CIGARETTE SMOKING AMONG WOMEN AND MEN IN THE UNITED STATES, 1900-1979*

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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 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 other 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 (26), 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 (44, 50), 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 (52).

[INSERT FIGURE 1 ABOUT HERE.]

A continuous, nationally representative series of smoking prevalence rates during the period 1900-1950 is not publicly available. Nevertheless, numerous sources can be pieced together 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 (40). 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 (40).

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
Figure 1. Annual consumption of cigarettes and filtertip cigarettes per person aged 18 years and over, 1900-1979.

Source: U.S. Department of Agriculture (52). 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.
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 (41,50,69). 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 (41,50,69). 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 (30,31).

Cigarettes continued to dominate other forms of tobacco among male smokers throughout the 1920's and 1930's. 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 (40).

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 (31), typically for free or at low cost (41), 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 1949, 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 (39).

[INSERT FIGURE 2 ABOUT HERE.]

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." (15, p. 149). By 1906, American "girl stenographers" were reported smoking cigarettes clandestinely (5, p. 181). By 1919, some younger women in New York were reported smoking at dinner parties "with a trace of defiance" (New York Times, March 16, 1919, cited in (52)). By 1922, New York women were smoking openly on the streets and in bus tops (10).

The first advertisement showing a woman smoking was Lorillard's 1919 publicity for Helmar cigarettes (46,50). 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
Figure 2. Percentage of adult current cigarette smokers in the greater Milwaukee area, 1924-1979.

Source: Milwaukee Journal consumer analyses (40). 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?" while all respondents were asked, "Do any women in your family 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?" Data for women from 1976 to 1979 (open circles) represent filter tip cigarette smokers only. All percentages reflect adults aged 18 years and over.
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." (33, pp. 58-61; 43, pp 58-59; 50, p. 149). In 1934, Eleanor Roosevelt smoked cigarettes publicly (28). By 1940, handbags and cosmetic compacts were typically designed to hold cigarettes (17).

Although the Milwaukee Journal (40) 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 (68). Moody's Investors Service estimated that women smoked 12 percent of cigarettes in 1929 (45). The average daily consumption of women smokers, as compared to men smokers, is not documented for this 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 daily consumption totalled 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 (53), 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 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 1930-40, Ley (34) 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 (14), reported that 52.5 percent of adult men and 18.1 percent of adult women smoked cigarettes. (See Table 1 below.) 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 (49).
After 1940, women's smoking rates accelerated, as new generations of women, particularly younger women in urban areas, entered the labor force (See also the chapter "Occupation and Environment" in this Report). In 1944, the Gallup Poll reported 48 percent adult male smokers and 36 percent adult female smokers (3). In 1949, the Gallup findings were 54 percent male and 33 percent female (3). Local consumer surveys of urban areas in 1948 (39) 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. Conover (11), 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.

Although the differential growth of cigarette use among various socio-economic 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 (40) noted 58 percent male smokers with monthly rent over $50 and 75 percent male smokers with rent under $30 per month. Among women, the corresponding proportions were 32 and 37 percent respectively. In Mills and Porter's 1947 survey of Columbus, Ohio (38), 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 (38)). Kirchoff and Rigdon (32), in a survey of over 21,000 patients, visitors, and employees of hospitals in Houston and Galveston, noted that 63.2 percent white male, 33.4 percent white females, 66.3 percent black males, and 32.2 percent black females smoked cigarettes.

All of the above findings reinforce the conclusion that the onset of widespread cigarette use among women lagged 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 (10,48,51).
The Emergence of Filtertip Cigarettes: 1951-1963

As shown in Figure 1, total per capita consumption of cigarettes declined during 1953-54. This decline was coincident with the appearance in the popular press of reports seriously suggesting a link between cigarette smoking and lung cancer (12, 35, 36, 42). 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 (52).

The transient decline during 1953-54 in the number of cigarettes consumed was not clearly matched by a decrease in the proportion of cigarette smokers (29). 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 (39).

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 (39). In a nation-wide 1964 survey reported by the National Clearinghouse for Smoking and Health (62), 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 value 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 (54). Per capita consumption continued to decline during the subsequent period of increased publicity concerning the health hazards of smoking (26,29). Since 1975, per capita consumption has declined at an average rate of 1.4 percent annually. 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 (14) and the supplement to the Current Population Survey in 1955 (18), 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 (3,4,55,57,58,62,63,65), revealing very similar trends in the prevalence of smoking, were described in the 1979 Surgeon General's Report (26).

[INSERT TABLE 1 ABOUT HERE.]

Among adult males, the prevalence of regular cigarette use has declined continuously since 1965, with more marked decreases in the intervals 1965-70 and 1976-78. (The absolute standard errors for National Center for Health

<table>
<thead>
<tr>
<th>Year</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>1935</td>
<td>18.1</td>
<td>52.5</td>
</tr>
<tr>
<td>1955</td>
<td>24.5</td>
<td>52.6</td>
</tr>
<tr>
<td>1965</td>
<td>33.3</td>
<td>51.1</td>
</tr>
<tr>
<td>1970</td>
<td>31.1</td>
<td>43.5</td>
</tr>
<tr>
<td>1974</td>
<td>31.9</td>
<td>42.7</td>
</tr>
<tr>
<td>1976</td>
<td>32.0</td>
<td>41.9</td>
</tr>
<tr>
<td>1978</td>
<td>29.9</td>
<td>37.0</td>
</tr>
<tr>
<td>1979</td>
<td>28.2</td>
<td>36.9</td>
</tr>
</tbody>
</table>

Source: (14,18,56,58-61).
Data for 1978 are revisions of preliminary estimates reported in (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 yrs 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.
Statistics 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 1976-79, 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.)

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 1964-79 do not closely match these national estimates, Figure 2 does show a marked decline in smoking rates for both sexes during 1964-1970, a deceleration in the decline of smoking prevalence during 1971-75,
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 (26). Column (i) of Table 2 presents estimates of the percentage of recent smokers who made a "fairly serious attempt to quit" 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 1978-79. 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

<table>
<thead>
<tr>
<th></th>
<th>(i) Percent of All Recent Smokers Who Attempted to Quit in Past Year</th>
<th>(ii) Percent of Smokers Attempting to Quit in Past Year Who Reported Successfully Quitting</th>
<th>(iii) Percent of All Recent Smokers Who Reported Successfully Quitting in Past Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>40.8</td>
<td>21.3</td>
<td>8.7</td>
</tr>
<tr>
<td>1975</td>
<td>30.2</td>
<td>19.5</td>
<td>5.9</td>
</tr>
<tr>
<td>1978</td>
<td>32.7</td>
<td>18.8</td>
<td>6.2</td>
</tr>
<tr>
<td>1979</td>
<td>32.4</td>
<td>21.6</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>Men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>44.4</td>
<td>26.4</td>
<td>11.7</td>
</tr>
<tr>
<td>1975</td>
<td>28.3</td>
<td>20.1</td>
<td>5.7</td>
</tr>
<tr>
<td>1978</td>
<td>29.1</td>
<td>21.5</td>
<td>6.3</td>
</tr>
<tr>
<td>1979</td>
<td>31.4</td>
<td>21.3</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Source: 1970 and 1975 data from surveys of persons aged 21 years and over, conducted by National Clearinghouse for Smoking and Health (63,65). 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 (61). 1979 data are preliminary estimates based upon interviews during January - June of that year.
percent of women and 2.9 percent of men in 1970 to 38.5 percent of women and 28.1 percent of men 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.

[INSERT TABLE 3 ABOUT HERE.]

At the same time, the average daily cigarette consumption of adult smokers has increased. Table 4 shows recent changes in the distribution of daily cigarette consumption among current smokers. These data must be interpreted in light of possible underreporting biases (67) and, in particular, a strong tendency for respondents to round off their reported daily consumption to one pack. Nevertheless, the percentage 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.)

[INSERT TABLE 4 ABOUT HERE.]

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 (40). In 1934, male smokers in Milwaukee consumed an average of 13.4 cigarettes per day, while women smokers
**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.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Less Than 5.0 mg</th>
<th>5.0 to 9.9 mg</th>
<th>10.0 to 14.9 mg</th>
<th>15.0 to 19.9 mg</th>
<th>20.0 mg or More</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>0.7</td>
<td>2.0</td>
<td>6.8</td>
<td>67.1</td>
<td>23.4</td>
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<tr>
<td>1975</td>
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<td>15.0</td>
<td>75.1</td>
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<td>1978</td>
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<td>8.8</td>
<td>21.1</td>
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<td>1979</td>
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<td>Men</td>
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<td>1970</td>
<td>0.2</td>
<td>0.9</td>
<td>1.8</td>
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<td>1975</td>
<td>0.6</td>
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<td>19.2</td>
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<tr>
<td>1978</td>
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<td>8.5</td>
<td>17.0</td>
<td>60.1</td>
<td>11.8</td>
</tr>
</tbody>
</table>

Source: National Clearinghouse for Smoking and Health (63,65), National Center for Health Statistics (61). 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.
TABLE 4 - ESTIMATED PERCENTAGE DISTRIBUTION OF ADULT CURRENT CIGARETTE SMOKERS ACCORDING TO REPORTED DAILY CONSUMPTION FREQUENCY, UNITED STATES, 1965 - 1979.

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent Smoking Less Than 15 Cigarettes per Day</th>
<th>Percent Smoking 25 Cigarettes or More per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>44.5</td>
<td>13.7</td>
</tr>
<tr>
<td>1970</td>
<td>39.1</td>
<td>18.0</td>
</tr>
<tr>
<td>1974</td>
<td>38.7</td>
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<td>1976</td>
<td>36.5</td>
<td>19.6</td>
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<td>1979</td>
<td>34.6</td>
<td>22.4</td>
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<tr>
<td>Males</td>
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</tr>
<tr>
<td>1965</td>
<td>29.6</td>
<td>24.5</td>
</tr>
<tr>
<td>1970</td>
<td>27.8</td>
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</tr>
<tr>
<td>1979</td>
<td>26.4</td>
<td>32.2</td>
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</tbody>
</table>

Source: (26,56,58-61). 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.
consumed 7 per day (40). If cigarette consumption in 1935 was 1,564 per adult (Figure 1 and (52)), and if the overall percentage of adult smokers was 37.3 percent (14), 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 (18), 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.

Moreover, numerous epidemiological studies and other surveys performed during the period 1950-65 have shown that for both sexes, especially for women, the proportion of heavy smokers was larger among the younger age groups (16,18,21,22,24,32,38,62,63). These findings applied to current daily cigarette consumption and lifetime maximum daily 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 (27). 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 (26). 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 (9,29,17).) 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 (17,18). However, the significantly higher mortality rates of continuing smokers, as compared to nonsmokers or former smokers (1,13,19,20,43,47,48,54), 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 (13), a male
cigarette smoker at age 32 has an estimated 25 percent probability of surviving to age 80, as compared to 49 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 (1, 19, 47), 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 1911-20 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 (19, 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
Figure 3. Changes in the prevalence of cigarette smoking among successive birth cohorts of men, 1900-1978.

Source: 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.
Figure 4. Changes in the prevalence of cigarette smoking among successive birth cohorts of women, 1900-1978.

Source: 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.
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 (14,16-18,21-25,32,37,38,56).

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 approaching 70 years old. (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 1946-48, while those born 1941 to 1950 reached a peak smoking prevalence of 58 percent in 1968-69. Women born 1921-30 reached a peak prevalence of 44 percent in 1958-60.
while those born in 1941-50 reached a peak smoking prevalence of 41 percent in 1970-73. (d) Among men born 1951-60, 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 cessation among adult males in the late 1960's. A similar effect is not clearly discernible for young women in this cohort. In both sexes, who are now approaching ages 20-29, 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 continuously declined during this century, to the point where it is nearly indistinguishable from that of men. As a result, each successive cohort of lifelong continuing women smokers will have an increasing number of years of exposure to cigarette smoke.

[INSERT FIGURE 5 ABOUT HERE.]

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 1911-20 have thus far experienced the
Figure 5. Mean age of onset of regular smoking among successive birth cohorts of women and men.
Source: See notes to Figures 3 and 4.
largest total exposure per capita. However, as seen from Figure 4, unless the smoking prevalence rates of women born during 1921-40 decline more rapidly in the future, the lifetime exposure of these latter cohorts is likely to exceed that of the 1911-20 cohort. It is not clear, however, whether the lifetime exposure of men born 1921-40, now 50 to 69 years of age, will exceed that of previous generations. With each successive cohort, the ratio of female to male exposure approaches one.

[INSERT FIGURE 6 ABOUT HERE.]

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 (65). Figure 7 depicts the proportion of years smoking filtertip cigarettes among comparable birth cohorts. (The youngest birth cohorts necessarily differ.) 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,
Figure 6. Accumulated years of cigarette smoking per person among successive birth cohorts of women and men, 1978.
Source: See notes to Figures 3 and 4.
their continued use of filter cigarettes (65). 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. As discussed in the 1979 Surgeon General's Report (26), these are difficult to determine from survey data. In view of the concern over the accuracy of contemporaneous survey reports of smoking frequency (67), past accounts of the time course of cigarette smoking frequency would be difficult to assess accurately. Nevertheless, the evidence presented in the previous section is consistent with the conclusion that the average cigarette consumption frequency among regular cigarette users has increased among each successive birth cohort.
Figure 7. Proportion of years smoking filtertip cigarettes among successive birth cohorts of women and men, 1975.

Source: 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 (65).
Cigarette Smoking Among Young Women

The more marked decline in peak smoking prevalence among men born 1951-60, now approaching 20 to 29 years of age, reflected a slowing in the rate of initiation of smoking that was not observed in women of the same age group. This trend appears to be continuing into 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, represents the preliminary results of over 2,600 telephone interviews of individuals aged 12 to 18 years. In this recent survey, but not in previous surveys reported in Table 5, women and men 19 years of age were also interviewed. Otherwise, the survey sampling techniques and interview questions eliciting smoking practices remained unchanged from previous years. (See notes to Table 5.)

The findings in Table 5 confirm the conclusion that the rate of initiation of smoking among even the youngest men is declining, an effect that is not present among young women. These results must be interpreted in light of sampling variability. (The absolute standard errors of 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
TABLE 5 - ESTIMATED PERCENTAGE OF CURRENT, REGULAR CIGARETTE SMOKERS, AGES 12 - 18, UNITED STATES, 1968 - 1979

<table>
<thead>
<tr>
<th>Year</th>
<th>Ages 12-14</th>
<th>Ages 15-16</th>
<th>Ages 17-18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>0.6</td>
<td>9.6</td>
<td>18.6</td>
</tr>
<tr>
<td>1970</td>
<td>3.0</td>
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<td>22.8</td>
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<td>1972</td>
<td>2.6</td>
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<td>25.3</td>
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<td>20.2</td>
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<td>1979</td>
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<td>11.8</td>
<td>26.2</td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>2.9</td>
<td>17.0</td>
<td>30.2</td>
</tr>
<tr>
<td>1970</td>
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<tr>
<td>1979</td>
<td>3.2</td>
<td>13.5</td>
<td>19.3</td>
</tr>
</tbody>
</table>

Source: Nation-wide surveys performed by National Clearinghouse for Smoking and Health, 1968-1974 (64), and National Institute of Education, 1979. Current regular smoker in all surveys includes 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.
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 17-19 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 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 teenage women is taken up in greater detail in the chapter entitled "Psychosocial and Behavioral Aspects of Smoking in Women" in this Report.

[INSERT TABLE 5 ABOUT HERE.]
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 1949, 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.


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 1978-79. 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 nonfilter 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 teenage smoking habits reveal that by ages 17 to 19, women exceed men in smoking prevalence. 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


(2) ADVERTISING & SELLING. Marlboro Makes a Direct Appeal. 8:25, March 23, 1927.


(6) BONNER, L. Why Cigarette Makers Don't Advertise to Women. Advertising & Selling. 7: 21, October 20, 1926.


(27) HARRIS, J.E. Public Policy Issues in the Promotion of

(28) HOOVER, I.H. Hail to the Chief. Saturday Evening Post. May 5, 1934.


(42) NORR, R. Cancer by the Carton. Reader's Digest. 61:7-8, December 1952.


(48) ROYAL COLLEGE OF PHYSICIANS OF LONDON. Smoking or

(49) SALES MANAGEMENT. How Critical are Men of Women who Smoke and Drink? 41(6):36, September 15, 1937.


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


(56) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH


(61) U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, NATIONAL CENTER FOR HEALTH STATISTICS. Changes in Cigarette Smoking and Current Smoking


(68) WESSEL, C.A. The First Sixty Billions Are the Hardest for the Cigarette Industry. Printers' Ink.
126(5):3-6, 137-146, January 31, 1924.
