

Chapter 8

A Vision for the Future

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Introduction

This report of the Surgeon General on the health effects of smoking returns to the topic of the first Surgeon General's report on active smoking and disease. This current report discusses many diseases associated with smoking including cancer, cardiovascular diseases, respiratory diseases, reproductive effects, and other adverse health consequences, and also updates prior estimates of the burden of diseases caused by smoking.

The courses of action highlighted below are potential next steps presented by the Surgeon General.

Given his role as the nation's spokesman on matters of public health, these recommendations represent a vision for the future built on information available today. They do not constitute formal policy statements, but are intended to inform and guide policymakers, public health professionals, professional and advocacy organizations, researchers, and most important, the American people, to ensure that efforts to prevent and control tobacco use are proportionate to the harmful effects it causes.

Tremendous Progress Since 1964

The publication of the first Surgeon General's report on smoking and health in January of 1964 (U.S. Department of Health, Education, and Welfare [USDHEW] 1964) was a landmark and pivotal event in the history of public health. By that time, there was a rapidly accumulating amount of evidence on the dangers of smoking, and it was inevitable that action would follow the publication of a comprehensive expert report with the powerful conclusion that smoking causes disease. Since 1964, there has been a broad societal shift in the acceptability of tobacco use and in the public's knowledge about the accompanying health risks. In 1963, per capita annual adult consumption in the United States peaked at 4,345 cigarettes, a figure that included both smokers and nonsmokers (Giovino et al. 1994). By 2002, per capita annual consumption in this country had declined to 1,979 cigarettes, the lowest level since before the start of World War II (U.S. Department of Agriculture 2003). In 1964, the majority of men smoked and an increasing number of women were becoming smokers. Today, there are more former smokers than current smokers, and each year over half of all daily smokers try to quit (Centers for

Disease Control and Prevention [CDC] 2003a). In 1964, smoking a cigarette was viewed as a "rite of passage" by almost all adolescents. Today, only about half of all high school seniors have ever smoked a cigarette and less than one in four is a current smoker, the lowest level since researchers started monitoring smoking rates among high school seniors in the mid-1970s (University of Michigan 2003).

In 1964, smoking was permitted almost everywhere, and even the U.S. Public Health Service had logo ashtrays on its conference tables. Today, second-hand tobacco smoke is widely accepted as a public health hazard and levels of exposure among nonsmokers have declined dramatically over the last decade. In fact, there is an unprecedented level of activity to achieve clean indoor air quality at both the local and state levels. More communities and states are considering and adopting laws that are even more comprehensive in the range of venues they cover. The 1964 Surgeon General's report on smoking and health started this country on an epic process of change toward a society free of tobacco-related disease and death. Yet many challenges remain.

The Need for a Sustained Effort

Smoking remains the leading preventable cause of disease and death in the United States, resulting in more than 440,000 premature deaths each year (CDC 2002; see also Chapter 7, "The Impact of Smoking on Disease and the Benefits of Smoking Reduction"). In 1964, the list of diseases known to be caused by smoking was short: chronic bronchitis and cancers of the lung and larynx (USDHEW 1964). Each subsequent Surgeon General's report has expanded the understanding of the magnitude of the health consequences of tobacco use. According to this 2004 report, the number of diseases caused by smoking has continued to increase. The list is now so long, this report concludes that smoking harms nearly every organ of the body and causes generally poorer health. For this reason, the burden of tobacco use on the physical and economic health of this country remains staggering. Since the release of the 1964 Surgeon General's report on smoking and health, more than 12 million Americans have died prematurely due to smoking. Currently, estimates of annual smoking attributable economic costs in the United States are over \$157 billion (CDC 2002; see also Chapter 7, "The Impact of Smoking on Disease and the Benefits of Smoking Reduction").

Some may view the progress achieved in the country since 1964 as evidence that the problem has been solved. Unfortunately, the data indicate that future reductions in the morbidity, mortality, and economic costs of tobacco use will require a continuing and sustained effort. Since 1965, the overall proportion of adults in this country who are current smokers has been reduced by half; however, the rate of decline in adult smoking prevalence has slowed in recent years (CDC 2003a). Equally disturbing, the rates of smoking among some racial and ethnic minority populations and among less educated Americans remain high (CDC 2003a). Although the percentage of high school seniors who are current smokers has been reduced from 36.5 percent in 1997 to 24.4 percent in 2003, the trends in youth smoking over the last few years indicate that the rate of decline is slowing appreciably (CDC 2003d; University of Michigan 2003).

Although the level of secondhand tobacco smoke that nonsmokers are exposed to has declined significantly in the last decade, the decline has been greater among adults than among children, who are largely exposed at home. Currently, levels of exposure to this known human carcinogen are more than twice as high among nonsmoking children than among nonsmoking adults (CDC 2003c). Finally, while the knowledge that smoking can adversely affect health has become widespread among the general public, the grave health risks remain poorly understood.

In recognition of the need to enhance public understanding of these health consequences of smoking, this Surgeon General's report introduces a "Public Summary" that will serve as the foundation of a continuing effort to disseminate the findings of this report more widely and comprehensively at the national, community, and local levels (among individuals and families). In 1964, the conclusion that smoking causes lung cancer was major news; today, it is widely accepted. Unfortunately for many people, the multiple ways in which smoking damages almost every organ of the human body are not well understood.

To help educators, the media, and health professionals more fully understand the scientific basis for all of the conclusions in this Surgeon General's report, a companion database of the more than 1,600 articles cited in this report will be available for the first time on the Internet at <<http://www.cdc.gov/tobacco>>. This database will be easily accessed with readily available search criteria that can create detailed evidence tables related to each of the health topics reviewed in this report, such as cancer risks at individual organ sites, various types of cardiovascular and lung risks and diseases, reproductive health effects, and other health outcomes. This comprehensive database will be regularly updated as new studies are published and as the scientific knowledge about the health consequences of tobacco use continues to expand. Thus, it will be a living resource that health professionals and the general public can use to keep up with the latest findings.

The Need for a Comprehensive Approach

The 2000 Surgeon General's report, *Reducing Tobacco Use*, provided a detailed framework for comprehensive tobacco use prevention and control efforts: educational, clinical, regulatory, economic, and social approaches (U.S. Department of Health and Human Services [USDHHS] 2000). That report noted that "...our recent lack of progress in tobacco control is attributable more to the failure to implement proven strategies than it is to a lack of knowledge about what to do" (USDHHS 2000, p. 436). A comprehensive approach—one that optimizes synergy from a mix of educational, clinical, regulatory, economic, and social strategies—has emerged as the guiding principle for effective efforts to reduce tobacco use.

There is a very strong scientific base to guide these sustained efforts. In addition to recent Surgeon General's reports, the Community Preventive Services Task Force, the U.S. Public Health Service, and other professional bodies have reviewed the efficacy of specific strategies (Fiore et al. 2000; *American Journal of Preventive Medicine* 2001). Additionally, CDC's *Best Practices for Comprehensive Tobacco Control Programs* provides a broad framework for comprehensive statewide tobacco control programs (CDC 1999). Recent analyses of evidence from these state programs conclude that the magnitude and rate of change in smoking behaviors are significantly related to the level and continuity of investments in comprehensive program efforts (Farrelly et al. 2003; Stillman et al. 2003). The results from these programs indicate that reducing youth initiation rates, promoting smoking cessation,

and increasing protections for nonsmokers from secondhand tobacco smoke exposure necessitate changing many facets of the social and policy environments. Thus, *Best Practices* provides effective guidance for efforts at the state level, but a comprehensive national tobacco control effort requires strategies that go beyond guidance to the states. Based on the evidence reviewed in *Reducing Tobacco Use* (USDHHS 2000), a comprehensive national effort should involve a broad mix of strategies. That report also noted that some of the program and policy changes needed within these strategies can be most effectively addressed at the national level.

There is a need for a continuing and sustained national tobacco use prevention and control effort. Many factors encourage tobacco use in this country: the positive imagery of smoking in movies and in the popular culture, the billions of dollars spent by the tobacco industry to advertise and promote cigarettes (e.g., \$11.2 billion in 2001 [Federal Trade Commission 2003]), acceptance of secondhand smoke in public places, and the perception by some that the problem has been solved. Additionally, funding levels for many effective state and national counter-advertising campaigns were recently reduced. We know enough to take action. As in many areas of public health, there is a need to improve the dissemination, adoption, and implementation of effective, evidence-based interventions, and to continue to investigate new methods to prevent and reduce tobacco use.

Continuing to Build the Scientific Foundation

Progress in tobacco control always has been built upon a foundation of conclusive scientific knowledge. Each of the previous 27 Surgeon General's reports on smoking and health has contributed to this ever-enlarging foundation not only about the health consequences of tobacco use, but also about effective strategies to prevent tobacco use among youth, to help current tobacco users quit, and to protect nonsmokers from exposure to secondhand tobacco smoke.

Progress in tobacco control always has been built upon a foundation of conclusive scientific knowledge. Each of the previous 27 Surgeon General's reports on smoking and health, as well as numerous other publications, have contributed to this ever-enlarging foundation of data. These reports include information about the health consequences of tobacco use, effective strategies to prevent tobacco use among young people and to help current tobacco users quit, and approaches to

protect nonsmokers from exposure to secondhand tobacco smoke (Fiore et al. 1996, 2000; National Cancer Institute 1999, 2001). Nevertheless, there are scientific questions remaining to be addressed on the adverse health effects of tobacco use, methods for the efficient surveillance of the tobacco-related epidemic, strategies to eliminate tobacco-related disparities, and innovative approaches for the prevention of tobacco use and treatment of nicotine addiction.

One major topic in need of more research is to complete the understanding of the mechanisms by which tobacco-related diseases are caused. A greater understanding of these causal mechanisms should have implications for disease prevention that extend to agents other than smoking. This report reviews the association between smoking and cancer, cardiovascular diseases, respiratory diseases, reproductive effects, and other health consequences, and defines a variety of specific research questions and issues related to the biologic mechanisms by which the multiple toxic agents in tobacco products and tobacco smoke cause specific adverse health outcomes. For example, the lung remains the primary site for elevated tobacco-related cancer risk; however, during the past 40 years, the type of lung cancer caused by smoking has changed for reasons still unknown. Similarly, as the evidence that smoking damages the heart and circulatory system and is a primary preventable cause of heart disease and stroke continues to expand, important research questions remain about how smoking interacts with other cardiovascular risk factors and accelerates the atherosclerotic disease process. With respect to these and the other research questions, the public health message remains the same: smoking greatly increases the risk of many adverse health effects. Therefore, never start smoking or quit as soon as possible.

For several organ sites, there is a need for more evidence regarding the possible causal role of smoking on cancer risk (see Chapter 2, "Cancer"). For prostate and colorectal cancers, the evidence is suggestive but not sufficient to determine a possible causal relationship. For breast cancer, even though there is no evidence overall for a causal role of smoking, on a genetic basis some evidence suggests that some women may be at an increased risk if they smoke. For other sites such as the liver, confounding exposures to other risk factors have made the evaluation of the risk of smoking very complex, but this report finds the evidence to be suggestive of causation. There should be further research on those sites where the evidence is

suggestive but not yet sufficient to warrant a causal conclusion. As this new evidence emerges it will be evaluated using the causal criteria and standardized language applied in the Surgeon General's reports to express the strength of the evidence bearing on causality for all adverse health effects of smoking. As new evidence emerges with respect to the research questions raised in this report, the individual chapter conclusions in this report will be re-evaluated.

Chapter 6, "Other Effects," of this report concludes that, overall, smokers are less healthy than nonsmokers. Most often the risks of smoking are discussed with respect to a specific cancer, to heart disease, or to respiratory disease risk. Unfortunately, because smoking is such a powerful cause of disease, most smokers suffer from adverse health effects in many parts of their bodies at once. Additionally, before a death from one of the diseases caused by smoking, which is often quite premature, many smokers live for years with a diminished quality of life from the burden of chronic and disabling health effects (e.g., reduced breathing capacity, poor heart functioning, greater susceptibility to lung infections, visual loss due to cataracts, and others). More research emphasis needs to be placed on the broad health consequences of smoking—namely, how smoking has a negative impact on many aspects of the body at the same time, and how these multiple adverse health effects combine to produce an overall reduced quality of life and greater health care costs prior to causing premature death. Recently, preliminary estimates indicated that for every premature death caused each year by smoking, there were at least 20 smokers living with a smoking-related disease (CDC 2003b).

This report highlights the diversity of the health effects caused by smoking, and how dramatically smoking affects the risk of the leading causes of death in this country (e.g., cancer, heart disease, respiratory disease). These findings emphasize that tobacco prevention and control should be key elements in a national prevention strategy for all of these major causes of death. Additionally, there is great disparity in tobacco-related disease and death among populations and the need to address the research gaps that exist for many special populations. Research is needed not only on disease outcome but also on the development of more effective strategies to reach and involve high risk populations (e.g., race/ethnicity, low income, low education, the unemployed, blue-collar and service workers, and heavily addicted smokers).

Finally, more research is needed on how changing tobacco products, as well as pharmaceutical products, have affected and could continue to affect health. In this report, one major conclusion finds that cigarettes with lower machine-measured yields of tar and nicotine (i.e., low-tar/nicotine cigarettes) have not produced a lower risk of smoking-related diseases. Yet there are rapidly growing numbers of modified tobacco products characterized as Potentially Reduced Exposure Products (PREPs) (Institute of Medicine 2001). Research has demonstrated that with the expectation of reducing risk, many smokers switched to low machine-measured tar/nicotine cigarettes, and may thus have been deterred from quitting (National

Cancer Institute 2001). Therefore, it is critically important that the health risks of the emerging PREPs be evaluated comprehensively and quickly to avoid a replication of that unfortunate low-tar/nicotine cigarette experience. Research on the biologic mechanisms by which the multiple toxic agents in tobacco products and tobacco smoke cause specific adverse health outcomes can help establish an important scientific foundation for evaluating the potential health effects of PREPs. Similarly, the public health and policy implications of changes in manufactured cigarettes, other tobacco-containing products, and pharmaceutical products will require the continued attention of public health researchers and policymakers.

Tobacco Control in the New Millennium

As the world enters this new millennium, it is faced with many new public health challenges even as many of the old risks to good health remain. During the last 40 years, people have become increasingly more aware of the adverse health consequences of tobacco use. Currently, tobacco use is the leading cause of preventable illness and death in this nation, in the majority of other high-income nations, and increasingly in low- and middle-income nations. Unfortunately, the high rates of tobacco-related illnesses and deaths will continue until tobacco prevention and control efforts worldwide are commensurate with the harm caused by tobacco use. At the start of the last century, lung cancer was a very rare disease. Now lung

cancer is the leading cause of cancer deaths in both men and women in this country (see Chapter 2, "Cancer"; USDHHS 2001). Our success in reducing tobacco use during the last 40 years has led to a reversal in the epidemic of lung cancer among men; nationwide, rates of lung cancer deaths among men have declined since the early 1990s (Weir et al. 2003). In California, where there has been a comprehensive tobacco control program in place since 1989, reductions in rates of tobacco-related disease and deaths already have been observed (CDC 2000; Fichtenberg and Glantz 2000; Scott et al. 2003). If we apply what we know works, we can make lung cancer a rare disease again by the end of this century!

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