

# Chapter 1. Introduction and Summary of Conclusions

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## Introduction

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This is the second report of the U.S. Surgeon General devoted to women and smoking. The first was published in 1980 (U.S. Department of Health and Human Services [USDHHS] 1980), 16 years after the initial landmark report on smoking and health of the Advisory Committee to the Surgeon General appeared in 1964 (U.S. Department of Health, Education, and Welfare [USDHEW] 1964). The 1964 report summarized the accumulated evidence that demonstrated that smoking was a cause of human cancer and other diseases. Most of the early evidence was based on men. For example, the report concluded, “Cigarette smoking is causally related to lung cancer in men.... The data for women, though less extensive, point in the same direction” (USDHEW 1964, p. 37). By the time of the 1980 report, the evidence clearly showed that women were also experiencing devastating health consequences from smoking and that “the first signs of an epidemic of smoking-related disease among women are now appearing” (USDHHS 1980, p. v). The evidence had solidified later among women than among men because smoking became commonplace among women about 25 years later than it had among men. However, it was still deemed necessary to include a section in the preface of the 1980 report titled “The Fallacy of Women’s Immunity.” In the two decades since, numerous studies have expanded the breadth and depth of what is known about the health consequences of smoking among women, about historical and contemporary patterns of smoking in demographic subgroups of the female population, about factors that affect initiation and maintenance of smoking among women (including advertising and marketing of tobacco products), and about interventions to assist women to quit smoking. The present report reviews the now massive body of evidence on women and smoking—evidence that taken together compels the Nation to make reducing and preventing smoking one of the highest contemporary priorities for women’s health.

A report focused on women is greatly needed. No longer are the first signs of an epidemic of tobacco-related diseases among women being seen, as was the case when the 1980 report was written. Since 1980, hundreds of additional studies have expanded what is known about the health effects of smoking among women, and this report summarizes that knowledge. Today the Nation is in the midst of a full-blown

epidemic. Lung cancer, once rare among women, has surpassed breast cancer as the leading cause of female cancer death in the United States, now accounting for 25 percent of all cancer deaths among women. Surveys have indicated that many women do not know this fact. And lung cancer is only one of myriad serious disease risks faced by women who smoke. Although women and men who smoke share excess risks for diseases such as cancer, heart disease, and emphysema, women also experience unique smoking-related disease risks related to pregnancy, oral contraceptive use, menstrual function, and cervical cancer. These risks deserve to be highlighted and broadly recognized. Moreover, much of what is known about the health effects of exposure to environmental tobacco smoke among nonsmokers comes from studies of women, because historically men were more likely than women to smoke and because many women who did not smoke were married to smokers.

In 1965, 51.9 percent of men were smokers, whereas 33.9 percent of women were smokers. By 1979, the percentage of women who smoked had declined somewhat, to 29.9 percent. However, the decline in smoking among men to 37.5 percent was much more dramatic. The gender gap in adult smoking prevalence continued to close after the 1980 report, but since the mid-1980s, the difference has been fairly stable at about 5 percentage points. In 1998, smoking prevalence was 22.0 percent among women and 26.4 percent among men. The gender difference in smoking prevalence among teens is smaller than that among adults. Smoking prevalence increased among both girls and boys in the 1990s. In 2000, 29.7 percent of high school senior girls and 32.8 percent of high school senior boys reported having smoked within the past 30 days (University of Michigan 2000).

In recent years, some research has suggested that the impact of a given amount of smoking on lung cancer risk might be even greater among women than among men, that exposure to environmental tobacco smoke might be associated with increased risk for breast cancer, and that women might be more susceptible than men to weight gain following smoking cessation. Other research indicated that persons with specific genetic polymorphisms may be especially susceptible to the effects of smoking and exposure to environmental tobacco smoke. These issues remain

active areas of investigation, and no conclusions can be drawn about them at this time. Nonetheless, knowledge of the vast spectrum of smoking-related health effects continues to grow, as does knowledge that examination of gender-specific effects is important.

Smoking is one of the most studied of human behaviors and thousands of studies have documented its health consequences, yet certain questions and data needs exist with respect to women and smoking. For example, there is a need to better understand why smoking prevalence increased among teenage girls and young women in the 1990s despite the overwhelming data on adverse health effects; to identify interventions and policies that will prevent an epidemic of tobacco use among women whose smoking prevalence is currently low, including women in certain sociocultural groups within the United States and women in many developing countries throughout the world; to study the relationship of active smoking to diseases among women for which the evidence to date has been suggestive or inconsistent (e.g., risks for menstrual cycle irregularities, gallbladder disease, and systemic lupus erythematosus); to increase the data on the health effects of exposure to environmental tobacco smoke on diseases unique among women; to provide additional research on whether gender differences exist in susceptibility to nicotine addiction or in the magnitude of the effects of smoking on specific disease outcomes; and to determine whether gender differences exist in the modifying effects of genetic polymorphisms on disease risks associated with smoking. Many studies of smoking behavior and of the health consequences of smoking have included both females and males but have not reported results by gender. Investigators should be encouraged to report gender-specific results in the future.

## **Preparation of the Report**

This report of the Surgeon General was prepared by the Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. It was produced with the assistance of experts in epidemiology, pharmacology, the behavioral sciences, medicine, and public health policy. Initial drafts were produced by more than 60 scientists who were selected because of their expertise and familiarity with the topics covered in this report. Their contributions were compiled into four major chapters that then underwent peer review by more than 80 experts, and the

drafts were revised by the editors on the basis of the experts' feedback. Subsequently, the report was reviewed by various institutes and agencies within the Department of Health and Human Services, which resulted in final revisions to the report.

Because numerous experts contributed to this report, with varying preferences of terms to report outcome measures and statistical significance, the editors chose certain simplifying conventions to report research results. In particular, the term "relative risk" generally was adopted throughout the report for ratio measures of association—whether original study results were reported as relative risks, estimated relative risks, odds ratios, rate ratios, risk ratios, or other terms that express risk among one group of individuals (e.g., smokers) as a ratio of another (e.g., non-smokers). Moreover, relative risks and confidence intervals were generally rounded to one decimal place, except when rounding could change a marginally statistically significant finding to an insignificant one. Thus, only when the original confidence limit was within 0.95 to 0.99 or within 1.01 to 1.04 were two decimal places retained in reporting the results.

Publication lags, even short ones, prevent an up-to-the-minute inclusion of all of the recently published articles and data. Therefore, by the time the public reads this report, some additional studies or data reports may have been published or released. The report has attempted to include the most up-to-date information available at the time of production.

## **Organization of the Report**

This report covers four major topics, each of which includes many subtopics: "Patterns of Tobacco Use Among Women and Girls" (Chapter 2), "Health Consequences of Tobacco Use Among Women" (Chapter 3), "Factors Influencing Tobacco Use Among Women" (Chapter 4), and "Efforts to Reduce Tobacco Use Among Women" (Chapter 5). The report concludes with "A Vision for the Future" (Chapter 6). Some subtopics covered are relevant to more than one section of the report and are discussed in more than one place and cross-referenced. This overlap is particularly true for the discussions of smoking and depression, weight, hormones, and pregnancy; some of these topics are discussed as correlates of smoking status in Chapter 2, as health effects of or physiologic influences on smoking in Chapter 3, and in relation to tailoring intervention and outcomes in Chapter 5. At the end of each chapter is a list of chapter conclusions, which are also included at the end of this chapter. The appendices describe the national surveys and other

data sources used for the analyses of patterns of tobacco use over time presented in Chapter 2 and in Chapter 3. The major conclusions of the report were distilled from the chapter conclusions and appear below.

Other recent reports of the Surgeon General have been devoted to smoking and youth (USDHHS 1994), smoking and racial or ethnic minorities (USDHHS 1998), and interventions to reduce smoking (USDHHS 2000). The reader is encouraged to consult those reports for comprehensive reviews of the evidence on these topics. The present report focuses on data specific to women and girls and on comparisons of results by gender.

The reader will note that throughout the report the term “gender” is used with reference to results specific to females vs. males when it might reasonably be argued that the term “sex” is the appropriate term. In practice, the distinction is sometimes difficult to make, and usage across much of the literature reviewed here is inconsistent. Nonetheless, the editors and contributors to the report recognize the important distinction between purely biologic or physiologic differences of females and males, which technically constitute “sex” differences, and the more socially constructed roles for women and men, to which use of the term “gender” should arguably be limited (Fishman et al. 1999).

## Major Conclusions

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1. Despite all that is known of the devastating health consequences of smoking, 22.0 percent of women smoked cigarettes in 1998. Cigarette smoking became prevalent among men before women, and smoking prevalence in the United States has always been lower among women than among men. However, the once-wide gender gap in smoking prevalence narrowed until the mid-1980s and has since remained fairly constant (Figure 1.1). Smoking prevalence today is nearly three times higher among women who have only 9 to 11 years of education (32.9 percent) than among women with 16 or more years of education (11.2 percent).
2. In 2000, 29.7 percent of high school senior girls reported having smoked within the past 30 days. Smoking prevalence among white girls declined from the mid-1970s to the early 1980s, followed by a decade of little change. Smoking prevalence then increased markedly in the early 1990s, and declined somewhat in the late 1990s. The increase dampened much of the earlier progress (Figure 1.2). Among black girls, smoking prevalence declined substantially from the mid-1970s to the early 1990s, followed by some increases until the mid-1990s. Data on long-term trends in smoking prevalence among high school seniors of other racial or ethnic groups are not available.
3. Since 1980, approximately 3 million U.S. women have died prematurely from smoking-related neoplastic, cardiovascular, respiratory, and pediatric diseases, as well as cigarette-caused burns. Each year during the 1990s, U.S. women lost an estimated 2.1 million years of life due to these smoking attributable premature deaths. Additionally, women who smoke experience gender-specific health consequences, including increased risk of various adverse reproductive outcomes.
4. Lung cancer is now the leading cause of cancer death among U.S. women; it surpassed breast cancer in 1987 (Figure 1.3). About 90 percent of all lung cancer deaths among women who continue to smoke are attributable to smoking.
5. Exposure to environmental tobacco smoke is a cause of lung cancer and coronary heart disease among women who are lifetime nonsmokers. Infants born to women exposed to environmental tobacco smoke during pregnancy have a small decrement in birth weight and a slightly increased risk of intrauterine growth retardation compared to infants of nonexposed women.
6. Women who stop smoking greatly reduce their risk of dying prematurely, and quitting smoking is beneficial at all ages. Although some clinical intervention studies suggest that women may have more difficulty quitting smoking than men, national survey data show that women are quitting at rates similar to or even higher than those for men. Prevention and cessation

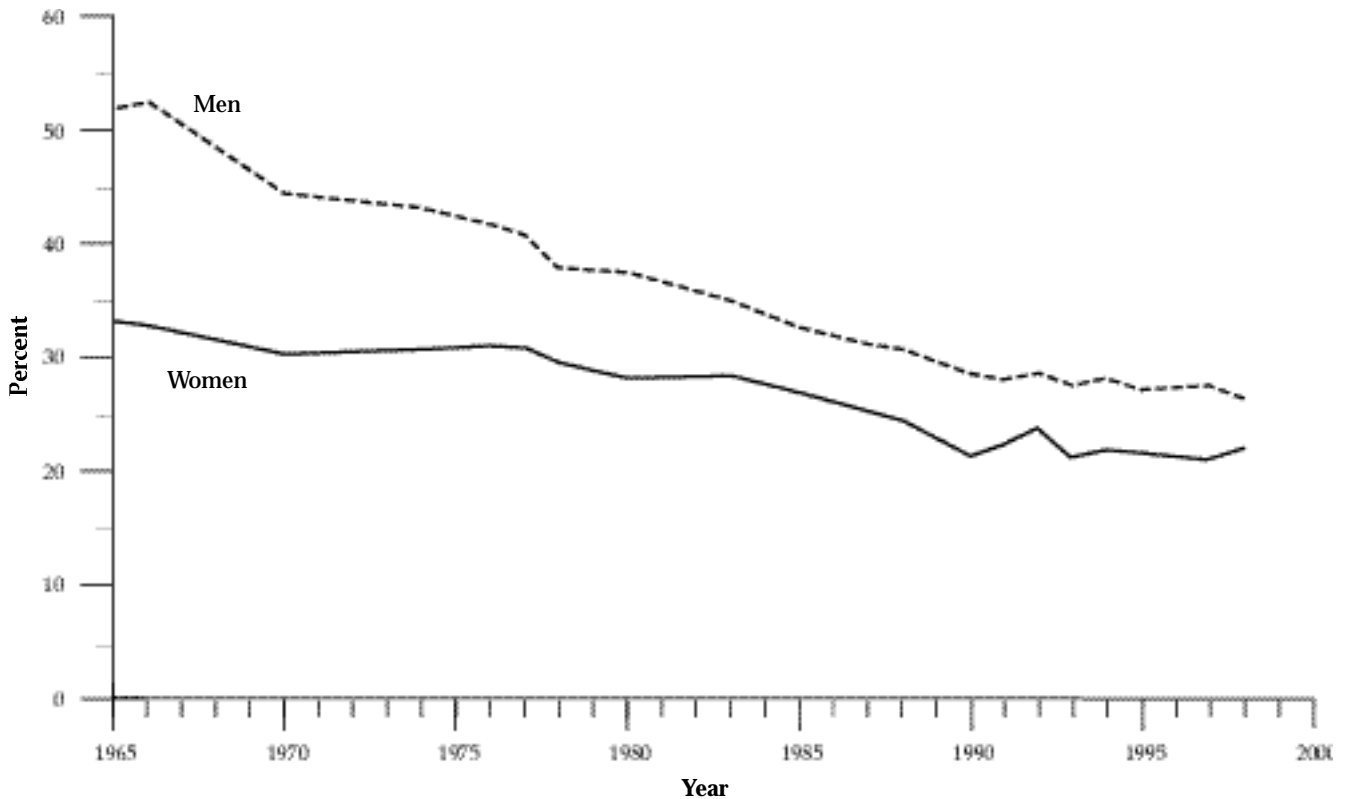
interventions are generally of similar effectiveness for women and men and, to date, few gender differences in factors related to smoking initiation and successful quitting have been identified.

7. Smoking during pregnancy remains a major public health problem despite increased knowledge of the adverse health effects of smoking during pregnancy. Although the prevalence of smoking during pregnancy has declined steadily in recent years (Figure 1.4), substantial numbers of pregnant women continue to smoke, and only about one-third of women who stop smoking

during pregnancy are still abstinent one year after the delivery.

8. Tobacco industry marketing is a factor influencing susceptibility to and initiation of smoking among girls, in the United States and overseas. Myriad examples of tobacco ads and promotions targeted to women indicate that such marketing is dominated by themes of social desirability and independence. These themes are conveyed through ads featuring slim, attractive, athletic models, images very much at odds with the serious health consequences experienced by so many women who smoke.

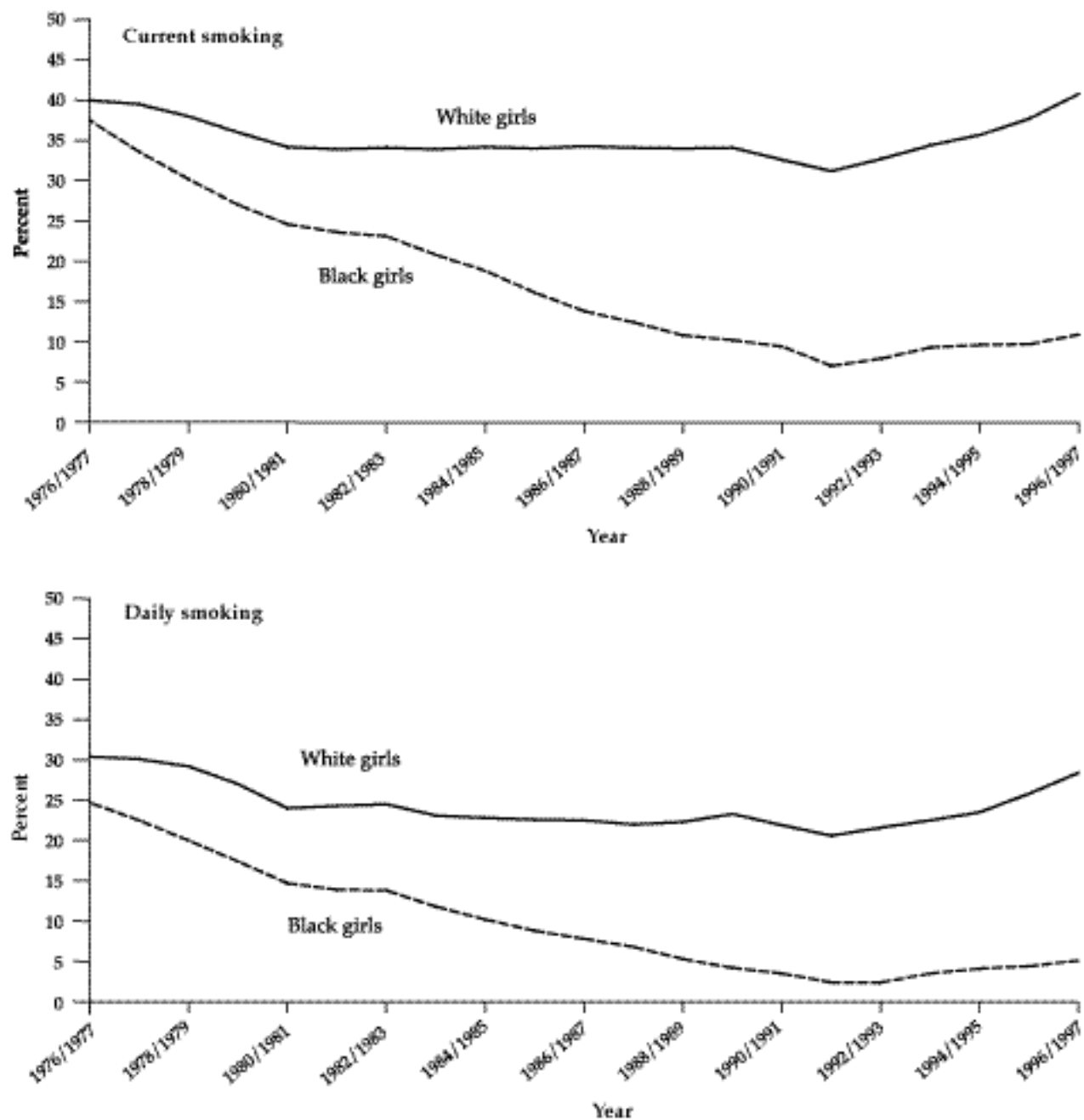
**Figure 1.1. Prevalence (%) of current smoking among adults aged 18 years or older, by gender, National Health Interview Survey, United States, 1965–1998**



Note: Prevalence of current smoking is the percentage of all persons in each demographic category who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey. Since 1992, estimates of current smoking explicitly include persons who smoked only on some days.

Sources: National Center for Health Statistics, public use data tapes, 1965–1998.

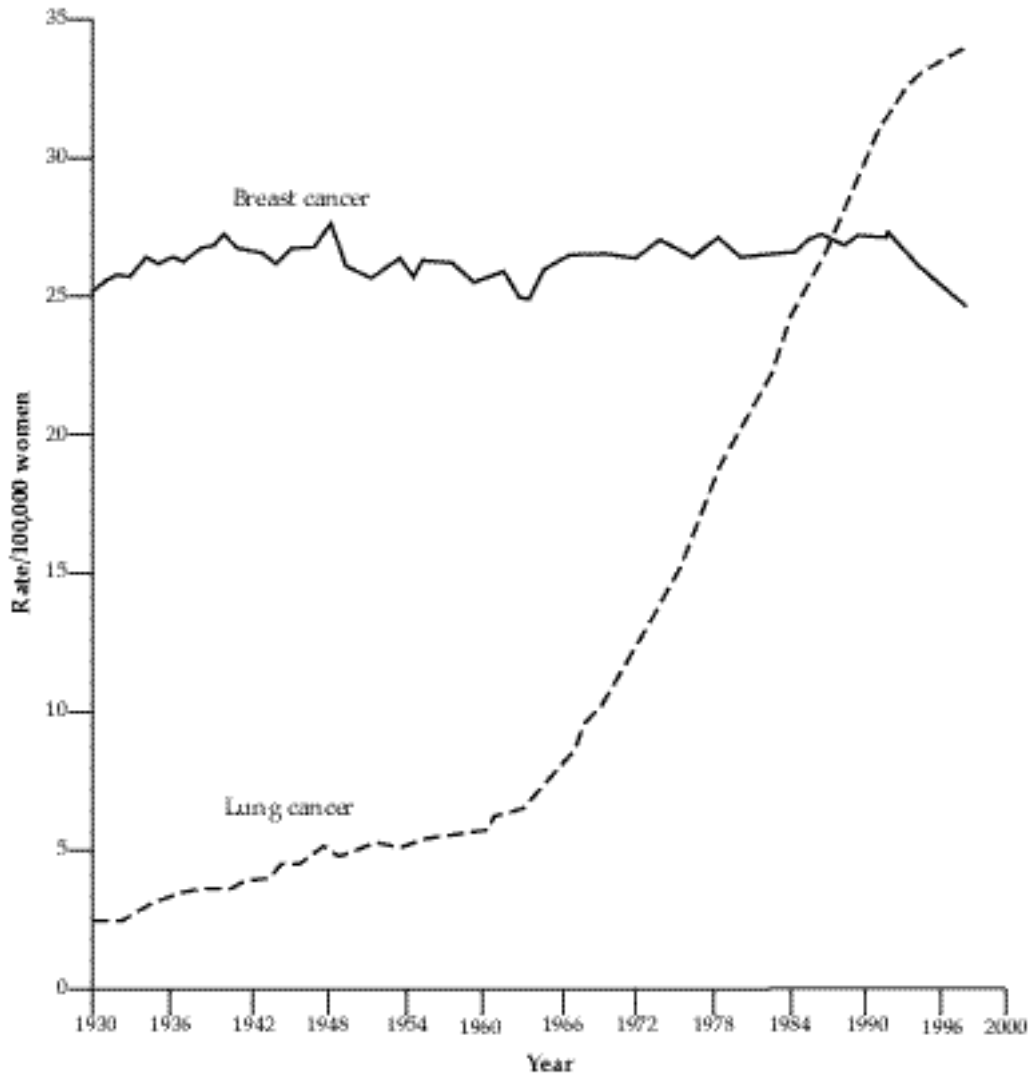
**Figure 1.2. Prevalence (%) of current smoking and daily smoking among high school senior girls, by race, Monitoring the Future Survey, United States, 1976–1997, aggregate data**



*Note:* Estimates are based on 2-year rolling averages, which are the percentages calculated by averaging data for specified year and previous year. Estimates for current smoking are based on responses to the question, “How frequently have you smoked cigarettes during the past 30 days?” Those reporting smoking  $\geq 1$  cigarette during the previous 30 days were classified as current smokers. Estimates for daily smoking were based on responses to the question, “How frequently have you smoked cigarettes in the past 30 days?” Those reporting smoking  $\geq 1$  cigarette/day during the previous 30 days were classified as daily smokers.

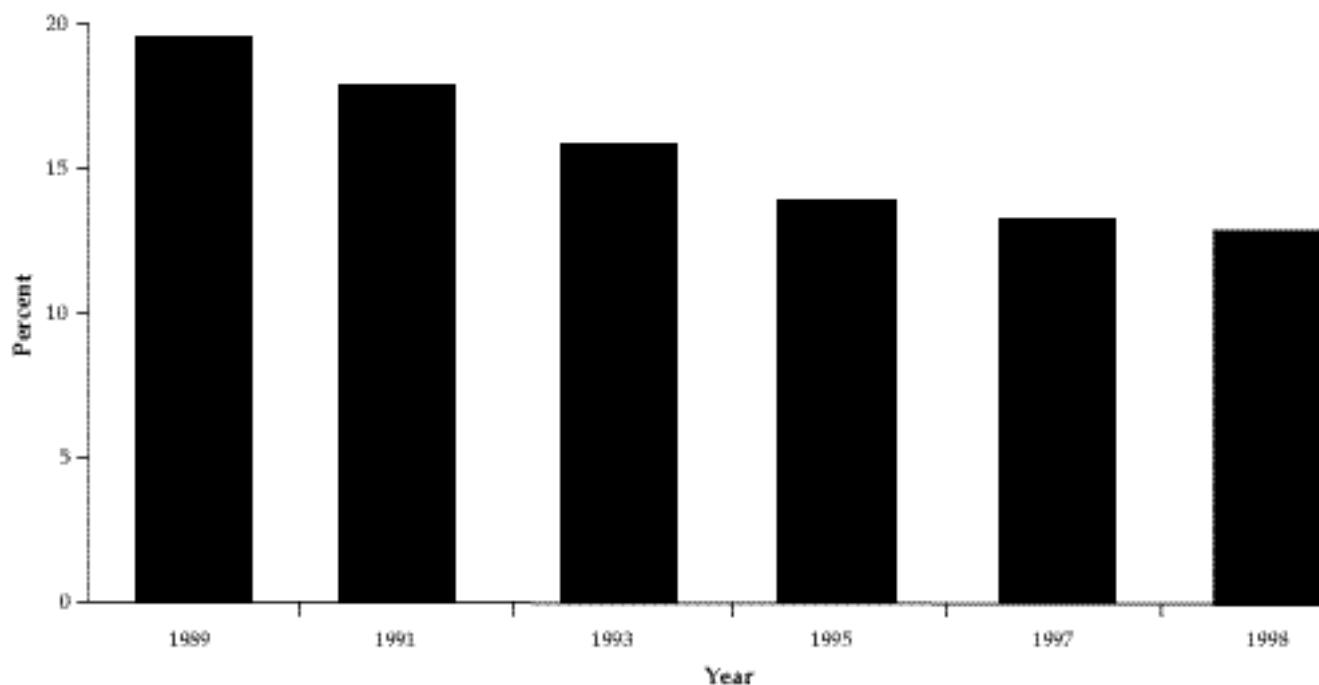
Sources: University of Michigan, Institute for Social Research, public use data tapes, 1976–1997.

**Figure 1.3. Age-adjusted death rates for lung cancer and breast cancer among women, United States, 1930-1997**



*Note:* Death rates are age adjusted to the 1970 population.

Sources: Parker et al. 1996; National Center for Health Statistics 1999; Ries et al. 2000; American Cancer Society, unpublished data.

**Figure 1.4. Prevalence (%) of cigarette smoking during pregnancy, 1989–1998**

Note: Percentage excludes live births for mothers with unknown smoking status.

Sources: National Center for Health Statistics 1992, 1994; Ventura et al. 1995, 1997, 1999, 2000.

## Chapter Conclusions

Note that Chapter 1, which summarizes the report, and Chapter 6, which focuses on a vision for the future, do not have conclusions.

### Chapter 2. Patterns of Tobacco Use Among Women and Girls

1. Cigarette smoking became prevalent among women after it did among men, and smoking prevalence has always been lower among women than among men. The gender-specific difference in smoking prevalence narrowed between 1965 and 1985. Since 1985, the decline in prevalence has been comparable among women and men.
2. The prevalence of current smoking among women increased from less than 6 percent in 1924 to 34 percent in 1965, then declined to 22 to 23 percent in the late 1990s. In 1997–1998, smoking prevalence was highest among American Indian or Alaska Native women (34.5 percent), intermediate among white women (23.5 percent) and black women (21.9 percent), and lowest among Hispanic women (13.8 percent) and Asian or Pacific Islander women (11.2 percent). By educational level, smoking prevalence is nearly three times higher among women with 9 to 11 years of education (30.9 percent) than among women with 16 or more years of education (10.6 percent).
3. Much of the progress in reducing smoking prevalence among girls in the 1970s and 1980s was lost with the increase in prevalence in the 1990s:



- current smoking among high school senior girls was the same in 2000 as in 1988. Although smoking prevalence was higher among high school senior girls than among high school senior boys in the 1970s and early 1980s, prevalence has been comparable since the mid-1980s.
4. Smoking declined substantially among black girls from the mid-1970s through the early 1990s; the decline among white girls for this same period was small. As adolescents age into young adulthood, these patterns are now being reflected in the racial and ethnic differences in smoking among young women. Data are not available on long-term trends in smoking prevalence among high school seniors of other racial and ethnic groups.
  5. Smoking during pregnancy appears to have decreased from 1989 through 1998. Despite increased knowledge of the adverse health effects of smoking during pregnancy, estimates of women smoking during pregnancy range from 12 percent based on birth certificate data to as high as 22 percent based on survey data.
  6. Historically, women started to smoke at a later age than did men, but beginning with the 1960 cohort, the mean age at smoking initiation has not differed by gender.
  7. Nicotine dependence is strongly associated with the number of cigarettes smoked per day. Girls and women who smoke appear to be equally dependent on nicotine when results are stratified by number of cigarettes smoked per day. Few gender-specific differences have been found in indicators of nicotine dependence among adolescents, young adults, or adults overall.
  8. The percentage of persons who have ever smoked and who have quit smoking is somewhat lower among women (46.2 percent) than among men (50.1 percent). This finding is probably because men began to stop smoking earlier in the twentieth century than did women and because these data do not take into account that men are more likely than women to switch to or to continue to use other tobacco products when they stop smoking cigarettes. Since the late 1970s or early 1980s, the probability of attempting to quit smoking and to succeed has been equally high among women and men.
  9. Prevalence of the use of cigars, pipes, and smokeless tobacco among women is generally low, but recent data suggest that cigar smoking among women and girls is increasing.

10. Smoking prevalence among women varies markedly across countries; the percentages range from an estimated 7 percent in developing countries to 24 percent in developed countries. Thwarting further increases in tobacco use among women is one of the greatest disease prevention opportunities in the world today.

### Chapter 3. Health Consequences of Tobacco Use Among Women

#### Total Mortality

1. Cigarette smoking plays a major role in the mortality of U.S. women.
2. The excess risk for death from all causes among current smokers compared with persons who have never smoked increases with both the number of years of smoking and the number of cigarettes smoked per day.
3. Among women who smoke, the percentage of deaths attributable to smoking has increased over the past several decades, largely because of increases in the quantity of cigarettes smoked and the duration of smoking.
4. Cohort studies with follow-up data analyzed in the 1980s show that the annual risk for death from all causes is 80 to 90 percent greater among women who smoke cigarettes than among women who have never smoked. A woman's annual risk for death more than doubles among continuing smokers compared with persons who have never smoked in every age group from 45 through 74 years.
5. In 1997, approximately 165,000 U.S. women died prematurely from a smoking-related disease. Since 1980, approximately three million U.S. women have died prematurely from a smoking-related disease.
6. U.S. females lost an estimated 2.1 million years of life each year during the 1990s as a result of smoking-related deaths due to neoplastic, cardiovascular, respiratory, and pediatric diseases as well as from burns caused by cigarettes. For every smoking attributable death, an average of 14 years of life was lost.
7. Women who stop smoking greatly reduce their risk for dying prematurely. The relative benefits of smoking cessation are greater when women stop smoking at younger ages, but smoking cessation is beneficial at all ages.

### Lung Cancer

8. Cigarette smoking is the major cause of lung cancer among women. About 90 percent of all lung cancer deaths among U.S. women smokers are attributable to smoking.
9. The risk for lung cancer increases with quantity, duration, and intensity of smoking. The risk for dying of lung cancer is 20 times higher among women who smoke two or more packs of cigarettes per day than among women who do not smoke.
10. Lung cancer mortality rates among U.S. women have increased about 600 percent since 1950. In 1987, lung cancer surpassed breast cancer to become the leading cause of cancer death among U.S. women. Overall age-adjusted incidence rates for lung cancer among women appear to have peaked in the mid-1990s.
11. In the past, men who smoked appeared to have a higher relative risk for lung cancer than did women who smoked, but recent data suggest that such differences have narrowed considerably. Earlier findings largely reflect past gender-specific differences in duration and amount of cigarette smoking.
12. Former smokers have a lower risk for lung cancer than do current smokers, and risk declines with the number of years of smoking cessation.

### International Trends in Female Lung Cancer

13. International lung cancer death rates among women vary dramatically. This variation reflects historical differences in the adoption of cigarette smoking by women in different countries. In 1990, lung cancer accounted for about 10 percent of all cancer deaths among women worldwide and more than 20 percent of cancer deaths among women in some developed countries.

### Female Cancers

14. The totality of the evidence does not support an association between smoking and risk for breast cancer.
15. Several studies suggest that exposure to environmental tobacco smoke is associated with an increased risk for breast cancer, but this association remains uncertain.
16. Current smoking is associated with a reduced risk for endometrial cancer, but the effect is probably limited to postmenopausal disease. The risk for this cancer among former smokers

generally appears more similar to that of women who have never smoked.

17. Smoking does not appear to be associated with risk for ovarian cancer.
18. Smoking has been consistently associated with an increased risk for cervical cancer. The extent to which this association is independent of human papillomavirus infection is uncertain.
19. Smoking may be associated with an increased risk for vulvar cancer, but the extent to which the association is independent of human papillomavirus infection is uncertain.

### Other Cancers

20. Smoking is a major cause of cancers of the oropharynx and bladder among women. Evidence is also strong that women who smoke have increased risks for cancers of the pancreas and kidney. For cancers of the larynx and esophagus, evidence among women is more limited but consistent with large increases in risk.
21. Women who smoke may have increased risks for liver cancer and colorectal cancer.
22. Data on smoking and cancer of the stomach among women are inconsistent.
23. Smoking may be associated with an increased risk for acute myeloid leukemia among women but does not appear to be associated with other lymphoproliferative or hematologic cancers.
24. Women who smoke may have a decreased risk for thyroid cancer.
25. Women who use smokeless tobacco have an increased risk for oral cancer.

### Cardiovascular Disease

26. Smoking is a major cause of coronary heart disease among women. For women younger than 50 years, the majority of coronary heart disease is attributable to smoking. Risk increases with the number of cigarettes smoked and the duration of smoking.
27. The risk for coronary heart disease among women is substantially reduced within 1 or 2 years of smoking cessation. This immediate benefit is followed by a continuing but more gradual reduction in risk to that among non-smokers by 10 to 15 or more years after cessation.
28. Women who use oral contraceptives have a particularly elevated risk of coronary heart disease if they smoke. Currently, evidence is conflicting as to whether the effect of hormone replacement

therapy on coronary heart disease risk differs between smokers and nonsmokers.

29. Women who smoke have an increased risk for ischemic stroke and subarachnoid hemorrhage. Evidence is inconsistent concerning the association between smoking and primary intracerebral hemorrhage.
30. In most studies that include women, the increased risk for stroke associated with smoking is reversible after smoking cessation; after 5 to 15 years of abstinence, the risk approaches that of women who have never smoked.
31. Conflicting evidence exists regarding the level of the risk for stroke among women who both smoke and use either the oral contraceptives commonly prescribed in the United States today or hormone replacement therapy.
32. Smoking is a strong predictor of the progression and severity of carotid atherosclerosis among women. Smoking cessation appears to slow the rate of progression of carotid atherosclerosis.
33. Women who are current smokers have an increased risk for peripheral vascular atherosclerosis. Smoking cessation is associated with improvements in symptoms, prognosis, and survival.
34. Women who smoke have an increased risk for death from ruptured abdominal aortic aneurysm.

#### **Chronic Obstructive Pulmonary Disease (COPD) and Lung Function**

35. Cigarette smoking is a primary cause of COPD among women, and the risk increases with the amount and duration of smoking. Approximately 90 percent of mortality from COPD among women in the United States can be attributed to cigarette smoking.
36. In utero exposure to maternal smoking is associated with reduced lung function among infants, and exposure to environmental tobacco smoke during childhood and adolescence may be associated with impaired lung function among girls.
37. Adolescent girls who smoke have reduced rates of lung growth, and adult women who smoke experience a premature decline of lung function.
38. The rate of decline in lung function is slower among women who stop smoking than among women who continue to smoke.

39. Mortality rates for COPD have increased among women over the past 20 to 30 years.
40. Although data for women are limited, former smokers appear to have a lower risk for dying from COPD than do current smokers.

#### **Sex Hormones, Thyroid Disease, and Diabetes Mellitus**

41. Women who smoke have an increased risk for estrogen-deficiency disorders and a decreased risk for estrogen-dependent disorders, but circulating levels of the major endogenous estrogens are not altered among women smokers.
42. Although consistent effects of smoking on thyroid hormone levels have not been noted, cigarette smokers may have an increased risk for Graves' ophthalmopathy, a thyroid-related disease.
43. Smoking appears to affect glucose regulation and related metabolic processes, but conflicting data exist on the relationship of smoking and the development of type 2 diabetes mellitus and gestational diabetes among women.

#### **Menstrual Function, Menopause, and Benign Gynecologic Conditions**

44. Some studies suggest that cigarette smoking may alter menstrual function by increasing the risks for dysmenorrhea (painful menstruation), secondary amenorrhea (lack of menses among women who ever had menstrual periods), and menstrual irregularity.
45. Women smokers have a younger age at natural menopause than do nonsmokers and may experience more menopausal symptoms.
46. Women who smoke may have decreased risk for uterine fibroids.

#### **Reproductive Outcomes**

47. Women who smoke have increased risks for conception delay and for both primary and secondary infertility.
48. Women who smoke may have a modest increase in risks for ectopic pregnancy and spontaneous abortion.
49. Smoking during pregnancy is associated with increased risks for preterm premature rupture of membranes, abruptio placentae, and placenta previa, and with a modest increase in risk for preterm delivery.
50. Women who smoke during pregnancy have a decreased risk for preeclampsia.

51. The risk for perinatal mortality—both stillbirth and neonatal deaths—and the risk for sudden infant death syndrome (SIDS) are increased among the offspring of women who smoke during pregnancy.
52. Infants born to women who smoke during pregnancy have a lower average birth weight and are more likely to be small for gestational age than are infants born to women who do not smoke.
53. Smoking does not appear to affect the overall risk for congenital malformations.
54. Women smokers are less likely to breastfeed their infants than are women nonsmokers.
55. Women who quit smoking before or during pregnancy reduce the risk for adverse reproductive outcomes, including conception delay, infertility, preterm premature rupture of membranes, preterm delivery, and low birth weight.
64. Women who smoke have an increased risk for peptic ulcers.
65. Women who currently smoke have a decreased risk for ulcerative colitis, but former smokers have an increased risk—possibly because smoking suppresses symptoms of the disease.
66. Women who smoke appear to have an increased risk for Crohn's disease, and smokers with Crohn's disease have a worse prognosis than do nonsmokers.

#### **Body Weight and Fat Distribution**

56. Initiation of cigarette smoking does not appear to be associated with weight loss, but smoking does appear to attenuate weight gain over time.
57. The average weight of women who are current smokers is modestly lower than that of women who have never smoked or who are long-term former smokers.
58. Smoking cessation among women typically is associated with a weight gain of about 6 to 12 pounds in the year after they quit smoking.
59. Women smokers have a more masculine pattern of body fat distribution (i.e., a higher waist-to-hip ratio) than do women who have never smoked.

#### **Bone Density and Fracture Risk**

60. Postmenopausal women who currently smoke have lower bone density than do women who do not smoke.
61. Women who currently smoke have an increased risk for hip fracture compared with women who do not smoke.
62. The relationship among women between smoking and the risk for bone fracture at sites other than the hip is not clear.

#### **Gastrointestinal Diseases**

63. Some studies suggest that women who smoke have an increased risk for gallbladder disease (gallstones and cholecystitis), but the evidence is inconsistent.

#### **Arthritis**

67. Some but not all studies suggest that women who smoke may have a modestly elevated risk for rheumatoid arthritis.
68. Women who smoke have a modestly reduced risk for osteoarthritis of the knee; data regarding osteoarthritis of the hip are inconsistent.
69. The data on the risk for systemic lupus erythematosus among women who smoke are inconsistent.

#### **Eye Disease**

70. Women who smoke have an increased risk for cataract.
71. Women who smoke may have an increased risk for age-related macular degeneration.
72. Studies show no consistent association between smoking and open-angle glaucoma.

#### **Human Immunodeficiency Virus (HIV) Disease**

73. Limited data suggest that women smokers may be at higher risk for HIV-1 infection than are nonsmokers.

#### **Facial Wrinkling**

74. Limited but consistent data suggest that women smokers have more facial wrinkling than do nonsmokers.

#### **Depression and Other Psychiatric Disorders**

75. Smokers are more likely to be depressed than are nonsmokers, a finding that may reflect an effect of smoking on the risk for depression, the use of smoking for self-medication, or the influence of common genetic or other factors on both smoking and depression. The association of smoking and depression is particularly important among women because they are more likely to be diagnosed with depression than are men.

76. The prevalence of smoking generally has been found to be higher among patients with anxiety disorders, bulimia, attention deficit disorder, and alcoholism than among individuals without these conditions; the mechanisms underlying these associations are not yet understood.
77. The prevalence of smoking is very high among patients with schizophrenia, but the mechanisms underlying this association are not yet understood.
78. Smoking may be used by some persons who would otherwise manifest psychiatric symptoms to manage those symptoms; for such persons, cessation of smoking may lead to the emergence of depression or other dysphoric mood states.

#### Neurologic Diseases

79. Women who smoke have a decreased risk for Parkinson's disease.
80. Data regarding the association between smoking and Alzheimer's disease are inconsistent.

#### Nicotine Pharmacology and Addiction

81. Nicotine pharmacology and the behavioral processes that determine nicotine addiction appear generally similar among women and men; when standardized for the number of cigarettes smoked, the blood concentration of cotinine (the main metabolite of nicotine) is similar among women and men.
82. Women's regulation of nicotine intake may be less precise than men's. Factors other than nicotine (e.g., sensory cues) may play a greater role in determining smoking behavior among women.

#### Environmental Tobacco Smoke (ETS) and Lung Cancer

83. Exposure to ETS is a cause of lung cancer among women who have never smoked.

#### ETS and Coronary Heart Disease

84. Epidemiologic and other data support a causal relationship between ETS exposure from the spouse and coronary heart disease mortality among women nonsmokers.

#### ETS and Reproductive Outcomes

85. Infants born to women who are exposed to ETS during pregnancy may have a small decrement

in birth weight and a slightly increased risk for intrauterine growth retardation compared with infants born to women who are not exposed; both effects are quite variable across studies.

86. Studies of ETS exposure and the risks for delay in conception, spontaneous abortion, and perinatal mortality are few, and the results are inconsistent.

### Chapter 4. Factors Influencing Tobacco Use Among Women

1. Girls who initiate smoking are more likely than those who do not smoke to have parents or friends who smoke. They also tend to have weaker attachments to parents and family and stronger attachments to peers and friends. They perceive smoking prevalence to be higher than it actually is, are inclined to risk taking and rebelliousness, have a weaker commitment to school or religion, have less knowledge of the adverse consequences of smoking and the addictiveness of nicotine, believe that smoking can control weight and negative moods, and have a positive image of smokers. Although the strength of the association by gender differs across studies, most of these factors are associated with an increased risk for smoking among both girls and boys.
2. Girls appear to be more affected than boys by the desire to smoke for weight control and by the perception that smoking controls negative moods; girls may also be more influenced than boys to smoke by rebelliousness or a rejection of conventional values.
3. Women who continue to smoke and those who fail at attempts to stop smoking tend to have lower education and employment levels than do women who quit smoking. They also tend to be more addicted to cigarettes, as evidenced by the smoking of a higher number of cigarettes per day, to be cognitively less ready to stop smoking, to have less social support for stopping, and to be less confident in resisting temptations to smoke.
4. Women have been extensively targeted in tobacco marketing, and tobacco companies have produced brands specifically for women, both in the United States and overseas. Myriad examples of tobacco ads and promotions targeted to women indicate that such marketing is dominated by themes of both social desirability and independence, which are conveyed through ads

featuring slim, attractive, athletic models. Between 1995 and 1998, expenditures for domestic cigarette advertising and promotion increased 37.3 percent, from \$4.90 billion to \$6.73 billion.

5. Tobacco industry marketing, including product design, advertising, and promotional activities, is a factor influencing susceptibility to and initiation of smoking.
6. The dependence of the media on revenues from tobacco advertising oriented to women, coupled with tobacco company sponsorship of women's fashions and of artistic, athletic, political, and other events, has tended to stifle media coverage of the health consequences of smoking among women and to mute criticism of the tobacco industry by women public figures.
5. Adolescent girls are more likely than adolescent boys to respond to smoking cessation programs that include social support from the family or their peer group.
6. Among persons who smoke heavily, women are more likely than men to report being dependent on cigarettes and to have lower expectations about stopping smoking, but it is not clear if such women are less likely to quit smoking.
7. Currently, no tobacco cessation method has proved to be any more or less successful among minority women than among white women in the same study, but research on smoking cessation among women of most racial and ethnic minorities has been scarce.
8. Women are more likely than men to affirm that they smoke less at work because of a worksite policy and are significantly more likely than men to attribute reduced amount of daily smoking to their worksite policy. Women also are more likely than men to support policies designed to prevent smoking initiation among adolescents, restrictions on youth access to tobacco products, and limits on tobacco advertising and promotion.
9. Successful interventions have been developed to prevent smoking among young people, but little systematic effort has been focused on developing and evaluating prevention interventions specifically for girls.

### **Chapter 5. Efforts to Reduce Tobacco Use Among Women**

1. Using evidence from studies that vary in design, sample characteristics, and intensity of the interventions studied, researchers to date have not found consistent gender-specific differences in the effectiveness of treatment intervention programs for tobacco use. Some clinical studies have shown lower cessation rates among women than among men, but others have not. Many studies have not reported cessation results by gender.
2. Among women, biopsychosocial factors such as pregnancy, fear of weight gain, depression, and the need for social support appear to be associated with smoking maintenance, cessation, or relapse.
3. A higher percentage of women stop smoking during pregnancy, both spontaneously and with assistance, than at other times in their lives. Using pregnancy-specific programs can increase smoking cessation rates, which benefits infant health and is cost effective. Only about one-third of women who stop smoking during pregnancy are still abstinent one year after the delivery.
4. Women fear weight gain during smoking cessation more than do men. However, few studies have found a relationship between weight concerns and smoking cessation among either women or men. Further, actual weight gain during cessation does not predict relapse to smoking.

### **Chapter 6. A Vision for the Future: What Is Needed to Reduce Smoking Among Women**

Chapter 6 defines broad courses of action for reducing tobacco use among women. These five strategies for the future are as follows: Increase awareness of the impact of smoking on women's health and counter the tobacco industry's targeting of women. Support women's anti-tobacco advocacy efforts and publicize that most women are nonsmokers. Continue to build the science base on gender-specific outcomes and on how to reduce disparities among women. Act now: we know more than enough. Stop the epidemic of smoking and smoking-related diseases among women globally.

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