who have dropped out (Pirie et al., 1988). The potential effect of advertising on the most vulnerable segments of society has led to efforts to restrict tobacco advertising and promotion at both national and local levels.

COMPREHENSIVE CONTROL STRATEGIES

As the focus of control strategies expanded beyond the individual to include the environmental factors described above, our understanding of smoking initiation and cessation also expanded. Researchers and health educators came to recognize that both smoking initiation and smoking cessation are dynamic, multistage processes, rather than linear, dichotomous events (Prochaska and DiClemente, 1986). It was also understood that smoking could be attacked at multiple stages in these processes and that different strategies could affect different stages with potentially synergistic outcomes. Programs that alter environmental influences, such as media campaigns, have proven much more effective when they are supported by resources to help individual smokers in their cessation efforts (see Chapter 5).

The current state of the art in controlling tobacco use combines multiple environmental changes with multiple programs directed to individuals in different stages of the initiation and cessation processes. It recognizes that no single approach is best for all smokers and that different smokers are most attracted to and most affected by different programs. Perhaps more importantly, it recognizes that no single channel reaches all smokers and that no single time is best for all smokers to make an attempt to quit. Comprehensive strategies are characterized by the delivery of persistent and inescapable messages to quit, or to not start, smoking, coupled with continuously available support for individual cessation efforts

Figure 13
Processes of smoking initiation and cessation

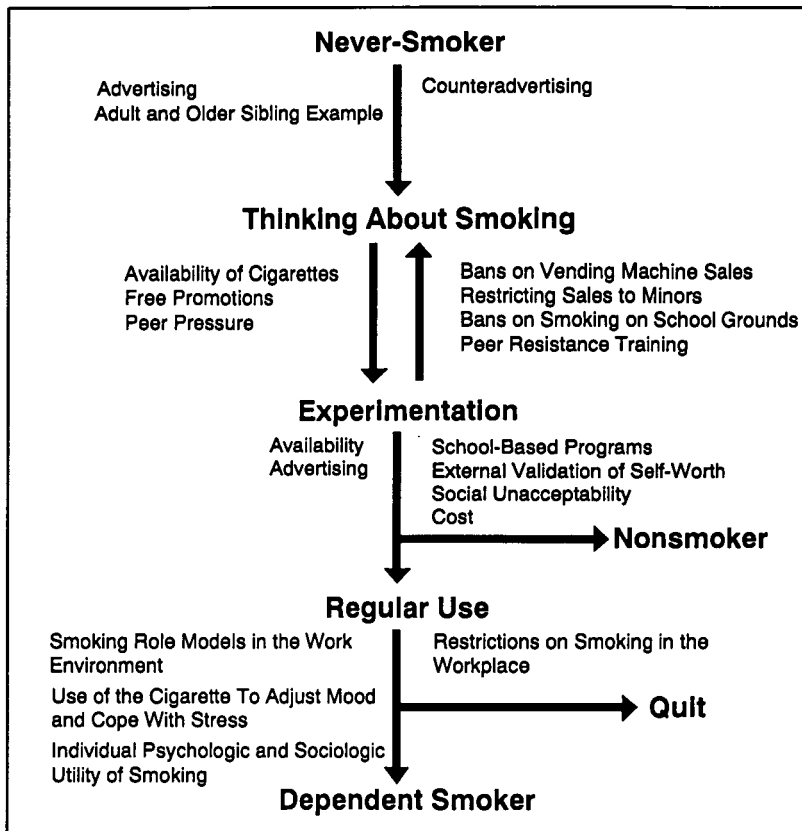


provided through multiple channels, and reinforced by environmental incentives for nonsmokers.

One formulation of the processes involved in cigarette initiation and cessation is presented in Figure 13. Exploration and initiation of regular cigarette use is largely confined to adolescents, with the transition from regular use to dependence during late adolescence and early adulthood. Experimentation with cigarettes and initial use is heavily influenced by issues that are active during adolescent development, whereas dependent use of cigarettes develops when smokers incorporate the personal psychological and sociological utility of smoking into the methods by which they function in and cope with the adult world. Many adolescents experiment with tobacco use but never become regular smokers, and some adolescent regular smokers stop before they become dependent on cigarette use.

The process of quitting smoking is often a cyclical one, with the smoker making many attempts to stop before finally

Figure 14
Forces that influence adolescent progression into adult smoking



gaining success. About one-third of current smokers attempt to quit each year, but 90 percent or more of those attempts fail (Pierce and Hatziandreu, 1989). Clearly, those who have unsuccessfully tried to quit need to be motivated to try again. A useful conceptualization of the cessation process is one in which smokers cycle through the stages of cessation, and each time smokers go through the cycle, a few more succeed in their efforts to quit. One goal of control strategies, then, is moving smokers from one stage of the cessation cycle to another, rather than using long-term cessation as the only goal and outcome measure of a program.

Affecting the Initiation Process

The development of tobacco dependence is not sudden, and the process of initiating tobacco use is a gradual one that probably begins early in adolescence or preadolescence. As outlined in Figure 14, the first step in the process is thinking about smoking cigarettes, and as children move into their teen years, a substantial fraction change from believing that they

will never use cigarettes to considering experimentation with smoking. The omnipresent images from tobacco advertising of the smoker as a confident, attractive, and secure individual (Tye, 1985), as well as examples of adult and older sibling smokers, are powerful inducements for children to perceive smoking as an entry into adulthood. Counteradvertising that creates a negative image of the smoker—for example, the smoker as inadequate and less mature—can be used in an effort to offset these influences.

The transition from thinking about smoking to having the first cigarette may not lead irreversibly to adult smoking, but clearly it is an important milestone in that passage. The widespread availability of cigarettes to teenagers and, particularly, the promotional distribution of free cigarettes, many of which are given to teens either directly or indirectly, clearly facilitate the teenager's experimentation with smoking. In contrast, programs that immunize teens through assertiveness training and modeling of refusal responses can be used to block this stage of initiation (Glynn, 1989).

The change from occasional experimentation with cigarettes to regular cigarette use is critical, because with regular use the adolescent develops a body of experience in which smoking is psychologically and sociologically useful. Clearly, the ability to purchase cigarettes easily, the social rewards, and peer acceptance of the teen's smoking behavior are critical to the development of regular use. However, the images created by tobacco advertising may also play an important role. The advertising images of the smoker as a confident, physically and sexually attractive, successful, and secure adult may resonate strongly in the adolescent who desperately wants to adopt and project those images. The ability to superimpose the advertising image on his or her own inadequate self-image makes the adolescent feel better, at least temporarily, and teenagers thus begin to develop a body of experience with the use of the cigarette to adjust their internal mood. Those adolescents without external validation of their self-worth have the greatest need to adjust their self-image and thus may be more likely to use cigarettes to do so.

School-based health education programs and programs that raise adolescents' self-esteem, as well as efforts to restrict advertising and promotional activities, are aimed at altering the transition to regular smoking (Glynn, 1989). Raising the cost of cigarettes, because adolescents have limited disposable income, and increasing the social unacceptability of smoking, even among teens, are further barriers to the transition.

Progressing from regular use to dependent use requires that the utility of tobacco use persist after the pervasive anxieties of

adolescence dissipate. For utility of the cigarette to continue, cigarette smoking has to be allowed in those situations when the smoker wants to use the cigarette. For smokers to learn to use cigarettes to handle stress at work, they must be allowed to smoke at the time when those stresses occur. If smoking is banned in the worksite, not only do smokers learn to not use the cigarette to cope with those stresses, but also they are obligated to develop alternative mechanisms to handle stress, and those mechanisms may be substituted for smoking in other settings as well.

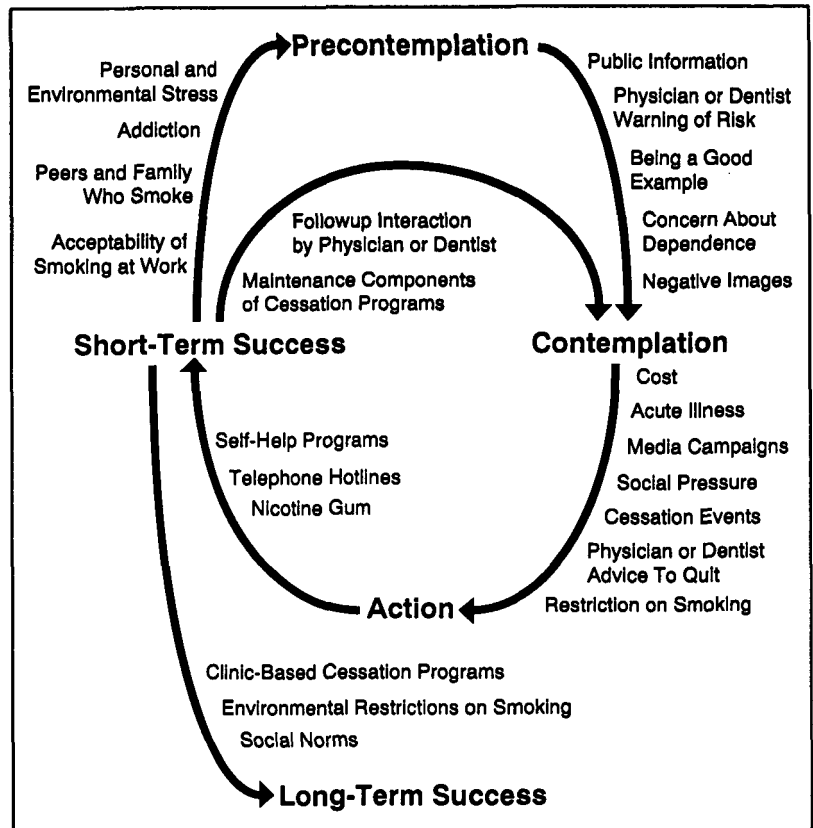
The socialization of an adolescent into the workforce may include powerful social reinforcement for smoking behavior, particularly in the military environment. Older role models and social norms that promote smoking can increase the utility of smoking for the young smoker and facilitate the transition to dependency. Conversely, the elimination of smoking from the worksite and the development of workplace norms that discourage smoking may weaken the dependence on tobacco and increase the development of other coping skills.

Affecting the Cessation Process

The majority of smokers want to quit, and this desire culminates in attempts to quit by approximately one-third of smokers each year (Pierce and Hatziafreu, 1989). The cyclical pattern of not thinking about quitting (precontemplation), thinking about quitting (contemplation), and attempting to quit—with success or failure—generates a new set of nonsmokers each time a group of smokers passes through the cycle (Prochaska and DiClemente, 1986). One formulation of the process of cessation, and the points at which specific smoking control interventions can influence the stages of cessation, is presented in Figure 15. The diagram is a simplification of the effects of smoking control efforts, but it gives an overview of the possible interactions in a comprehensive control program.

Many environmental influences and programs for controlling tobacco use are intended to influence smokers at different points in this cycle. Public information campaigns that present the risks associated with smoking are intended to move smokers from the precontemplation to the contemplation stage, as is personalizing of the risk of smoking through physicians' warnings. However, there are other reasons why smokers think about quitting, including concerns about addiction to cigarettes and interest in being a good example. Recently the negative image of the smoker and the social unacceptability of smoking have also provided strong reasons why smokers think about quitting. Individual programs to control tobacco use can aim and have been aimed at altering the frequency and intensity with which these motivational issues are presented to the smoker.

Figure 15
Process of cessation



The move from thinking about quitting to making an attempt to quit is often triggered by a variety of environmental stimuli. The data from California presented above suggest that an increase in the cost of cigarettes can be a powerful trigger for cessation attempts.

A physician's or dentist's advice to quit smoking, particularly when it is related to an acute illness, also is a powerful trigger for cessation, with up to half of the patients who are advised to quit making a cessation effort (US DHHS, in press). Media campaigns, especially when coupled with cessation events such as the Great American Smokeout, also can trigger cessation attempts by large numbers of smokers (Gunby, 1984). Changes in workplace rules to restrict smoking on the job have been associated with attempts to quit by a substantial number of workers.

Triggering cessation efforts, whether or not they succeed, is an important strategy because each round of cessation activity results in a few more nonsmokers. The large proportion of smokers who attempt to quit each year is a testament to the success of those components of the control effort that are designed to move smokers from precontemplation to contemplation and from contemplation to action. The major gap in current control efforts is in converting cessation attempts into long-term successes.

Self-help programs, telephone hotlines, and nicotine gum are all useful enhancers of short-term success in smoking cessation, and clinic-based programs have a substantial benefit for long-term cessation for those who can be recruited to participate (Schwartz, 1987). However, the major barriers to long-term success remain difficult to alter and, with the exception of addiction, are largely in the smoker's environment. They include social norms and workplace rules that promote smoking and facilitate relapse, the continued smoking behavior of peers and family members, and unusual episodes of stress that lead the smoker to fall back on old coping strategies, including smoking. Long-term success remains the most elusive component of a comprehensive strategy to control tobacco use; however, the prospect of continued changes in social norms and tighter restrictions on where smokers can smoke offers hope that even this component may show improvement in the future.

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