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 women 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 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-

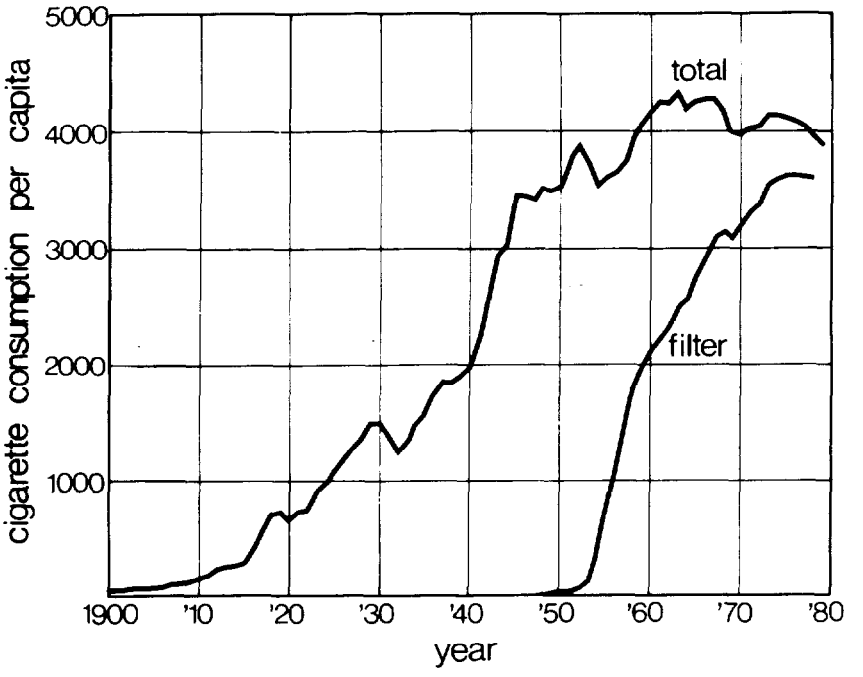

FIGURE 1.—Annual consumption of cigarettes and filtertip cigarettes per person aged 18 years and over, 1900–1979*

*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

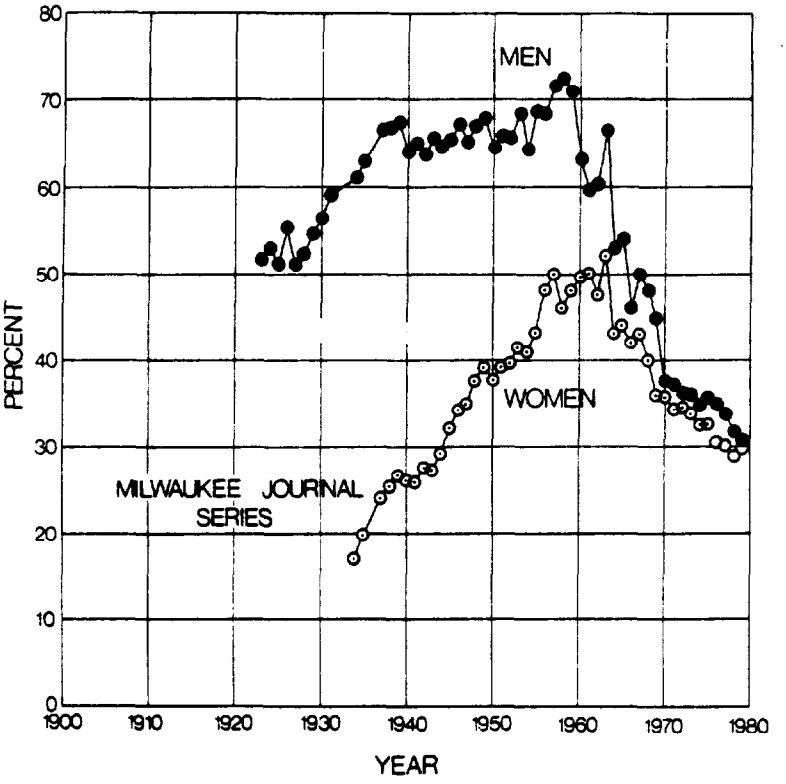

FIGURE 2.—Percentage of adult current cigarette smokers in the greater Milwaukee area, 1924–1979*

*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 cigarets?" From 1955 to 1959, all respondents were asked, "Do any men (women) in your household smoke cigarets 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, cigarets 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, cigarets with (without) a filtertip 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
Women			
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
Men			
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

probability of success in that year was significantly lower than that of men (column (ii)). Quit attempt rates for both sexes (column (i)) declined by 1975, but have increased in 1978 to 1979. With respect to the probability of attempting to quit and the success rate, adult men and women cigarette smokers are now indistinguishable.

Table 3 displays recent changes in the distribution of cigarette brands according to F.T.C. "tar" contents. The proportion of adults smoking cigarettes with F.T.C. "tar" delivery less than 15 milligrams has increased from 9.5 percent of women and 2.9 percent of men in 1970 to 38.5 percent of women and 28.1 percent of me in the first half of 1979. A corresponding increase in the proportion of smokers of cigarettes with F.T.C. nicotine delivery less than 1.0 milligram was also observed.

TABLE 3.—Estimated percentage distribution of adult current regular cigarette smokers according to F.T.C. "tar" content of primary brand, United States 1970–1979

Year	Less Than 5.0 mg	5.0 to 9.9 mg	10.0 to 14.9 mg	15.0 to 19.9 mg	20.0 mg or More
Women					
1970	0.7	2.0	6.8	67.1	23.4
1975	1.2	1.2	15.0	75.1	7.5
1978	5.3	8.8	21.1	59.2	5.7
1979	5.6	9.5	23.4	55.4	6.1
Men					
1970	0.2	0.9	1.8	61.3	28.1
1975	0.6	1.1	11.0	68.1	19.2
1978	3.3	6.2	13.5	63.5	13.6
1979	2.6	8.5	17.0	60.1	11.8

1979 data are preliminary estimates provided by the National Center for Health Statistics. 1970 and 1975 data represent adults aged 21 years and over. 1978 and 1979 data represent adults aged 17 years and over. Estimates exclude those with unknown primary cigarette brand.
SOURCE: U.S. Department of Health, Education, and Welfare (54,61,62).

At the same time, the average daily cigarette consumption of adult smokers has increased. Table 4 shows recent changes in the distribution of reported daily cigarette consumption among current smokers. These data must be interpreted in light of possible underreporting biases (65) and, in particular, a strong tendency for respondents to round off their reported daily consumption to one pack. Nevertheless, the percent of women smoking less than one pack per day has declined, while the proportion smoking more than one pack per day has increased. Except for 1979, a similar trend is observed for men. (The absolute

standard errors of the 1978 and 1979 estimates are approximately 1.0 percent.)

The data of Table 4 represent the more recent portion of an apparently long run trend toward increasing daily cigarette consumption among regular smokers. In 1924, Milwaukee men smokers consumed an average of 10 cigarettes per day (38). In 1934, male smokers in Milwaukee consumed an average of 13.4 cigarettes per day, while women smokers consumed 7 per day (38). If cigarette consumption in 1935 was 1,564 per adult (Figure 1 and (50)), and if the overall percentage of adult smokers was 37.3 percent (12), then mean consumption per adult smoker was 11.5 cigarettes per day. If consumption per adult was 3,597 in 1955 and if the prevalence of regular smoking was 37.6 percent (16), then mean consumption per adult in that year was 26.2 cigarettes. The corresponding calculation based on 1979 per capita consumption data and adult prevalence data (Figure 1 and Table 1) yields 33.3 cigarettes per day.

Numerous epidemiological studies and other surveys performed during the period 1950 to 1965 have shown that for both

TABLE 4.—Estimated percentage distribution of adult current cigarette smokers according to reported daily consumption frequency, United States, 1965–1979

Year	Percent Smoking Less Than 15 Cigarettes per Day	Percent Smoking 25 Cigarettes or More per Day
Women		
1965	44.5	13.7
1970	39.1	18.0
1974	38.7	18.5
1976	36.5	19.6
1978	36.0	21.0
1979	34.6	22.4
Men		
1965	29.6	24.5
1970	27.8	27.7
1974	26.3	30.6
1976	24.2	31.1
1978	23.4	34.2
1979	26.4	32.2

Data for 1976 represent persons aged 20 years and over. All other years represent persons aged 17 years and over. Data for 1979 are preliminary estimates based on interviews conducted during January–June of that year, provided by the Health Interview Survey, National Center for Health Statistics.

SOURCE: Harris, J. E. (26), U.S. Department of Health, Education, and Welfare (54–56,58–59).

sexes, especially for women, the proportion of heavy smokers was larger among the younger age groups (14,16,19,20,22, 30,36,61,64). These findings applied to current daily cigarette consumption and lifetime maximum cigarette consumption. They are consistent with the hypothesis that regular smokers in past decades consumed fewer cigarettes per day than contemporary smokers.

The empirical relationships between rates of smoking cessation (Table 2), changes in F.T.C. "tar" and nicotine delivery of cigarettes (Table 3), and increases in daily cigarette consumption (Table 4) are poorly understood (25). It is not known whether smokers of the lowest "tar" cigarettes are more or less likely to attempt to quit, or to succeed in quitting, than smokers of conventional filtertip or nonfilter cigarettes. The extent to which the act of switching to a lower "tar" cigarette may serve as a substitute for quitting may differ among women and men. The observed increase in daily cigarette consumption among current smokers could represent the effect of: higher cessation rates among lighter smokers; an increase in the daily cigarette consumption of continuing smokers; or an increased daily cigarette consumption of new entrants into the smoking population; or a combination of these effects (24). The relationship of these possible mechanisms to the observed increase in the proportion of filtertip cigarette and low "tar" cigarette smokers is not well elucidated.

Exposure to Cigarette Smoke Among Successive Birth Cohorts

Figures 3 and 4 depict estimates of the prevalence of current cigarette smoking from 1900 to 1978 among successive birth cohorts of men and women. Each continuously graphed time series corresponds to individuals born during a particular decade. For example, among women born from 1931 to 1940 (Figure 4), who are now 40 to 49 years old, the prevalence of smoking rose rapidly during the post World War II period and reached a peak of 45 percent by 1963. Thereafter, their overall prevalence of smoking declined to 39 percent in 1978.

These prevalence data were constructed from the reported lifetime smoking histories of over 13,000 respondents to the Health Interview Survey during July to December, 1978. (For related applications of this methodology, see 7,15,27). Although the accuracy of survey recollection of age started smoking, age of smoking cessation, and the duration of significant, temporary periods of abstinence is not known, no particular source of recall bias has been identified (15,16). However, the significantly higher mortality rates of continuing smokers, as compared to

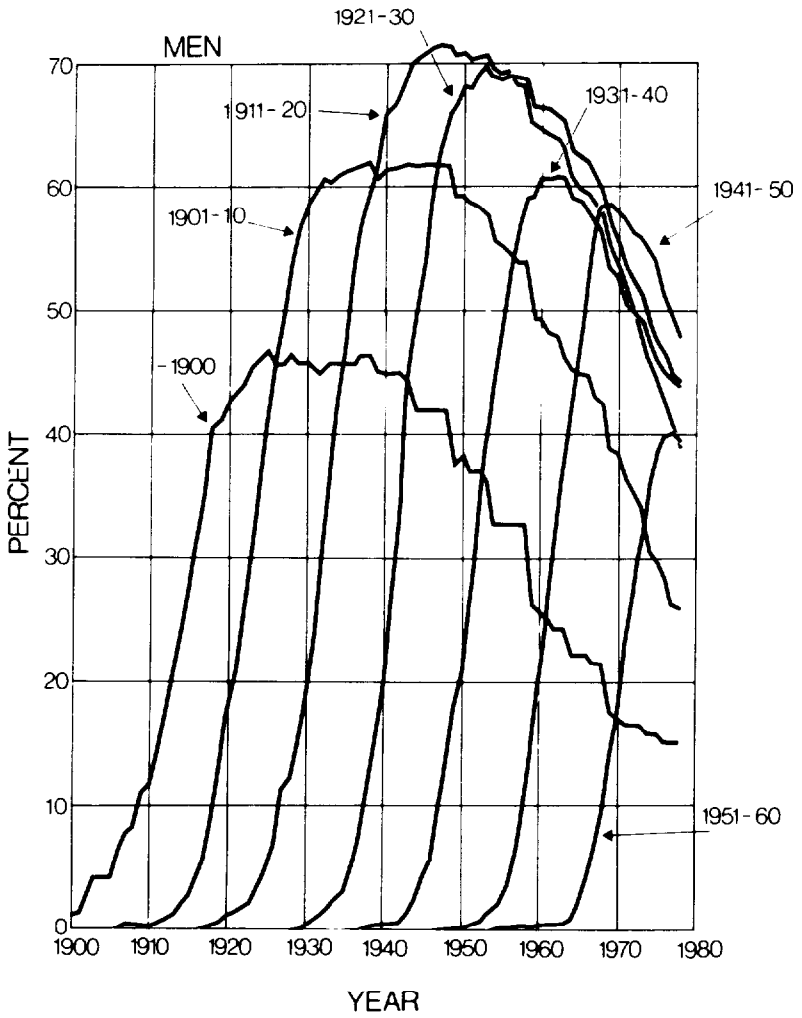

FIGURE 3.—Changes in the prevalence of cigarette smoking among successive birth cohorts of men, 1900–1978

Calculated from the results of over 13,000 interviews conducted during the last two quarters of 1978, provided by Division of Health Interview Statistics, U.S. National Center for Health Statistics.

SOURCE: U.S. Department of Health, Education, and Welfare (60).

nonsmokers or former smokers (1,11,17,18,41,45,46,52), introduces a selection bias that may understate the prevalence of past smoking for the oldest cohorts. For example, on the basis of the insurance life tables recently reported by Cowell and Hirst (11), a male cigarette smoker at age 32 has an estimated 25 percent probability of surviving to age 80, as compared to 49

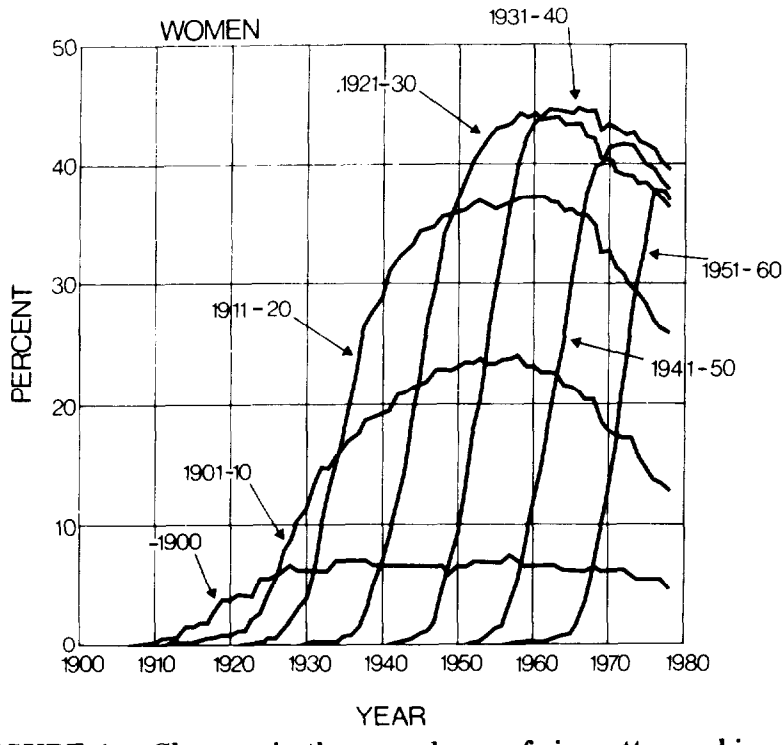

FIGURE 4.—Changes in the prevalence of cigarette smoking among successive birth cohorts of women, 1900–1978

Calculated from the results of over 13,000 interviews conducted during the last two quarters of 1978, provided by Division of Health Interview Statistics, U.S. National Center for Health Statistics.
SOURCE: U.S. Department of Health, Education, and Welfare (60).

percent for a nonsmoker. The estimated probabilities of surviving to age 60 are 80 percent for smokers and 93 percent for nonsmokers, respectively. Therefore, the peak smoking prevalence rate of men born before 1900, calculated from 1978 survey responses to be 46 percent in 1937, could actually have been as high as 65 percent. Since individuals who quit smoking have a higher survival than continuing smokers (18,45), the actual point in time at which smoking rates peaked in this cohort may have been later than 1937. This effect is less likely to be important among men born after 1910, who are now approaching 70 years old. A similar calculation for men born, for example, between 1911 and 1920 reveals that their peak smoking rate may have been understated by at most 2 or 3 percentage points.

This source of bias is likely to be less important for older women. On the basis of age-specific mortality data reported by

Hammond in 1966 (18, Appendix Table 2b), women continuing to smoke cigarettes from age 35 would have an estimated 48 percent chance of surviving to age 80 years, as compared to 54 percent for nonsmokers. The estimated probabilities of survival to age 60 would be 91 percent for smokers and 93 percent for nonsmokers. If these survival data are currently applicable to women smokers and nonsmokers, then the estimated peak prevalence rate of smoking among women born before 1910 could be understated by only one to two percentage points.

Despite these possible biases, the predicted percentages of current smokers in Figures 3 and 4 are consistent with past survey and epidemiological data on the smoking habits of different age groups (12,14–16,19–23,30,35,36,55).

Comparison of Figures 3 and 4 reveals the following conclusions. (a) The most marked differences in smoking prevalence among men and women appeared in those individuals born before 1910, who are now over 70 years of age. (b) Women born between 1921 and 1940, who are now approaching 40 to 59 years of age, experienced the highest smoking prevalence rates. These women have not yet reached the age where the absolute excess deaths of smokers over nonsmokers are expected to become substantial (1). (c) Among successive cohorts of men and women, the age of peak smoking prevalence has declined. Among younger cohorts, the peak smoking prevalence rates are declining, although the effect is less marked for women. Men born between 1911 and 1920 reached a peak smoking prevalence of 71 percent during 1946 to 1948, while those born 1941 to 1950 reached a peak smoking prevalence of 58 percent in 1968 to 1969. Women born 1921 to 1930 reached a peak prevalence of 44 percent in 1958 to 1960, while those born in 1941 to 1950 reached a peak smoking prevalence of 41 percent in 1970 to 1973. (d) Among men born 1951 to 1960, the rate of increase of smoking prevalence was slower than in previous cohorts. This slowing of the diffusion of smoking practices was coincident with the increased publicity concerning the health risks of smoking and the relatively high rate of quitting smoking among adult males in the late 1960s. A similar effect is not clearly discernible for young women in this cohort. In both sexes, among individuals who are now approaching ages 20 to 29, the prevalence of smoking has apparently peaked. Smoking rates among men and women in this age group are now nearly indistinguishable.

Figure 5 depicts the mean age of starting regular smoking among successive birth cohorts, calculated from the same data as for Figures 3 and 4. The age of onset of smoking among women declined continuously during this century, to the point where it is nearly indistinguishable from that of men. As a re-

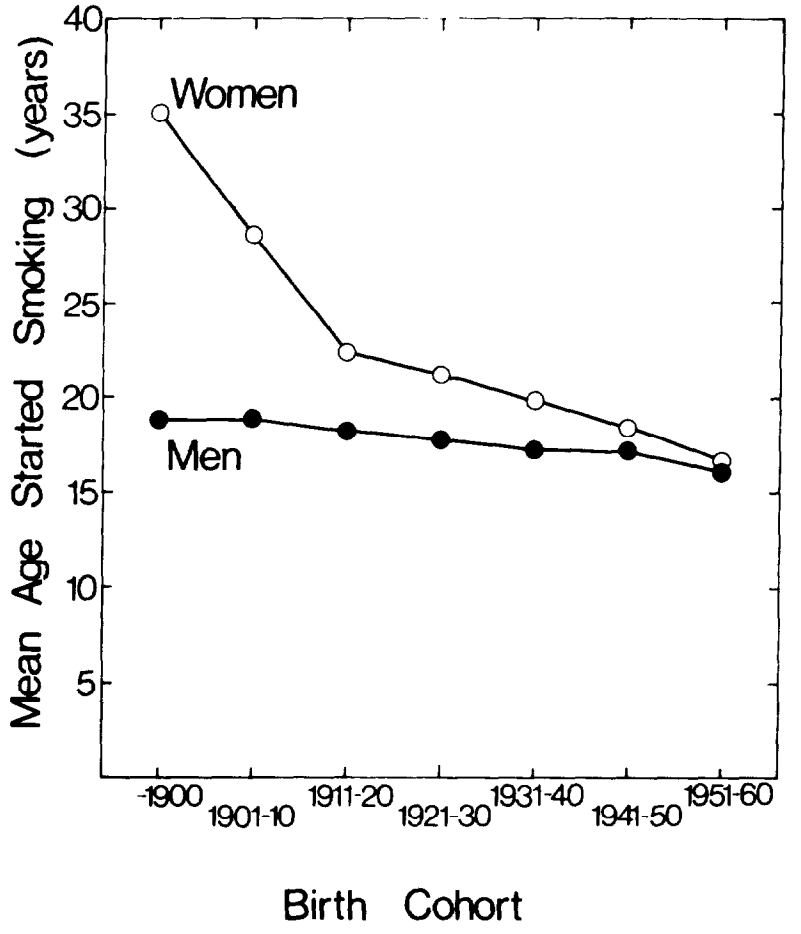

FIGURE 5.—Mean age of onset of regular smoking among successive birth cohorts of women and men

SOURCE: U.S. Department of Health, Education, and Welfare (60).

sult, each successive cohort of lifelong continuing women smokers will have an increasing number of years of exposure to cigarette smoke.

Figure 6 depicts the accumulated years of cigarette smoking per capita, up to 1978, for each birth cohort. These magnitudes correspond to the total areas under each cohort prevalence curve in Figures 3 and 4. Among women, individuals born 1911 to 1920 have thus far experienced the largest total exposure per capita. However, as seen from Figure 4, unless the smoking prevalence rates of women born during 1921 to 1940 decline more rapidly in the future, the lifetime exposure of these latter cohorts is likely to exceed that of the 1911 to 1920 cohort. It is not clear, however, whether the lifetime exposure of men born

from 1921 to 1940, now 50 to 69 years of age, will exceed that of previous generations. With each successive cohort, the ratio of female to male exposure increasingly approaches one.

As a result of the rapid diffusion of filtertip cigarettes after 1950 (Figure 1), each successive birth cohort was exposed to a different proportion of filtertip and nonfilter cigarettes. Details of the respondent's past history of cigarette brand use were not obtained in the 1978 Health Interview Survey. Such data, however, are available from a series of over 2,000 interviews of current and former smokers aged 21 years and over, conducted by the National Clearinghouse for Smoking and Health in 1975 (62). Figure 7 depicts, for the same birth cohorts, the proportion of lifetime years of smoking that represents filtertip cigarette use. (The birth dates of the youngest cohorts in Figures 6 and 7 do not match due to differences in survey date and eligible age group.) Among men, there is a distinct, monotonically increasing relation between the proportion of filtertip cigarette exposure and birth date. The corresponding relationship among women born before 1930 reflects their lower smoking cessation rates and, therefore, their continued use of filter cigarettes (62). A woman born in 1925, for example, who began smoking at age 21 (Figure 5), and who switched to filtertip cigarettes in 1957 (Figure 1), has now been smoking filtertip cigarettes for over two thirds of her smoking career and 40 percent of her entire life.

The prevalence of cigarette smoking, age of initiation, lifetime duration of smoking, and the extent of use of various types of cigarettes are not the only measures of cigarette smoke exposure among a particular population. Trends in depth of inhalation, fraction of cigarette actually smoked, and other dimensions of the style of smoking also affect smoke exposure. However, as discussed in the 1979 Surgeon General's Report (24), these are difficult to determine from survey data. In view of the concern over the accuracy of contemporaneous survey reports of daily cigarette consumption (65); past accounts of the time course of daily cigarette consumption would be difficult to assess accurately. Nevertheless, the evidence presented in the previous section is consistent with the conclusion that the average daily cigarette consumption among regular cigarette users has increased among each successive birth cohort.

Cigarette Smoking Among Young Women

The more marked decline in peak smoking prevalence among men born between 1951 and 1960, now approaching 20 to 29 years of age, reflected a slowing in the rate of initiation of smok-

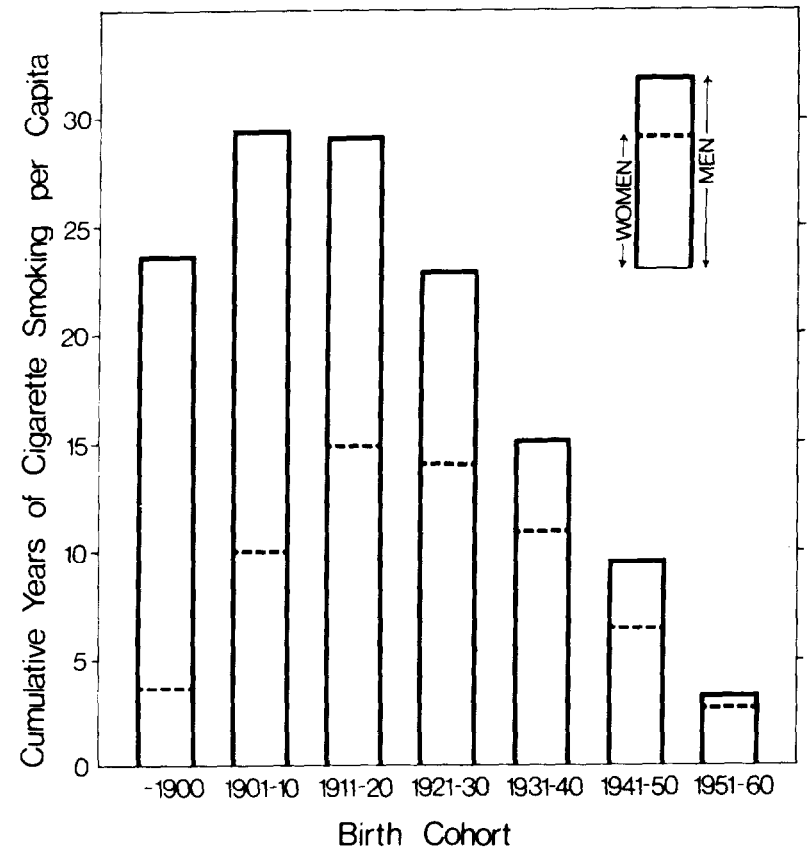

FIGURE 6.—Accumulated years of cigarette smoking per person among successive birth cohorts of women and men, 1978

SOURCE: U.S. Department of Health, Education, and Welfare (60).

ing that was not observed in women of the same age group. This trend appears to be continuing in the next birth cohort.

Table 5 reports the results of nation-wide surveys of teenage cigarette smoking during 1968 to 1979. The most recent survey, conducted by the National Institute of Education during late 1978 and early 1979, presents the preliminary results of over 2,600 telephone interviews of individuals aged 12 to 18 years. In this survey, but not in the others reported in Table 5, women and men 19 years of age were also interviewed. Otherwise, the survey sampling techniques and interview questions regarding smoking practices were the same for all the surveys. (See notes to Table 5).

The data in Table 5 support the conclusion that the rate of initiation of smoking among even the youngest men is declining,

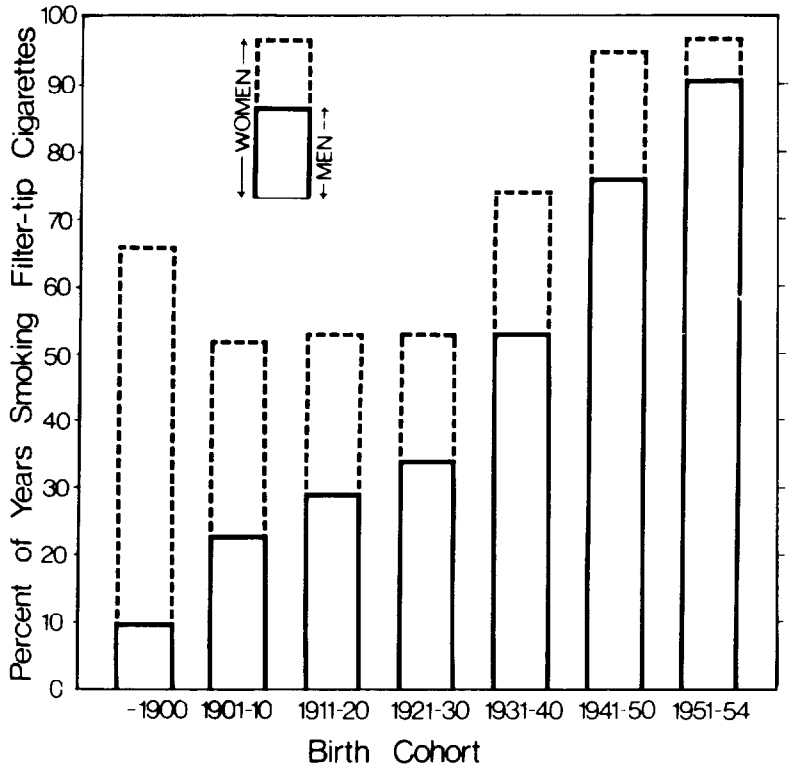

FIGURE 7.—Proportion of years smoking filtertip cigarettes among successive birth cohorts of women and men, 1975

Calculated from the results of over 2,000 smoking histories of men and women who had ever smoked, collected by National Clearinghouse for Smoking and Health.
SOURCE: U.S. Department of Health, Education, and Welfare (62).

an effect that is not present among young women. These results must be interpreted in light of sampling variability. (The absolute standard errors on the 1979 estimates for ages 15–16 and 17–18 are about 2 percent.) As in adult surveys, non-response biases must also be considered. Nevertheless, the findings in Table 5 are consistent with other nation-wide estimates of smoking rates among young women and men. The prevalence of current regular smoking among respondents 17 to 19 years of age in this survey was 28.1 percent for females and 22.8 percent for males. The comparable rates for women and men aged 17 to 19 from the Health Interview Survey were 29.2 percent and 27.5 percent, respectively. An analysis of the growth of smoking prevalence among this group, performed in the same manner as

TABLE 5.—Estimated percentage of current, regular cigarette smokers, ages 12–18, United States, 1968–1979

Year	Ages 12–14	Ages 15–16	Ages 17–18
Females			
1968	0.6	9.6	18.6
1970	3.0	14.4	22.8
1972	2.8	16.3	25.3
1974	4.9	20.2	25.9
1979	4.4	11.8	26.2
Males			
1968	2.9	17.0	30.2
1970	5.7	19.5	37.3
1972	4.6	17.8	30.2
1974	4.2	18.1	31.0
1979	3.2	13.5	19.3

Nation-wide surveys performed by National Clearinghouse for Smoking and Health, 1968–1974, and National Institute of Education, 1979. Current regular smokers in all surveys include all those who smoke cigarettes at least weekly. In 1979, approximately 90 percent of current regular smokers used cigarettes on a daily basis. For 1979 only, 29.7 percent males and 31.9 percent females, aged 19, were reported as regular smokers.

SOURCE: U.S. Department of Health, Education, and Welfare (63).

that of Figures 3 and 4, suggested that smoking rates among this group of women grew rapidly and exceeded those of men by 1975. The future smoking habits of this generation of young women cannot be accurately predicted.

Smoking among adolescent women is discussed in greater detail in the chapter entitled "Psychosocial and Behavioral Aspects of Smoking in Women" in this Report.

Summary

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.

References

(1) ADAMS, E.E. Mortality. In: Smoking and Health. A Report of the Surgeon General. U.S. Department of Health, Education, and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health, January 1979, pp. 2-1 to 2-47.

(2) ADVERTISING & SELLING. Marlboro makes a direct appeal. Advertising and Selling 8:25, March 23, 1927.

(3) AMERICAN INSTITUTE OF PUBLIC OPINION (GALLUP). The Gallup Opinion Index, September 1970, July 1971, July 1972, June 1978.

(4) AMERICAN INSTITUTE OF PUBLIC OPINION (GALLUP). The Gallup Poll Public Opinion, 1935-1971 Series, pp. 477-1501; 1972-1977 Series, pp. 274-1203.

(5) BAIN, J., JR., WERNER, C. Cigarettes in Fact and Fancy. Boston, H.M. Caldwell Co., 1906.

(6) BONNER, L. Why cigarette makers don't advertise to women. Advertising & Selling 7: 21, October 20, 1926.

(7) BURBANK, F. U.S. lung cancer death rates begin to rise proportionately more rapidly for females than for males: a dose-response effect? Journal of Chronic Diseases 25: 473-479, 1972.

(8) CAIRNS, J. The cancer problem. Scientific American 233(5): 64-78, November 1975.

(9) CONOVER, A.G. Discussion of Elmo Jackson's paper. Journal of Farm Economics 32(4, Part 2): 923-924, November 1950.

(10) CONSUMERS UNION. Cigarette smoking and lung cancer. Consumer Reports 19: 54-92, February 1954.

(11) COWELL, M.J., HIRST, B.L. Mortality Differences Between Smokers and Nonsmokers. Worcester, Massachusetts, State Mutual Life Insurance Company of America, October 22, 1979.

(12) FORTUNE MAGAZINE. The Fortune survey. III. Cigarettes. 12(1): 68, 111-116, July 1935.

(13) GOTTSEGEN, J.J. Tobacco. A Study of Its Consumption in the United States. New York, Pitman Publishing Corp., 1940.

(14) GRAHAM, E.A. Primary cancer of the lung with special consideration of its etiology. Bulletin of the New York Academy of Medicine 27(5): 261-276, May 1951.

(15) HAENSZEL, W., SHIMKIN, M.B. Smoking patterns and epidemiology of lung cancer in the United States: are they compatible? Journal of the National Cancer Institute 16(6): 1417-1441, June 1956.

(16) HAENSZEL, W. SHIMKIN, M.B., MILLER, H.P. Tobacco Smoking Patterns in the United States. U.S. Department of Health, Education, and Welfare, Public Health Service, Monograph No. 45, 1956.

(17) HAMMOND, E.C. Life expectancy of American men in relation to their smoking habits. Journal of the National Cancer Institute 43(4): 951-962, October 1969.

(18) HAMMOND, E.C. Smoking in Relation to the Death Rates of One Million Men and Women. National Cancer Institute Monograph 19: 127-204, January 1966.

(19) HAMMOND, E.C., GARFINKEL, L. Changes in cigarette smoking. Journal of the National Cancer Institute 33: 49–64, 1964.
(20) HAMMOND, E.C., GARFINKEL, L. Changes in cigarette smoking 1959–1965. American Journal of Public Health 58(1): 30–45, January 1968.
(21) HAMMOND, E.C., GARFINKEL, L. Influence of Health on Smoking Habits. National Cancer Institute Monograph 19: 269–285. January 1966.
(22) HAMMOND, E.C., GARFINKEL, L. Smoking habits of men and women. Journal of the National Cancer Institute 27: 419–442, 1961.
(23) HAMMOND, E.C., HORN, D. The relationship between human smoking habits and death rates. Journal of the American Medical Association 155: 1316–1328, 1954.
(24) HARRIS, J.E. Cigarette Smoking in the United States,1950–1978. In: Smoking and Health, A Report of the Surgeon General. U.S. Department of Health, Education, and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health, January 1979, pp. A1–A29.
(25) HARRIS, J.E. Public policy issues in the promotion of less hazardous cigarettes. In: A Safe Cigarette? Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, 1980, pp. 333–340.
(26) HOOVER, I.H. Hail to the chief. Saturday Evening Post, May 5, 1934.
(27) IPPOLITO, R.A., MURPHY, R.D., SANT, D. Staff Report on Consumer Responses to Cigarette Health Information. U.S. Federal Trade Commission, Bureau of Economics, August 1979.
(28) JACKSON, E.L. The Consumption of Tobacco Products: A Descriptive Economic Analysis, United States 1900–1940. Doctoral Dissertation, Harvard University, Cambridge, Massachusetts, 1942.
(29) JACKSON, E.L. Trends in the consumption of tobacco products, United States, 1900–1950. Journal of Farm Economics 32(4, Part 2): 881–893, November 1950.
(30) KIRCHOFF, H., RIGDON, R.H. Smoking habits of 21,612 individuals in Texas. Journal of the National Cancer Institute 16(5): 1287–1304, April 1956.
(31) LEWINE, H. Good-Bye to All That. New York, McGraw-Hill Book Co., 1970.
(32) LEY, H.A., Jr. The incidence of smoking and drinking among 10,000 examinees. Proceedings of the Life Extension Examiners 2: 57–63, 1940.
(33) LIEB, C.W. Can the poisons in cigarettes be avoided? Reader's Digest 63: 45–47, December 1953.
(34) MILLER, L.M., MONAHAN, J. The facts behind the cigarette controversy. Reader's Digest 65: 1–6, July 1954.
(35) MILLS, C.A. Tobacco smoking: some hints of its biological hazards. Ohio Medical Journal 46: 1165–1170, 1950.
(36) MILLS, C.A., PORTER, M.M. Tobacco smoking habits in an American city. Journal of the National Cancer Institute 13: 1283–1297, April 1953.
(37) MILWAUKEE JOURNAL. Consolidated Consumer Analysis. Milwaukee Journal, 1947–1969.
(38) MILWAUKEE JOURNAL. Consumer Analysis of the Greater Milwaukee Market. Milwaukee Journal, 1924–1979.
(39) NICHOLLS, W.H. Price Policies in the Cigarette Industry. Nashville, Tennessee, Vanderbilt University Press, 1951.
(40) NORR, R. Cancer by the carton. Reader's Digest 61: 7–8, December 1952.

(41) PEARL, R. Tobacco smoking and longevity. Science 87(2253): 216–217, March 4, 1938.

(42) PORTER, E.O. The cigarette in the United States. Southwestern Social Science Quarterly 28: 64–75, June 1947.

(43) PRINTERS' INK. Blow some more my way. Printers' Ink 159(2): 20, April 14, 1932.

(44) PRINTERS' INK. Women and cigarettes. Printers' Ink 158(7): 25–27, February 18, 1932.

(45) ROGOT, E. Smoking and mortality among U.S. veterans. Journal of Chronic Diseases 27: 189–203, 1974.

(46) ROYAL COLLEGE OF PHYSICIANS OF LONDON. Smoking or Health. Kent, England, Pitman Medical Publishing Co., Ltd., 1977.

(47) SALES MANAGEMENT. How critical are men of women who smoke and drink? Sales Management 41(6): 36, September 15, 1937.

(48) TENNANT, R.B. The American Cigarette Industry. New Haven, Connecticut, Yale University Press, 1950.

(49) TOBACCO RESEARCH COUNCIL. Statistics of Smoking in the United Kingdom. In: Todd, G.F. (Editor). Research Paper No. 1, 1972, and Supplements 1973–1975.

(50) U.S. DEPARTMENT OF AGRICULTURE, ECONOMIC RESEARCH SERVICE. Tobacco Situation, various issues.

(51) U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS. Historical Statistics of the United States, Colonial Times to the Present, 1975.

(52) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE. Smoking and Health, Report of the Advisory Committee to the Surgeon General of the Public Health Service, Public Health Service. Publication No. 1103, 1964, 387 pp.

(55) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Changes in cigarette consumption between June 1966 and August 1968. Monthly Vital Statistics Report 19(9, Supplement): December 16, 1970.

(54) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Changes in cigarette smoking and current smoking practices among adults: United States, 1978. Advance Data From Vital and Health Statistics No. 52: 1–16, September 19, 1979.

(55) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Changes in Cigarette Smoking Habits Between 1955 and 1966. Vital and Health Statistics, Series 10, Number 59, April 1970.

(56) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Characteristics of Persons with Hypertension. Vital and Health Statistics, Series 10, Number 121, December 1978.

(57) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Cigarette Smoking Status—June 1966, August 1967, and August 1968. Monthly Vital Statistics Report 18(9, Supplement): 1–4, December 5, 1969.

(58) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Cigarette Smoking: United States, 1970. Monthly Vital Statistics Report 21(3, Supplement): 1–8, June 2, 1972.

(59) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Current Estimates from the Health Interview Survey, United States–1976. Vital and Health Statistics, Series 10, Number 119, November 1977.

(60) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. (Unpublished data)

(61) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE. NATIONAL CLEARINGHOUSE FOR SMOKING AND HEALTH. Adult Use of Tobacco, 1970. June 1973.

(62) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CLEARINGHOUSE FOR SMOKING AND HEALTH. Adult Use of Tobacco 1975. 1976.

(63) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CLEARINGHOUSE FOR SMOKING AND HEALTH. Patterns and Prevalence of Teenage Cigarette Smoking: 1968, 1970, and 1974. July 1974.

(64) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CLEARINGHOUSE FOR SMOKING AND HEALTH. Use of Tobacco, Practices, Attitudes, Knowledge, and Beliefs, United States, Fall 1964 and Spring 1966. July 1969.

(65) WARNER, K. E. Possible increases in the underreporting of cigarette consumption. Journal of the American Statistical Association 73(362): 314–318, June 1978.

(66) WESSEL, C.A. The first sixty billions are the hardest for the cigarette industry. Printers' Ink 120(5): 3–6, 137–146, January 31, 1924.

(67) WHITTEN, I.T. Brand Performance in the Cigarette Industry and the Advantage of Early Entry, 1913–74. U.S. Federal Trade Commission, June 1979.