

## **INTRODUCTION AND SUMMARY.**

## **INTRODUCTION AND SUMMARY**

The 1980 Report on the Health Consequences of Smoking focuses upon the evidence relating cigarette smoking to health effects in women. It is not presented as a detailed discussion of the entire range of effects of smoking on health. Such a detailed review of all existing evidence can be found in the 1979 Report of the Surgeon General on Smoking and Health. Instead, this volume on smoking and women's health is offered as a review and reappraisal of smoking and major health relationships specifically in women. It is intended to serve the medical community as a unified source of existing scientific evidence about health effects of smoking cigarettes for women. As an examination of current knowledge, it will logically lend itself to application in both the personal and public health arenas.

Its content is the work of numerous scientists within the Department of Health, Education, and Welfare, as well as scientific experts outside that organization.

This volume examines the major issues relating tobacco use to women's health including trends in consumption, the biomedical evidence of the health effects of cigarette usage by women, and determinants of smoking initiation, maintenance, and cessation.

This section summarizes the principal findings of this report. It is hoped that the entire volume will serve to highlight the established risks of smoking for women and their children, as well as to define the areas in need of further investigation.

### **Patterns of Cigarette Smoking**

1. Women have differed from men in their historical onset of widespread cigarette use, in the rate of diffusion of smoking among each new birth cohort, in their intensity of cigarette smoking and their use of various types of cigarettes.

2. Men took up cigarette smoking rapidly at the beginning of the twentieth century, especially during World War I. Cigarettes rapidly replaced other forms of tobacco.

By 1925, approximately 50 percent of adult males were cigarette smokers. Smoking among men accelerated rapidly during World War II. By 1950, the prevalence of cigarette use among men approached 70 percent in some urban areas.

3. The onset of widespread cigarette use among women lagged behind that of men by 25 to 30 years. The proportion of adult women smoking cigarettes did not exceed one-quarter until the onset of World War II.

4. Between 1951 and 1963, increasing proportions of women

and men smokers converted to filtertip cigarettes. By 1964, 79 percent of adult women smokers and 54 percent of adult men smokers used filter cigarettes.

5. After reaching a peak value of 4,336 in 1963, annual per capita consumption of cigarettes declined in 1964, 1968-70, and in the period since 1975. The most recent estimate of 3,900 cigarettes per capita in 1979 is approximately equal to that observed in 1952.

6. From 1965 to 1978, the proportion of adult men cigarette smokers declined from 51 to 37 percent. The preliminary estimate of adult men's smoking prevalence for 1979 is 36.9 percent. From 1965 to 1976, the proportion of adult women smokers remained virtually unchanged at 32 to 33 percent. Since 1976, the proportion of women smokers has declined to below 30 percent. For 1979, the preliminary estimate of adult women's smoking prevalence is 28.2 percent. The overall smoking prevalence of 32.3 percent for both sexes in 1979 represents the lowest recorded value in at least 45 years.

7. The proportion of adult smokers attempting to quit smoking declined from 1970 to 1975, but increased in 1978-1979. In contrast to past years, the proportions of women and men now attempting to quit smoking, and their reported quitting rates, are indistinguishable. Approximately one in three adult smokers now makes a serious attempt to quit smoking during the course of a year. Approximately one in five of those who attempt to quit subsequently succeed.

8. The proportion of adult smokers using lower "tar" and nicotine brands has increased substantially. In 1979, 39 percent of adult women smokers and 28 percent of adult men smokers reported primary brands with F.T.C. "tar" delivery less than 15.0 milligrams. It is not known whether smokers of the lowest "tar" cigarettes are more or less likely to attempt to quit smoking, or to succeed in quitting, than smokers of conventional filtertip or non-filter cigarettes.

9. The average number of cigarettes smoked by women and men current smokers has increased. The relationship of this finding to recent declines in the average F.T.C. "tar" and nicotine deliveries of cigarettes is not well understood.

10. With each successive generation, the smoking characteristics of women and men have become increasingly similar.

11. Among women, the average age of onset of regular smoking progressively declined with each successive birth cohort—from 35 years of age for those born before 1900, to 16 years of age among those born 1951 to 1960. The average age of onset of regular smoking among young women is now virtually identical to that of young men.

12. Maximum smoking prevalence rates have declined substantially in recent birth cohorts of men. Men born 1931 to 1940 reached a peak smoking proportion of 61 percent during 1960–62, while men born 1941 to 1950 reached a peak smoking proportion of 58 percent in 1968–69. Men born 1951 to 1960 reached a peak smoking proportion of 40 percent in 1976. Among recent cohorts of women, peak smoking prevalence rates have declined to a much smaller extent. Women born 1931 to 1940 reached a peak smoking proportion of 45 percent in 1966–68, while women born 1941 to 1950 reached a peak smoking proportion of 41 percent in 1970–73. Women born 1951 to 1960 reached a peak smoking proportion of 38 percent in 1976. Among the generation born 1951 to 1960, the proportions of women and men smoking cigarettes are now virtually identical.

13. The proportions of women and men smokers in each age group have declined. Among those born before 1951, this decline in smoking prevalence resulted mainly from smoking cessation. By contrast, the observed decline in smoking prevalence among younger men born 1951 to 1960 has resulted from both smoking cessation and a lower rate of smoking initiation. This decline in the rate of onset of smoking among young men has not been observed for young women.

14. Recent survey data on adolescent smoking habits reveal that by ages 17 to 19, smoking prevalence among women exceeds that of men. This finding supports the conclusion that the rate of initiation of smoking among young men—but not that of young women—is declining. The future cigarette use of the youngest generations of women is uncertain.

15. With each successive birth cohort, the accumulated years of cigarette smoking per woman has progressively approached the accumulated years of cigarette smoking per man. Each successive birth cohort has also experienced progressively smaller sex differences in the fraction of lifetime years of smoking that represents filtertip cigarette use.

16. Among men born during this century, each successive birth cohort has thus far experienced fewer cumulative years of cigarette smoking, higher proportionate exposure to filtertip cigarettes, and lower smoking prevalence rates. This relationship between birth date and cigarette smoke exposure does not hold for women. Women born 1921 to 1940 have experienced substantially higher smoking prevalence rates than earlier generations. Unless they quit smoking in substantial numbers, these women, currently aged 40 to 59, will surpass older women in total years of cigarette smoking per capita, the total years of nonfilter cigarette smoking per capita, and in the total number of cigarettes smoked. The health consequences of this enhanced

exposure to cigarette smoke among women are likely to be more prominent in the coming decades.

### **Mortality**

1. The mortality ratio for women who smoke cigarettes is about 1.2 or 1.3.

2. Mortality ratios for women increase with the amount smoked. In the largest prospective study the mortality ratio was 1.63 for the two-pack-a-day smoker as compared to nonsmokers.

3. Mortality ratios are generally proportional to the duration of cigarette smoking; the longer a woman smokes, the greater the excess risk of dying.

4. Mortality ratios tend to be higher for those women who begin smoking at a young age as compared to those who begin smoking later.

5. Mortality ratios are higher for those women who report they inhale smoke than for those who do not inhale.

6. Mortality ratios for women tend to increase with the tar and nicotine content of the cigarette.

7. Mortality ratios for female smokers are somewhat less than for male smokers. This may reflect differences in exposure to cigarette smoke, such as starting smoking later, smoking cigarettes with lower "tar" and nicotine content, and smoking fewer cigarettes per day than men.

8. Women demonstrate the same dose-response relationships with cigarette smoking as men. An increase in mortality occurs with an increase in number of cigarettes smoked per day, an earlier age of beginning cigarette smoking, a longer duration of smoking, inhalation of cigarette smoke, and a higher tar and nicotine content of the cigarette. Women who have smoking characteristics similar to men may experience mortality rates similar to men.

### **Morbidity**

The 1979 Report of the Surgeon General summarized the information on smoking and morbidity as follows:

1. In general, female current cigarette smokers report more acute and chronic conditions including chronic bronchitis and/or emphysema, chronic sinusitis, peptic ulcer disease, and arteriosclerotic heart disease, than women who never smoked.

2. There is a dose-response relationship between the number of cigarettes smoked per day and the frequency of reporting for most of the chronic conditions.

3. The age-adjusted incidence of acute conditions (e.g., influenza) for women smokers is 20 percent higher for women who had ever smoked than for nonsmokers.

Additional data from the Health Interview Survey (HIS) is presented:

1. Currently employed women who smoke cigarettes report more days lost from work due to illness and injury than working women who do not smoke.

2. Limitation of activity is reported more commonly among women under the age of 65 who have ever smoked than among those who never smoked.

### **Cardiovascular Diseases**

Coronary heart disease is the major cause of death among both males and females in the U.S. population. The 1979 Surgeon General's Report clearly demonstrated the close association of cigarette smoking and increased coronary heart disease among males. This report reviews the evidence associating cigarette smoking and cardiovascular disease in women:

1. Coronary heart disease, including acute myocardial infarction and chronic ischemic heart disease, occurs more frequently in women who smoke. In general, cigarette smoking increases the risk by a factor of about two, and in younger women cigarette smoking may increase the risk several fold.

2. Cigarette smoking is a major independent risk factor for coronary heart disease in women; it also acts synergistically with other coronary heart disease risk factors producing a risk greater than the sum of the individual risks.

3. The use of oral contraceptives by women cigarette smokers increases the risk of a myocardial infarction by a factor of approximately ten.

4. Women who smoke low "tar" and nicotine cigarettes experience less risk for coronary heart disease than women who smoke high "tar" and nicotine cigarettes, but their risk is still considerably greater than that of nonsmokers.

5. Increased levels of high-density lipoprotein (HDL) are correlated with a reduced risk for an acute myocardial infarction; women cigarette smokers have decreased levels of HDL.

6. Cigarette smoking is a major, independent risk factor for the development of arteriosclerotic peripheral vascular disease in women. Smoking cessation improves the prognosis of the disorder and has a favorable impact on vascular patency following reconstructive surgery.

7. Women cigarette smokers experience an increased risk for subarachnoid hemorrhage; the use of both cigarettes and oral

contraceptives appears to synergistically increase the risk for subarachnoid hemorrhage.

8. Women who smoke cigarettes may be more likely to develop severe or malignant hypertension than nonsmoking women.

### **Cancer**

1. Cigarette smoking is causally associated with cancer of the lung, larynx, oral cavity, and esophagus in women as well as in men; it is also associated with kidney cancer in women.

2. Cigarette smoking accounts for 18 percent of all cancers newly diagnosed and 25 percent of all cancer deaths in women. In 1980, 26,500 of the estimated 101,000 deaths, or over one-quarter of the deaths expected from lung cancer, will occur in women.

3. Women cigarette smokers have been reported to have between 2.5 and 5 times greater likelihood of developing lung cancer than nonsmoking women.

4. Among women the risk of developing lung cancer increases with increasing number of cigarettes smoked per day, duration of the smoking habit, depth of inhalation, and tar and nicotine content of the cigarette smoked. The risk is inversely related to the age at which smoking began.

5. A dose-response relationship has been demonstrated between cigarette smoking and cancer of the lung, larynx, oral cavity, and urinary bladder in women.

6. The rise in lung cancer death rates is currently much steeper in women than in men. It is projected that the age-adjusted lung cancer death rate will surpass that of breast cancer in the early 1980s.

7. The rapid increase in lung cancer rates in women is similar to but steeper than the rise seen in men approximately 25 years earlier. This probably reflects the fact that women first began to smoke in large numbers 25-30 years after the increase in cigarette smoking among men. Thus, neither men nor women are protected from developing lung cancer caused by cigarette smoking.

8. Cigarette smoking has been causally related to all four of the major histologic types of lung cancer in both women and men, including epidermoid, small cell, large cell and adenocarcinoma.

9. The use of filter cigarettes and cigarettes with lower levels of "tar" and nicotine by women is correlated with a lower risk of cancer of the lung and larynx compared to the use of high-"tar" and-nicotine or unfiltered cigarettes. The risk posed by smoking

low-“tar” cigarettes, however, is clearly greater than that among females who never smoked.

10. After cessation of cigarette smoking, a woman’s risk of developing lung and laryngeal cancer has been shown to drop slowly, equalling that of nonsmokers after 10–15 years.

11. Excessive ingestion of alcohol acts synergistically with cigarette smoking to increase the incidence of oral and laryngeal cancer in women.

### **Non-Neoplastic Bronchopulmonary Diseases**

1. Recent statistics indicate a rising death rate due to chronic obstructive lung disease (COLD) among women. The data available demonstrate an excess risk of death from COLD among smoking women over that of nonsmoking women. This excess risk is much greater for heavy smokers than for light smokers.

2. Women’s total risk of COLD appears to be somewhat lower than men’s, a difference which may be due to differences in prior smoking habits.

3. The prevalence of chronic bronchitis varies directly with cigarette smoking, increasing with the number of cigarettes smoked per day.

4. There is conflicting evidence regarding differences in the prevalence of chronic bronchitis in women and men. Several recent studies suggest that there is no significant difference in the prevalence of chronic bronchitis between male and female smokers. This may be the result, however, of increasingly similar smoking behavior of women and men.

5. The presence of emphysema at autopsy exhibits a dose-response relationship with cigarette smoking during life.

6. There is a close relationship between cigarette smoking and chronic cough or chronic sputum production in women, which increases with total pack-years smoked.

7. Women current smokers have poorer pulmonary function by spirometric testing than do female ex-smokers or nonsmokers, a relationship which is dose-related to the number of cigarettes smoked.

### **Interaction Between Smoking and Occupational Exposures**

1. The 1979 Surgeon General’s Report identified the ways in which smoking cigarettes may interact with the occupational environment. They include:

- a) Facilitation of absorption of physical contamination of cigarettes,
- b) Transformation of workplace chemicals into more toxic substances,



- c) Addition of the exposure to a toxic constituent of tobacco smoke to a concurrent exposure to the same constituent present in the workplace,
- d) Addition of a health effect due to environmental exposure to a similar health effect due to smoking,
- e) Synergy of exposures, and
- f) Causation of accidents.

2. Women are entering occupational environments with greater frequency, and thus may be experiencing greater exposures to physical and chemical agents.

3. Cohorts of women with a greater prevalence of smoking are currently reaching the ages of maximal disease occurrence, replacing earlier cohorts with lower cigarette exposures.

4. Physiologic differences in hormonal status between males and females constitute a potential source of differing responses.

5. In the workplace women who are pregnant present a nine-month exposure opportunity, including potential teratogenic and perinatal mortality effects.

6. Concurrent exposure of women to smoking and asbestos resulted in a clear excess of cancer of the lung.

7. Women smokers exposed to cotton dust run a higher risk of developing byssinosis, bronchitic syndromes, and abnormal pulmonary function tests than nonsmoking women.

### **Pregnancy and Infant Health**

1. Babies born to women who smoke during pregnancy are, on the average, 200 grams lighter than babies born to comparable nonsmoking women.

2. The relationship between maternal smoking and reduced birth weight is independent of all other factors that influence birth weight including race, parity, maternal size, socioeconomic status, and sex of child; it is also independent of gestational age.

3. There is a dose-response relationship between maternal smoking and reduced birth weight; the more the woman smokes during pregnancy, the greater the reduction in birth weight.

4. If a woman gives up smoking early during pregnancy, her risk of delivering a low-birth-weight baby approaches that of a nonsmoker.

5. The ratio of placental weight to birth weight increases with increasing levels of maternal smoking, reflecting a considerable decrease in mean birth weight and a slight increase in mean placental mass; this may represent an adaptation to relative fetal hypoxia.

6. The pattern of fetal growth retardation that occurs with maternal smoking is a decrease in all dimensions including body length, chest circumference, and head circumference.

7. Maternal smoking during pregnancy may adversely affect the child's long-term growth, intellectual development, and behavioral characteristics.

8. Maternal smoking during pregnancy exerts a direct growth-retarding effect on the fetus; this effect does not appear to be mediated by reduced maternal appetite, eating or weight gain.

9. The risk of spontaneous abortion, fetal death, and neonatal death increases directly with increasing levels of maternal smoking during pregnancy; interaction of maternal smoking with other factors which increase perinatal mortality may result in an even greater risk.

10. Excess deaths of smokers' infants are found mainly in the coded cause categories of "unknown" and "anoxia" for fetal deaths, and the categories of "prematurity alone" and "respiratory difficulty" for neonatal deaths; this suggests that the excess deaths are due to problems of the pregnancy, rather than to abnormalities of the fetus or neonate.

11. Increasing levels of maternal smoking result in a highly significant increase in the risk of abruptio placentae, placenta previa, bleeding early or late in pregnancy, premature and prolonged rupture of membranes, and preterm delivery—all of which carry high risks of perinatal loss.

12. Although there is little effect of maternal smoking on mean gestation, the proportion of fetal deaths and live births that occur before term increases directly with maternal smoking level. Up to 14 percent of all preterm deliveries in the United States may be attributable to maternal smoking.

13. The incidence of preeclampsia is decreased among women who smoke during pregnancy; however, if preeclampsia develops in a smoking woman, the risk of perinatal mortality is markedly increased compared to preeclamptic nonsmokers.

14. An infant's risk of developing the "sudden infant death syndrome" is increased by maternal smoking during pregnancy.

15. There are insufficient data to support a judgement on whether maternal and/or paternal cigarette smoking increases the risk of congenital malformations.

16. Infants and children born to smoking mothers may experience more long-term morbidity than those born to non-smoking mothers; however, studies usually cannot distinguish between the effects of smoking during pregnancy and the effects of the infant's or child's passive exposure to cigarette smoke after birth.

17. Studies in women and men suggest that cigarette smoking may impair fertility.

18. Experimental studies on tobacco smoke, nicotine, carbon monoxide, polynuclear aromatic hydrocarbons, and other constituents of smoke help define pathways by which maternal smoking during pregnancy may exert its aforementioned effects.

### **Peptic Ulcer Disease**

The 1979 Surgeon General's Report included evidence that cigarette smoking in males was significantly associated with the incidence of peptic ulcer disease and increased the risk of dying from peptic ulcer disease by approximately two-fold. The effect of smoking on pancreatic secretion and pyloric reflux demonstrated among men may provide a mechanism by which peptic ulcers develop.

1. Female smokers show a prevalence of peptic ulcer higher than that of nonsmokers by approximately two-fold.
2. The effect of cessation on healing is not known.

### **Interactions of Smoking with Drugs, Food Constituents and Responses to Diagnostic Tests**

Most published studies investigating the effects of cigarette smoking on drug use have been performed on mixed populations; factors specific for women have not been demonstrated to date. It has, however, been clearly demonstrated that women are prescribed and consume more prescription drugs than men.

1. Studies of selected drugs indicate that smoking may affect clinical responses and alter the dose required for an effective therapeutic result.
2. Smoking interacts with oral contraceptive use to increase the risk of myocardial infarction and subarachnoid hemorrhage.
3. Common clinical laboratory parameters are altered in smokers compared to nonsmokers; the health significance of these changes is unknown.
4. Insufficient information exists for assessment of the impact of smoking on the nutritional needs of women.

### **Psychosocial and Behavioral Aspects of Smoking in Women**

1. The percentage of 17-18 year old women who smoke has shown a steady rise between 1968 and 1979. It now appears, however, that the increase in smoking prevalence among all 12-18 year old females has leveled off and begun to decline. Young women born after 1962 show a substantially reduced

initiation of smoking and will probably have a much lower prevalence of smoking as adults.

2. Those young women who do begin to smoke are starting to smoke regularly at a younger age, with more than half of the male and female adolescents who begin to smoke starting before the 10th grade.

3. The earlier tobacco is used and the greater the number of cigarettes smoked per day, the less likely an attempt to quit will be successful.

4. The percentage of women smokers who smoke more than one pack per day is increasing.

5. Adolescent and adult women are more likely to use low-tar and-nicotine cigarettes, smoke fewer cigarettes per day and inhale less deeply than do men, but the difference between the sexes in these patterns of smoking is decreasing. Adolescent and adult black women are more likely to be smokers than their white peers, but they smoke fewer cigarettes per day.

6. Adolescents from low income families, single parent families, and families with lower parental educational levels are more likely to become smokers.

7. Female and male adolescents are more likely to begin smoking if a parent or older sibling also smokes.

8. Adolescent smokers associate with peers who smoke and nonsmokers associate with nonsmoking peers.

9. Adolescent girls overestimate the percentage of their peers who smoke and they have a very positive image of the people in cigarette advertisements, but they are less likely than adolescent boys to see smoking as a social asset.

10. Adolescent girls who smoke tend to be more outgoing but feel less able to influence their future.

11. Adolescents experience stress due to feelings of unattractiveness, incompetency in school achievement and personal relations, limited opportunity for personal growth and concern over future social and economic roles. This stress may be the common mechanism producing the increased rates of smoking in some groups.

12. The factors associated with successful quitting by adolescents of either sex are lower number of cigarettes smoked per day, higher educational aspirations and achievement, greater acceptance of the health risk of smoking, and having more nonsmokers among their friends.

13. It is possible that women and men modify their smoking in order to maintain a constant nicotine level.

14. Women are more likely than men to smoke in order to reduce stress.

15. Women at higher education and income levels are more

likely to succeed in quitting. Additional factors associated with successful quitting are a strong commitment to change, the use of behavioral techniques and reliable social support for quitting. Women have been reported to show lower rates than men of successful cessation following organized cessation programs, a difference which is less apparent in those programs that include social support.

**PART I:**

**PATTERNS OF CIGARETTE SMOKING.**

## **PATTERNS OF CIGARETTE SMOKING**

### **Introduction**

This chapter traces the evolution of cigarette smoking among successive generations of American women and men during the twentieth century. The available evidence demonstrates that women have differed from men in their historical onset of widespread cigarette use, in the rate of diffusion of smoking among each new birth cohort, in their intensity of cigarette smoking, and in their use of various types of cigarettes.

Four main conclusions emerge from this analysis. First, although men rapidly took up smoking during the early decades of this century, the proportion of adult female cigarette smokers did not exceed one-quarter until the onset of World War II. The peak intensity of smoking occurred among women born after 1920. Second, as a result of higher past rates of quitting and lower past rates of initiation among men, as well as changes in the type of cigarette consumed, the smoking characteristics of women and men are now becoming increasingly similar. Third, the prevalence of cigarette smoking among adult American women and men is declining. This conclusion applies to all age groups, but with less certainty to the youngest generation of women. Fourth, increasing public awareness of the health consequences of smoking has resulted in significant changes in the nature of the cigarette product. Yet little is known about the effects of these product changes on the initiation, maintenance and cessation of smoking, particularly among women.

Since the last review of cigarette smoking in the 1979 Report of the Surgeon General (24), two new national surveys have been performed under the sponsorship of the National Center for Health Statistics and the National Institute of Education. This chapter relies in part on the recent, preliminary results of these surveys.

### **The Rise of Cigarette Smoking: 1900–1950**

Although the use of cigarettes in the United States was observed as early as 1854 (42,48), consumption did not increase dramatically until after 1900. As shown in Figure 1, per capita consumption of all types of cigarettes increased by more than tenfold from 1900 to 1920. Despite a transient decline during the Great Depression, consumption increased from 665 cigarettes per capita in 1920 to 3,522 cigarettes per capita in 1950 (50).

A continuous, nationally representative series of smoking prevalence rates during the period 1900 to 1950 is not publicly available. Nevertheless, numerous sources can be pieced to-

gether to characterize the differential growth of cigarette smoking among women and men.

Figure 2 depicts estimates of the percentage of male and female current cigarette smokers in the greater Milwaukee area, as compiled by the Milwaukee Journal (38). In 1923, the first reported year of this survey, 51.8 percent of males aged 18 years and over smoked cigarettes. Sixty percent of male cigarette smokers also smoked pipes or cigars. In total, 87 percent of adult males used some type of tobacco (38).

Although earlier survey estimates of male smoking rates are unavailable, it appears that the rise of cigarette consumption prior to 1923 reflected both the conversion of established male non-cigarette tobacco users to cigarette smoking and the recruitment of a new generation of younger male smokers during World War I. Innovations in cigarette production and marketing have been cited as influential factors in this rapid growth (39,48,67). Camel cigarettes, a blend of lighter Burley smoking tobaccos with previously dominant Turkish cigarette tobaccos, were introduced in 1913 and within months attained a national market. Two similar brands, Lucky Strike and Chesterfield, followed in 1916 and 1919, respectively (39,48,67). During World War I, the War Industries Board estimated that soldiers of the Allied Armies consumed 60 to 70 percent more tobacco than they had used in civilian life (28,29).

Cigarettes continued to dominate other forms of tobacco among male smokers throughout the 1920s and 1930s. By 1935, 62.5 percent of adult males in the greater Milwaukee area smoked cigarettes (Figure 2), while the percentages of pipe and cigar users had declined substantially. Average cigarette consumption frequency among men smokers increased from 3.7 packs per week in 1923 to 4.8 packs per week in 1935 (38).

Consumption among men accelerated during World War II (Figures 1 and 2). In 1944, more than 25 percent of cigarettes produced in the U.S. were distributed to overseas forces (29), typically for free or at low cost (39), to the point where subsequent shortages developed in the domestic market. By 1948, 67.1 percent of adult males in the Milwaukee area smoked cigarettes (Figure 2). This estimate of the prevalence of cigarette use among urban men is confirmed by other local consumer surveys performed in that year. For example, in 1948, adult male smoking rates were 69.1 percent in Omaha, 67.4 percent in Birmingham, 69.4 percent in Philadelphia, 63.9 percent in Seattle, and 63.4 percent in San Jose (37).

The growth of cigarette smoking among women occurred much later in the face of strong social taboos. Gottsegen noted that "the ultra smart set and women social leaders began to



smoke at the turn of the century" (13). By 1906, American "girl stenographers" were reported smoking cigarettes clandestinely (5). By 1919, some younger women in New York were reported smoking at dinner parties "with a trace of defiance" (48). By 1922, New York women were smoking openly on the streets and in bus tops (48).

The first advertisement showing a woman smoking was Lorillard's 1919 publicity for Helmar cigarettes (43,48). In 1926, a young woman in a Liggett and Myers' Chesterfield advertisement did not smoke but pleaded, "Blow some my way" (6). In April, 1927, a Philip Morris advertisement for Marlboro cigarettes noted that "women, when they smoke at all, quickly develop discriminating taste," and that Marlboro cigarettes were as "mild as May" (2). In 1928, a Lucky Strike advertisement urged women to "reach for a Lucky instead of a sweet" (31,39,48). In 1934, Eleanor Roosevelt smoked cigarettes publicly (26). By 1940, handbags and cosmetic compacts were typically designed to hold cigarettes (13).

Although the Milwaukee Journal (38) reported that 16.7 percent of adult women smoked cigarettes in 1934 (Figure 2), prior estimates of women's smoking prevalence are sporadic. Wessel estimated that women consumed 5 percent of all cigarettes in 1924 (66). Moody's Investors Service estimated that women smoked 12 percent of all cigarettes smoked in 1929 (44). The average daily consumption of women smokers, as compared to men smokers, is not documented for that period. If men smokers consumed approximately twice as many cigarettes per day as women smokers (cf. the Milwaukee Journal's 1934 survey report that women's consumption frequency was 135 packs per year as compared to 244 packs per year for male smokers), and if the estimates of male smoking prevalence rates in Figure 2 are taken as nationally representative, and if there were approximately 5 percent more adult males than adult females during the 1920 to 1930 decade (51), then Wessel's estimate yields a 6 percent adult female smoking prevalence in 1924 and Moody's estimate yields a 16 percent prevalence in 1929.

The Milwaukee Journal series in Figure 2 must be interpreted in light of changes in the type of survey respondent and the wording of questions designed to elicit smoking practices (see caption to Figure 2). Moreover, this urban population series may not be representative of all American women. Nevertheless, the publicly available survey data sources are consistent with the conclusion that smoking rates among women did not exceed one-quarter until the onset of World War II.

Based on 10,000 applications for insurance policies during 1930 to 1940, Ley (32) estimated age-standardized smoking rates

of 63.9 percent of men and 20.8 percent of women aged 15 years and over. In 1935, Fortune Magazine, in the first nation-wide survey (12), reported that 52.5 percent of adult men and 18.1 percent of adult women smoked cigarettes. (See Table 1). Among those under 40 years of age, 65.5 percent of men and 26.2 percent of women were smokers. Among those over 40 years, 39.7 percent of men and 9.3 percent of women were smokers. Urban-rural differences in smoking were significant. The proportion of smokers ranged from 61.4 percent of men and 31.2 percent of women in cities with population over one million, to 44.1 percent of men and 8.6 percent of women in rural areas with population under 2,500. A survey of 250 urban women by the Market Research Corporation in 1937 reported 26 percent regular smokers and an additional 23 percent occasional smokers (47).

After 1940, women's smoking rates accelerated, as new generations of women, particularly younger women in urban areas, entered the labor force (see also title "Occupation and Environment" in this Report). In 1944, the Gallup Poll reported 48 percent adult male smokers and 36 percent adult female smokers (4). In 1949, the Gallup findings were 54 percent male and 33 percent female (4). Local consumer surveys of urban areas in 1948 revealed 37.6 percent adult women cigarette smokers in Milwaukee (see also Figure 2), 34.3 percent in Omaha, 35.6 percent in Birmingham, 46.7 percent in Philadelphia, 38.3 percent in Seattle, and 34.0 percent in San Jose (37). Conover, citing "trade journal" surveys in the three or four years prior to 1950, reported smoking prevalence rates of 65 to 70 percent among men and 40 to 45 percent among women (9).

Although the differential growth of cigarette use among various socioeconomic groups is not well documented, the available data during this period suggest that male smoking rates declined with increasing income, while the relation of women's smoking to income was less clear. The Milwaukee Journal in 1945 noted 58 percent of men with monthly rents over \$50 were smokers, and 75 percent of men with rents under \$30 per month were smokers (38). Among women, the corresponding proportions were 32 and 37 percent respectively. In Mills and Porter's 1947 survey of Columbus, Ohio (36), 28.3 percent of white females and 64.9 percent white males smoked cigarettes, whereas 36.4 percent black females and 68.9 percent black males smoked cigarettes (estimates calculated from the age distribution data provided in Table 6 of (36)). Kirchoff and Rigdon, in a survey of over 21,000 patients, visitors, and employees of hospitals in Houston and Galveston, noted that 63.2 percent white males, and 33.4 percent white females, 66.3 percent black males, and 32.2 percent black females smoked cigarettes (30).

All of the above findings reinforce the conclusion that the onset of widespread cigarette use among women lagged behind that of men by 25 to 30 years. This historical delay in the growth of cigarette smoking among women has also been documented for the United Kingdom (8,46,49).

### **The Emergence of Filtertip Cigarettes: 1951–1963**

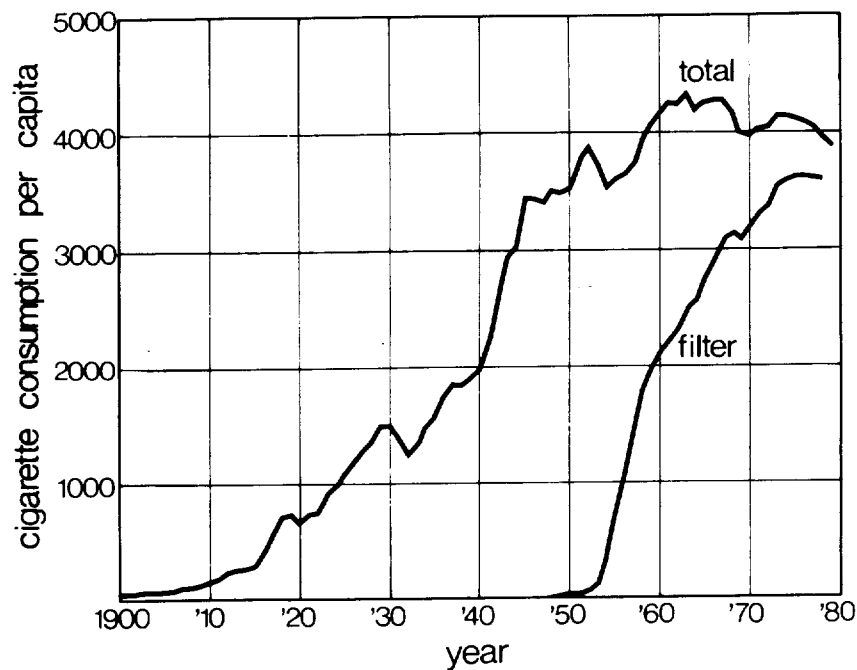
As shown in Figure 1, total per capita consumption of cigarettes declined during 1953 to 1954. This decline was coincident with the appearance in the popular press of reports seriously suggesting a link between cigarette smoking and lung cancer (10,33,34,40). Thereafter, the consumption of filtertip cigarettes increased rapidly (Figure 1). In 1953 filtertip cigarettes constituted 2.9 percent of cigarette production. By 1958, their share of production had increased to 45.3 percent, and by 1963 it was 58.0 percent (50).

The transient decline during 1953 to 1954 in the number of cigarettes consumed was not clearly matched by a decrease in the proportion of cigarette smokers (27). At least in urban areas, the proportion of women smokers continued to increase. From 1953 to 1958, the prevalence of adult female smoking increased from 42.9 to 45.4 percent in Milwaukee (Figure 2), from 38.4 to 42.6 percent in Omaha, from 47.0 to 50.2 in Washington, D.C., and from 39.6 to 44.4 percent in San Jose (37).

At the same time, both women and men rapidly converted to filtertip cigarettes. By 1958, filter cigarette use prevailed among 61 percent of women smokers and 42 percent of men smokers in Milwaukee, 54 percent of women smokers and 43 percent of men smokers in Omaha, 53 percent of women smokers and 47 percent of men smokers in Washington, D.C., and 59 percent of women smokers and 42 percent of men smokers in San Jose (37). In a nation-wide 1964 survey reported by the National Clearinghouse for Smoking and Health (64), 79 percent of adult female smokers and 54 percent of adult male smokers used filter cigarettes.

### **Increasing Public Health Awareness: 1964–1979**

Per capita consumption reached a peak of 4,336 in 1963 (Figure 1). It declined transiently after the appearance in January 1964 of the first Report of the Advisory Committee to the Surgeon General (52). Per capita consumption continued to decline during the subsequent period of increased publicity concerning the health hazards of smoking (24,27). Since 1975, per capita consumption has declined at an average rate of 1.4 percent an-



**FIGURE 1.—Annual consumption of cigarettes and filtertip cigarettes per person aged 18 years and over, 1900-1979\***

\*Total per capita consumption data for 1917-19 and 1940-79 include overseas forces. Total per capita consumption for 1979 is preliminary estimate. Per capita consumption of filtertip cigarettes derived from annual data on the filtertip share of total cigarette production.  
SOURCE: U.S. Department of Agriculture (50).

nually. The most recent 1979 estimate of 3,900 cigarettes per capita closely approximates that observed in 1952.

Table 1 summarizes the results of selected, nationally representative surveys of adult cigarette use during the period 1935 to 1979. Except for the Fortune survey of 1935 (12) and the supplement to the Current Population Survey in 1955 (16), these data were collected under the sponsorship of the National Center for Health Statistics. The results of other recent national surveys of adult cigarette use (34,57,58,61,62,64), revealing very similar trends in the prevalence of smoking, were described in the 1979 Surgeon General's Report (24).

Among adult males, the prevalence of regular cigarette use has declined continuously since 1965, with more marked decreases in the intervals 1965 to 1970 and 1976 to 1978. (The absolute standard errors for the National Center for Health Statis-

tics estimates for 1970 to 1976 are less than 0.3 percent. The absolute standard errors for 1978 and 1979 are 0.6 percent.) Among adult women, the direction of change in smoking prevalence is less clear. The estimates for the interval 1976 to 1979, however, suggest a recent downturn. The preliminary 1979 estimate of 32.3 percent for the overall prevalence of adult cigarette smoking among both sexes represents the lowest recorded value in at least 45 years. (The overall prevalence of cigarette smoking in the 1935 Fortune Magazine survey was 37.3 percent among adults of both sexes.)

**TABLE 1.—Estimates of the prevalence of regular cigarette smoking among adults, United States, selected national surveys, 1935–1979**

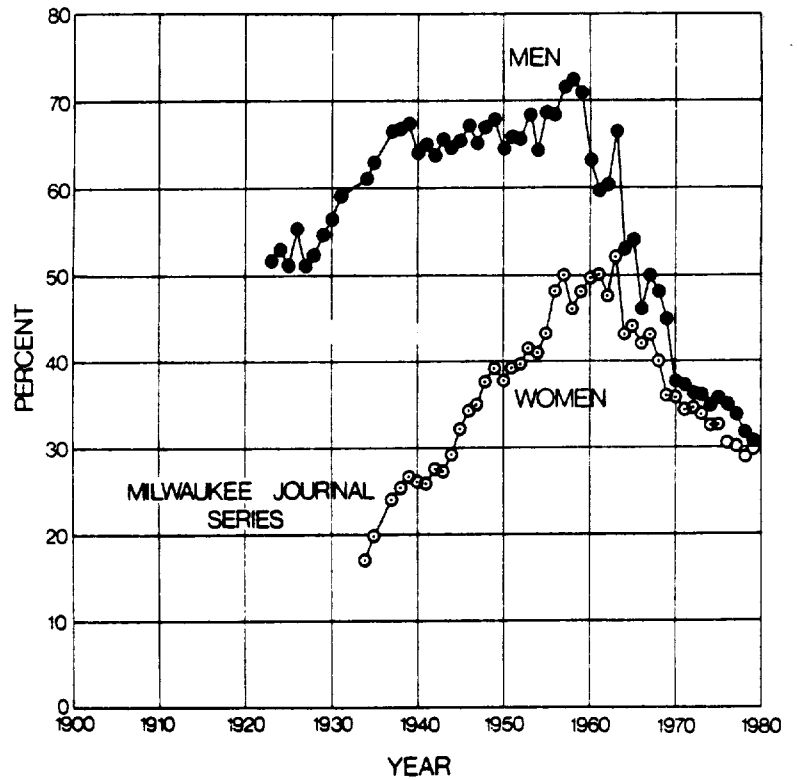
Year	Females	Males
1935	18.1	52.5
1955	24.5	52.6
1965	33.3	51.1
1970	31.1	43.5
1974	31.9	42.7
1976	32.0	41.9
1978	29.9	37.0
1979	28.2	36.9

Data for 1978 are revisions of preliminary estimates reported in Harris (26). Data for 1979 are preliminary estimates based on a sample of over 13,000 interviews conducted during January–June 1979, provided by Health Interview Survey, National Center for Health Statistics. 1955 data represent persons 18 years and over. 1976 data represent persons 20 years and over. Estimates for the years 1965, 1970, 1974, 1978 and 1979 represent persons 17 years and over.

SOURCE: Fortune Magazine (12), Haenszel, W. (16), U.S. Department of Health, Education, and Welfare (54–56, 58–59).

These patterns of change in smoking prevalence applied to both white and black adults. For white men, the prevalence of regular smoking declined from 51.5 percent in 1965 to 36.3 percent in 1979. For black men, the prevalence of regular smoking declined from 60.8 percent in 1965 to 42.0 percent in 1979. For white women, smoking prevalence declined from 34.2 percent in 1965 to 28.2 percent in 1979. For black women smoking prevalence declined from 34.4 percent in 1965 to 28.9 percent in 1979. Racial differences in cigarette use are discussed in greater detail in the chapter in this report entitled “Psychosocial and Behavioral Aspects of Smoking in Women.”

Although the Milwaukee area data for 1964 to 1979 do not closely match these national estimates, Figure 2 does show a marked decline in smoking rates for both sexes during 1964 to



**FIGURE 2.—Percentage of adult current cigarette smokers in the greater Milwaukee area, 1924–1979\***

\*Prior to 1941, the wording of the question eliciting cigarette use and the type of respondent are not recorded. From 1941 to 1954, men were asked, "Do you smoke cigarettes?" From 1955 to 1959, all respondents were asked, "Do any men (women) in your household smoke cigarettes with (without) a filter tip?" From 1960 to 1965 and in 1967, both men and women were asked "Have you bought, for your own use, cigarettes with (without) a filter tip in the past 30 days?" In 1966 and from 1968 to 1979, both men and women were asked, "Have you bought, for your own use, cigarettes with (without) a filter tip in the past 7 days?" All percentages reflect adults aged 18 years and over. Data for women from 1976 to 1979 (open circles) represent filtertip cigarette smokers only.

SOURCE: Milwaukee Journal (38).

1970, a deceleration in the decline of smoking prevalence during 1971 to 1975, and a resumption of the decline in prevalence among men in the last four years.

The cessation of cigarette smoking has been a significant factor in explaining this overall decline in smoking prevalence (24). Column (i) of Table 2 presents estimates of the percentage of recent smokers who made a "fairly serious attempt to quit"

**TABLE 2.—Estimated rates of attempted and successful quitting among adult, recent cigarette smokers, United States, 1970–1979**

	(i) Percent of All Recent Smokers Who Attempted to Quit in Past Year	(ii) Percent of Smokers Attempting to Quit in Past Year Who Reported Successfully Quitting	(iii) Percent of All Recent Smokers Who Reported Successfully Quitting in Past Year
<b>Women</b>			
1970	40.8	21.3	8.7
1975	30.2	19.5	5.9
1978	32.7	18.8	6.2
1979	32.9	21.6	7.0
<b>Men</b>			
1970	44.4	26.4	11.7
1975	28.3	20.1	5.7
1978	29.1	21.5	6.3
1979	31.4	21.3	6.7

1970 and 1975 data from surveys of persons aged 21 years and over, conducted by National Clearinghouse for Smoking and Health. 1978 and 1979 data from the Health Interview Survey of persons aged 17 years and over, conducted by the U.S. National Center for Health Statistics. 1979 data are preliminary estimates based on interviews during January–June of that year.  
SOURCE: U.S. Department of Health, Education, and Welfare (54,61,62).

within one year of the interview date. (Recent smokers include all current smokers plus those former smokers reported to have stopped within one year of interview.) Column (ii) shows what proportion of those attempting to quit regarded themselves as former smokers. Column (iii) shows the proportion of all recent smokers (whether or not they attempted or succeeded quitting) who reported themselves as recent former smokers. These data necessarily reflect respondents' self-assessment of both the seriousness of a quit attempt and their degree of success. Nevertheless, they do provide an indication of the representative smoker's annual probability of attempting to quit, the probability of successful cessation given a quit attempt, and the overall annual smoking cessation rate. (The absolute standard errors in Table 4 are approximately 1.0 percent, 1.5 percent, and 0.3–0.5 percent for columns (i), (ii), and (iii), respectively.)

All three indicators of smoking cessation were highest for men in 1970. Although a relatively large proportion of women smokers attempted to quit smoking in 1970 (column (i)), their